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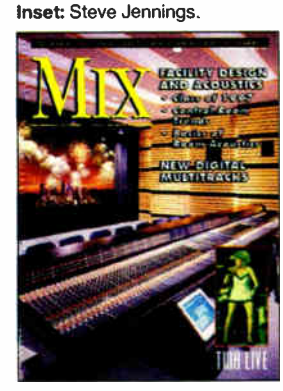
Cover: Creative Cafe, a joint venture between Academy Award-winning sound designer Stephen Hunter Flick, EFX's Rick Stevens and Richard d'Abo, opened in early summer in the former Pathe Film building on Wilshire in L.A. The three dub stages and ADR-Foley stage were all redesigned by Peter Grueneisen of studio bau:ton. Stage B, shown here, features a fully automated Harrison MPC with 288 inputs. Monitoring is custom JBL, and the facility has more than 500 tracks available on Fairlight DaD and MFX3+ machines linked to Doremi Labs V1 nonlinear video machines. **Photo:** Ed Freeman. **Inset:** Steve Jennings.



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CR1604

More professionals channel their creativity through

When you page through this magazine, you're going to see a multitude of ads for compact mixers. Some of the mixers look a lot like our CR1604-VLZ™. Heck, even some of the ads for other 16-channel mixers look a lot like Mackie ads[1].

Pretty soon, you may start to wonder how much difference there really is between all the various mixer makes and models.

Naturally, we're going to tell you that there's a VAST difference between the CR1604-VLZ™ and other 16-channel mixers[2].

[1] Dense, fine print type. Lots of lines and arrows pointing to features. Textured backgrounds.

[2] There ARE vast differences too numerous to mention without resorting to dense, fine print...with textured backgrounds.

But luckily, you don't have to take our word for it. One of the best, unbiased benchmarks of mixer performance is who uses it. And that's where the CR1604-VLZ™ blows the competition in the weeds. We're the overwhelming choice of professionals who can afford any mixer they want. And who have taken the time to listen to every mixer on the market.

Send for our thick, color tabloid brochure[1] and we'll include a comprehensive list of distinguished CR1604-VLZ™ users. It includes familiar names like the Tonight Show, The Late Show and Saturday Night Live bands, The Presidents of the United States of America, Ronnie Montrose, Microsoft®,

A short Grant Reeves bio: Music for Sony, U.S. Navy, Anheiser Busch, Apple, Fujitsu, Hewlett-Packard, Hitachi Data Systems, NASA, Siemens, UNISYS, United Way, Airborne Express, LSI Logic, McKesson Health Systems, Pyramid, Las Vegas Chamber of Commerce, Austin Chamber of Commerce, Applied Materials, Weyerhauser, KIRO TV, KICU TV, KMPG Peat Marwick, among others. Six Gold Tellys, Joeys and other industry awards. For more information, log onto www.GrantReeves.com.

[3] Mention in this ad is intended only to denote useage or ownership as reported to Mackie Designs. Mention is in no way intended to represent a specific or implied endorsement by the individuals, groups, programs or production companies listed.

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CR1604-VLZs than through any other 16-channel mixer.

sound design wizard Frank Serafine, Jet Propulsion Labs and all four national TV networks[3].

■ The list also includes a lot of folks you may not have heard of... a huge group of pros who make their living creating music for ads, documentaries, corporate videos and multimedia. Real live, bonafied electronic musicians like Grant Reeves, shown below with his CR1604-VLZ™, sequencer and air guitar.

■ Bottom line, part one: Everything you track and mix down goes through your mixer. It needs the low noise floor, maximum mix headroom, pristine microphone preamps, and musical, natural EQ for which Mackie is renowned.

■ Bottom line, part two: You spend more session time in front of your mixer than you do with any other single component in your studio. You want a console that's intuitive, flexible and easy to use... for thousands upon thousands of hours. Ask somebody who owns a Mackie CR1604-VLZ™ and one of the first things they'll probably mention are the "little things," the myriad small details that make the mixer a joy to work with.

■ Then visit your nearest Mackie Dealer and start channeling your creative impulses through a real CR1604-VLZ™.

One of the six industry awards won by the CR1604-VLZ.

No way were we going to get this ad past Greg Mackie without at least SOME informative fine print. First, the CR1604-VLZ basics: 16 x 4 x 2 configuration with 16 mic and 16 line inputs ■ 16 inserts & 8 direct outs ■ 6 aux sends per channel ■ 2 master aux sends & 4 aux returns ■ 4-band EQ with wide sweepable midrange ■ AFL/ PFL solo ■ Large emitter geometry discret mic preamps. There's more! Here's a list of CR1604-VLZ features and components NOT found on other comparably-priced 16-channel mixers. ■ Unique multi-way rotating input/output pod ■ In-place stereo solo ■ Constant- loudness pan pots ■ UnityPlus gain structure for easy level setting, low noise and high headroom ■ Negative gain mix amp architecture to handle 16 simultaneous HOT inputs without distortion ■ Wideband sweepable midrange EQ ■ Sharp, 18dB/octave low cut filters on every channel ■ RUDE solo light ■ Control Room/Phone source matrix ■ Effects To Monitors on Aux Returns 1 & 2 ■ True logarithmic-taper 60mm faders ■ Balanced inputs & outputs (except headphone, tape in/outs, and direct outs) ■ Comprehensive, easy-to-read manual.

Below: a few of the 400+ folks and one incontinent Chihuahua (not shown) who work at Mackie Designs in Woodinville, WA, 20 miles northeast of Seattle.

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FROM THE EDITOR

NOT JUST A LAW, BUT A GOOD IDEA

The speed of sound is 1,087 feet/second—at least in dry air at 0°C. But at the more temperate 20°C found in typical studios, it clocks in at about 1,127 feet/second, or 1.127 feet/millisecond. Although the basic tenets of acoustics and the physics of sound are not difficult to understand, I continually hear about audio engineers who think the physical laws of nature don't apply to them.

For example, acoustical foam is a lightweight, fairly inexpensive material that—if used correctly—can be effective at absorbing sound by controlling reflections and providing absorption of higher frequencies. At 1,127 ft/sec, a 50Hz wave is nearly 25 feet long, so there's little reason to expect a 2-inch thickness of foam to be effective in countering a massive onslaught of LF energy. Yet every day, someone somewhere blankets a room with foam in the (false) hopes of achieving soundproofing. And if sound leakage into adjacent areas really is *the* problem, then this foam (or carpet-on-the-walls) approach will only make the situation worse. In a space where the high frequencies that enhance intelligibility and detail are absorbed, the musicians within that space will increase their instrumental level to be heard by the other players, which only makes the sound leakage problems worse. But in that case, don't blame the foam—used in the wrong application, it doesn't work, just as a 2-inch dome tweeter is a poor choice as a subwoofer.

In another case, an engineer places a reference monitor on a console top, thinking such near-field placement automatically removes the room acoustics. However, assuming the monitor is placed three feet (3.4 ms) from the listener, the pathway of the first reflection (bouncing off the console and then heard by the listener) is approximately five feet away, for a delay time of 5.6 ms. The difference between the two—2.2 ms—is enough to cause phase cancellation in the range of 250 Hz. Here, some acoustical experimentation—simply moving the monitor a few inches higher and changing its angle slightly, to reduce console reflections—could make a major improvement in the monitoring system, at no cost.

Obviously, a little acoustical knowledge goes a long way, and our annual facility design issue has plenty to offer. David Schwind of Charles Salter Associates presents some of the basics of room acoustics with numerous case studies; Bob Hodas tests RPG's B.A.S.S. Trap system; Mark Frink looks at venue designs from the standpoint of the live engineer; Mel Lambert interviews master acoustician (and AES president) Elizabeth Cohen; "The Class of '97" presents our annual look into some of the industry's hottest new rooms; and *Mix* founder David Schwartz talks to TEC Award-nominated studio designers about control room design. Speaking of the Technical Excellence & Creativity Awards, subscribers will find a ballot with their issues—check out the voting guide on page 144 and do your part in selecting our industry's best and brightest.

We're counting on you,

George Petersen

BPA INTERNATIONAL SPARS ABP American Business Press

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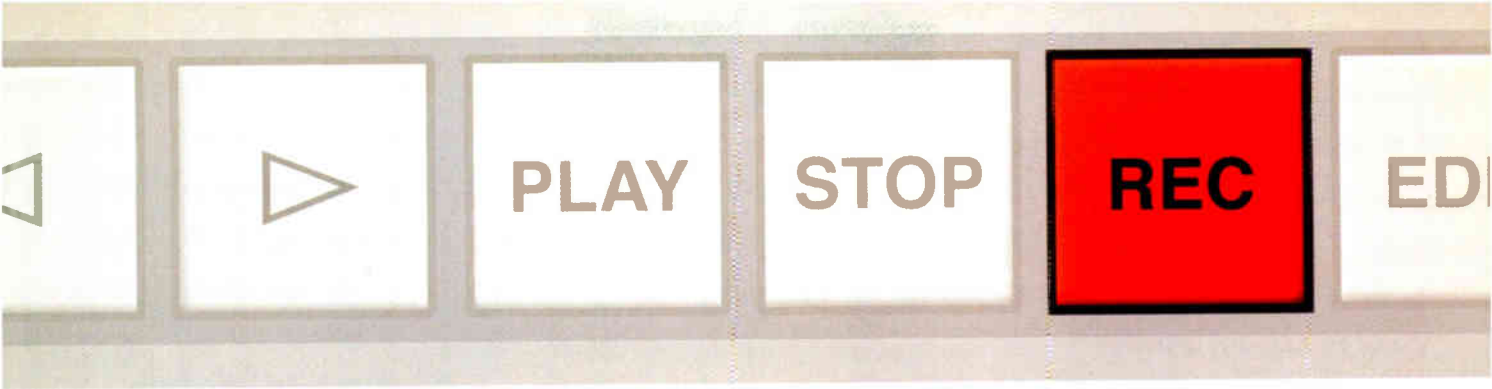

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CURRENT

103RD AES—AN UPDATE

The 103rd AES convention will be held at New York City's Jacob Javits Center from September 26-29. Convention chairman Russ Hamm and his colleagues have gone to great lengths to make this 50th-anniversary celebration the most "attendee friendly" conference of them all.

Sixteen workshops and more than 140 technical papers will be delivered, and planners have laid things out in a way that should let seasoned pros, their junior partners and students get all the information possible when they visit the Big Apple. At a recent luncheon in New York City, where this year's committee (which included Hamm, facilities chair Bill Allen, papers chair Wieslaw Woszczyk and workshops chair Douglas Cook) laid out its plans, it was clear that great care has gone into making this year's show as logical as possible, with an eye on the future.

Have we treated digital recording media like the Messiah, rushing into its camp without pause when a bit of skepticism might be in order? Expect Grammy Award-winning producer/engineer George Massenburg to tackle that issue and offer a vinyl vision on the great recordings of the last 50 years when he delivers his keynote address.

When will full-bandwidth audio be deliverable on the Internet? Expect Thomas Dolby Robertson to address that topic in his workshop, "The Future of Music on the Internet." Others may be interested to hear how top mastering engineers such as Bob Ludwig feel about the future of PC- and Mac-based EQ. No doubt, there will be something for everyone. See you there.

—Gary Eskow

MACKIE SUES BEHRINGER, SAM ASH AND SAMSON

Mackie Designs, based in Woodinville, Wash., recently filed a lawsuit in U.S. District Court against audio retailer Sam Ash Corp. of Hicksville, N.Y., Samson Technologies, also of New York and Ulrich Bernard Behringer and his audio manufacturing firm, Behringer Spezielle Studiotechnick. In the suit, which alleges trademark and trade dress infringement, copyright and patent infringement, and unfair competitive practices, Mackie accuses the defendants of conspiring to manufacture and distribute imitations of Mackie audio products, using copied schematics and identical parts. The products were distributed in the U.S. and Canada through the Sam Ash companies, which the lawsuit claims financed the copying.

Mackie claims sales of the imitation products have cost the company in lost revenues and damaged its market position. The company's complaint seeks actual damages of $109 million, trebled to $327 million under federal law, plus attorneys' fees and costs.

"[Mackie intends] to protect our business and will pursue predators who illegally copy Mackie products," says chief operating officer Roy Wemyss. "We have a strong intellectual property position and will defend our products from what we see as very deliberate copying—both visually and electronically." Mackie announced that its products would no longer be available at Sam Ash Music, effective July 26.

—CONTINUED ON PAGE 12

TEC AWARDS SPONSORS ANNOUNCED

The Mix Foundation for Excellence in Audio has announced the sponsors for the 1997 Technical Excellence & Creativity Awards, to be held Saturday, September 27, at the Marriott Marquis in New York City.

Platinum Sponsors are JBL Professional (Northridge, Calif.), *Mix* magazine (Emeryville, Calif.) and Quantegy Inc. (Peachtree, Ga).

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For more information about the 1997 TEC Awards sponsors, see page 144. A limited number of sponsorships and tickets are still available; for more information, call 510/939-6149 or e-mail KarenTEC@aol.com. ■

MIX FOUNDATION EXTENDS SCHOLARSHIP DEADLINE

The Mix Foundation for Excellence in Audio extended its deadline for submitting applications for the TEC Awards Scholarship Grant to Saturday August 30, 1997.

If you are interested in receiving an application, mail, fax or e-mail your name, address and phone number to the Mix Foundation, 1547 Palos Verdes Mall #294, Walnut Creek, CA 94596; fax 510/939-4022; e-mail KarenTEC@aol.com. No phone calls, please. The grant recipients will be announced at the TEC Awards and in the December issue of *Mix*. ■

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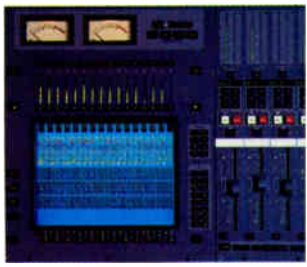

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INDUSTRY NOTES

Barry Margerum was appointed new CEO at **Euphonix Inc.** (Palo Alto, CA), while former CEO **James Dobbie** will continue on as chairman...SSL (Oxford, UK) appointed **Tim Harrison** as area sales manager for music recording and film... Lynnwood, WA-based **Symetrix** brought onboard **David Dewey** as the director of sales...**Don Sydney** will join **Meyer Sound** (Berkeley, CA) as director of business development, and **Brian Coviello** will be regional sales manager for the Northeastern United States. Meyer also promoted **Jennifer Smith** to news coordinator, a newly created position within the company's marketing division...**Sonic Foundry Inc.** (Madison, WI) promoted **Brian Hamilton** to director of OEM business development and hired software design engineer **Peter Haller**... **Lori Carsillo** was named media and events coordinator at Palo Alto, CA-based **Opcode Systems Inc**...**Jill Lego** was appointed director of marketing communications at **Quantegy Inc.** (Peachtree City, GA)...**Charles M. Salter Associates Inc.** (San Francisco) promoted **Philip Sanders** to principal consultant...**Akai** (Fort Worth, TX) changed its name from Akai International Music Corporation to Akai Musical Instrument Corporation...**Telex Communications** of Minneapolis, appointed **Struan Robertson** as intercom systems engineer for Europe, Africa and the Middle East...**Independent Audio**, based in Portland, ME, will no longer be distributor of HHB products. It will still distribute the remainder of its product range, including ATC studio monitors, Coles ribbon mics and CEDAR for Pro Tools...**Hafler** (Tempe, AZ), a division of the Rockford Corporation, announced the retirement of 20-year company veteran **Margie Williams**. Her last position was as sales and marketing manager... Quincy, IL-based **Harris Corporation** acquired **Northeast Broadcast Lab** Inc., located in South Glen Falls, NY. **Rich Redmond** was named sales manager for the office, **Brian Szewczyk** will remain as a broadcast sales specialist, **Joe Myers** will continue to serve on the broadcast sales staff, **Jean Greene** will serve as office administrator, and sales specialist **Gary Hardwick** will transfer to the Northeastern office. Harris also recently acquired **Innovation Telecommunications Image and Sound (ITIS)**, based in Rennes, France...**Audio Processing Technology (APT)** of Belfast, Ireland, appointed **Jon McClintock** as sales engineer...**Midas** (Kidderminster, UK) announced several new exclusive distributors. Distribution in Norway will be handled by **AVAB CAC**; national offices of **AudioSales** will handle distribution for Austria, Hungary, the Czech Republic and Slovakia; **The Meter Company Ltd.** will distribute Midas products in Egypt; and **Electrosound** is the new Portuguese distributor. For more information, call Midas at 44/1562/741-515...**Main Line Marketing**, of Melbourne, FL, and **ELrep Sales Co.**, of Tucker, GA, are the new regional territory representatives of **D.A.S. Audio/USA**, manufacturer of professional transducers and loudspeaker systems... **Yamaha's** (Buena Park, CA) Audio, Guitar and Synthesizer division reorganized its commercial audio sales force. **Larry Italia** has been named sales/marketing manager for commercial audio; **Randy Weitzel** was hired as commercial audio district manager for the Rocky Mountain states; **Kathy Carrillo**, in Yamaha's order processing department, will now handle all calls for the commercial audio area...**Integral Vision-AID** of Farmington Hills, MI, promoted inside sales engineer **Jim Tarnaski** to customer service manager...Baton Rouge, LA-based **PreSonus** was granted its first U.S. patent, "MIDI to Analog Sound Processor Interface," by the U.S. trademark and patent office. ■

—FROM PAGE 10, CURRENT

INTERNET OPPORTUNITIES DISCUSSED AT SEATTLE AES CONFERENCE

Audio on the Internet was at the forefront of discussion at the 14th International Conference of the Audio Engineering Society, held in June in Seattle. The three-day conference examined the impact of the Internet on the audio and multimedia industries, and addressed issues such as content quality, piracy and infringement issues; and production, distribution and marketing opportunities. Presenters and panelists at the conference included Dr. Elizabeth Cohen, president of the Audio Engineering Society; Philip Rosedale of Progressive Networks; former Grateful Dead lyricist John Perry Barlow; and Philip Wiser, co-founder of Liquid Audio. Also addressed were new and emerging technologies, such as the development of "Internet2" high-speed protocol, 3D audio transmission and multisite recording and production.

SPARS HOSTS BIZ/TECH '97 IN NYC

The 1997 SPARS Business and Technical Conference, Biz/Tech '97, took place at the World Trade Center Marriott Hotel in New York City, May 16-18. The event, attended by studio owner/managers, manufacturers and service providers, featured sales presentations and business seminars hosted by such industry luminaries as Howard Schwartz and Stephen St.Croix. On the technology side, the Internet as a delivery platform was a hot topic, as representatives from EDNet and Liquid Audio discussed the latest developments in Internet audio streaming, delivery system software and hardware, and what to expect in the immediate future.

For more information about SPARS, contact executive director Shirley Kaye at 561/641-6648 or visit the SPARS Web site at www.webcom.com/spars/.

CORRECTION

The July "Current" listed Hillel Resner as national secretary of the National Academy of Recording Arts and Sciences. His correct title is national secretary-treasurer. ■

CHECK OUT THIS MONTH'S MIX ONLINE!
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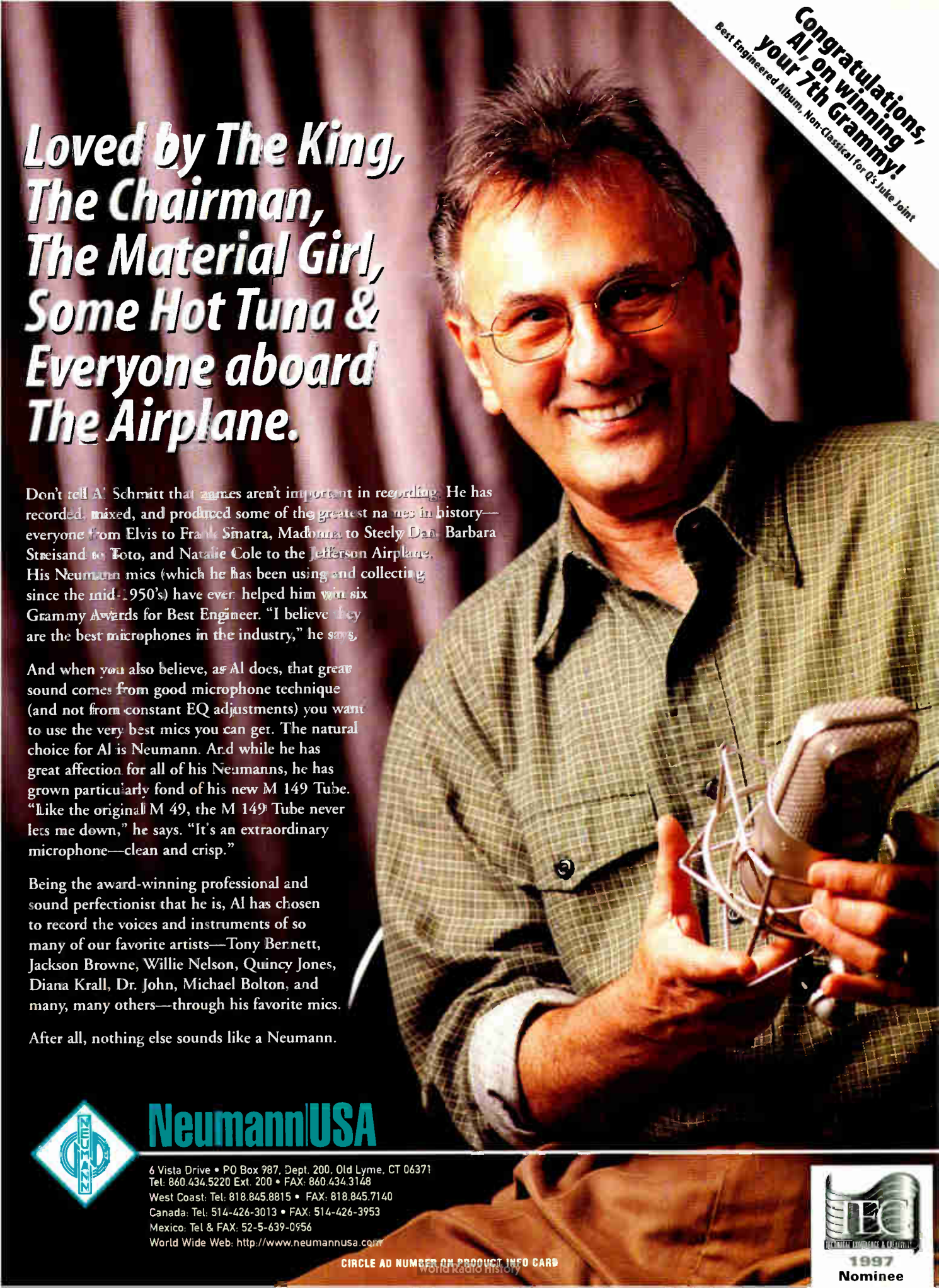

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NOW YOU DON'T HEAR IT, NOW YOU DO

BEYOND OUTER LIMITS

ILLUSTRATION STU SUCHIT

No-fi. No, not really no-fi; but high-fi. Literally. Yeah, that's it. The jewelry-cleaner of audio, the highest fi you can get, and then higher; beyond audio-as-we-know-it-fi. That's what I am going to tell you about *this* month. But unlike last month's Worst-Sounding Speaker On Earth, this one doesn't make any sound at all. Not directly. And unlike last month's freak toy, when this is fully developed, it will have a flat frequency response, the most controllable dispersion pattern and the most insane imaging on Earth. In fact, the imaging is more controlled than anyone thought *was* possible.

Let me tell you up front that I have never heard this device. Few have. And you can't buy it—not yet. But if the developers can pull it off, it will change audio—all aspects of audio—more than any other breakthrough since Edison's wax cylinder. It will be truly revolutionary. *You* will control the horizontal, *you* will control the vertical.

AND AWAY WE GO

It all started when I interviewed Bob Todrank from ATC (American Technology Corporation) and he convinced me that what I am about to tell you is real and viable. I normally would not let *anyone* convince me of *anything* without personally experiencing it, but Bob and I have known each other since the beginning of carbon-based life, and he does make sense. Further, I want to tell you that I am including paraphrased versions of information that I downloaded from ATC's Web page. This is something else I have never done before in my column, but it seems the most direct way to give you certain details. So here's the deal...ATC uses a technology called acoustical heterodyning, which creates a phe-

—CONTINUED ON PAGE 230

BY STEPHEN ST.CROIX

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Take the Classic Cure.

Get over those digital chills!

Freedman Electronics of Australia has created the **RØDE Classic Valve (Tube) Studio Microphone.**

For richness, warmth, and a remedy for the sonic blahs, seek out the RØDE Classic!

$1999

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The RØDE CLASSIC Features:

- A rare and costly **6072 tube,** first choice of the finest microphone craftsmen.
- **Full 1" Gold-Sputtered Dual Diaphragm Capsule,** in combination with 6072-based circuitry, ensuring a warmth of tone for pristine vocal recordings.
- **Nine polar response patterns** and **two Frequency selections for high-pass filter,** selected at the supplied external power supply. (30 feet away from the performer)
- **-10dB and -20dB pads,** selected at the power supply, allowing optimum performance at different sound pressure levels.
- **Gold Plated Tuchel connectors** to insure accurate noise-free signal transitions.
- Australian-made **10m (30') high-grade multi-core cable,** helping to eliminate RF and other unwanted signal contaminators.
- High quality **Jensen transformer,** for added cleanliness and accurate bass response.
- **Internal shock mounting system** for Capsule and Tube, helping eliminate low frequency rumbles and vibrations.
- **Custom Flight Case**
- **Hand-crafted** solid brass body, textured with fine glass bead blasting. A nickel finish provides lifelong durability.
- A tremendous value at **$1999!**

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RETRO THIS, PART 2

THE GREAT LEAP BACKWARD

Are you salivating over all the new "retro" gear that's flooding the market? Do you think big knobs, burnished steel, VU meters and glowing tubes are going to drag your facility out of the doldrums? Do you think Scully tape decks, Minimoogs, Pultec equalizers and RCA consoles are magical, and if you just had some of them in your studio you could make million-selling records? Well, if you read my column last month, you know that I think that for the most part, the movement back to the gear of yesteryear is pure horse hockey.

You see, I was there. And I'm not even so old. But I can tell you that dealing with this stuff was one big pain in the butt. I'll show you: Come with me now back in time, way back, to a classic electronic music studio, before the days of digital synths—heck, before the days of *any* synths. No programming, no sequencing, no computers, no digital readouts—just knobs and sliders, all of which do just what they're supposed to do, in real time. And lots of tubes. Analog heaven, right?

Your sound sources are a shelf full of discrete, industrial-strength oscillators. They'll produce sine, square or triangle waves, at any pitch you want. Of course, you better not want it for very long, because as the tubes warm up, those babies will drift. You patch them through a gorgeous passive third-octave filter built for some European telephone company, based around moving ferrite cores. The cores are open to the room, and even if you tell people not to smoke, you still often get a nice crackling sound when you move a slider. So you either leave the filter alone during a take, or if you need to change the curve, you keep recording until you get a take in which you did the move right and it didn't sound like a bowl of Rice Krispies.

Don't forget that the input impedance on the filter is way too low for the signal from the oscillators (they weren't made for this!), so you have to manually patch the signal through a couple of pads

BY PAUL D. LEHRMAN

ILLUSTRATION: DAVE EMBER

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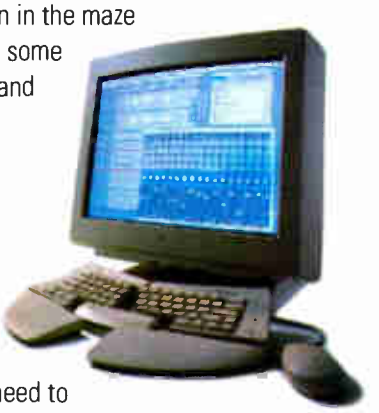
This Way.

1997 Nominee

Today's Digital Audio Workstation is an indispensible tool for Post Production, CD Premastering, and Music Production. With each new twist and turn in the maze of technological possibilities, some systems lead, others follow, and many fall by the wayside.



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Follow the path we've blazed in digital audio with achievements such as:

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- Sonic High Density Studio - the world's first multitrack 96kHz 24-bit audio system
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And as you find your way to the future – 96kHz and DSD High-Density Audio™, Surround Sound and DVD Audio – don't get stuck with yesterday's tools. Count on only one company to lead the way – Sonic Solutions.

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and transformers, lest you get (at best) a horribly distorted "blaaatch!" or (at worst) fry a core or two.

There's plenty more: The ring modulators, frequency shifters, broadband equalizers and envelope generators all need to be calibrated, level-matched (meters? we don't need no steenking meters!) and dealt with quickly, before they drift off. Want to increase the RT60 on the reverb plate? Just pull the long rod attached to the damper. But you can't do it while there's sound going through it, because the horrendous *roarrr* it produces obliterates everything else.

Now you've been here about three hours, patching, tweaking, cajoling, programming, re-tweaking because of the drift, mixing and monitoring along each stage, and you've created five seconds' worth of brilliant sound, which you'd better put on tape pronto. If you want to use that sound in more than one place in your piece, you'd best record it a number of times; if you just do it once, and then later make copies, you run the risk of adding hiss and distortion, and if you try to duplicate the sound any other day, even if you've kept the best notes in the world, you'll never be able to get it exactly right.

Are you drooling with envy yet? Me neither. But this studio, at the Columbia-Princeton Electronic Music Center, is where I got my first formal training in electronic music. Looking back on it now, it sounds like about as much fun as building up DNA molecules, one amino acid at a time, would be to a biochemist. As an educational experience, it was priceless, but as a way to actually create something, it sucked. In fact, after a couple of years working like that, I gave up electronic music completely for a solid decade. I only came back to it when systems became available that allowed me to produce more than one composition in my lifetime.

I think that for the most part, the movement back to the gear of yesteryear is pure horse hockey.

Retro, feh.

Okay, I got that out my system. Now I can admit that there were things I *liked* about working with unpredictable analog gear, and that some of those things really have been lost in the rush to digitization, computerization and automation. And there are valuable lessons to be learned from the currently fashionable (if I may steal from Mao) Great Leap Backward, as long as we don't take them too literally.

To my mind, the most valuable lesson of the retro movement has to do with the human interface. Digital workstation users miss having all the faders and knobs right in front of them. Fortunately, manufacturers are finally getting hip to the idea that a mouse is not the best way to handle a 64-channel mix with 14 effects inserts, and alternative controllers with real sliders and buttons, some of which even move, are popping up all over the place. Musicians are getting tired of those tiny little parameter windows on their synths, and in response, new instruments are

vote with your ears...

Focusrite GREEN RANGE

The Green Dual Mic Pre is the latest in a long line of renowned Focusrite designs which many users would vote as their favourite sounding device.

The values and traditions of Focusrite product design have stayed true from the first range, the ISA through to the RED, the Blue and now the Green Range

The Green Dual Mic Pre is designed to accurately reproduce every subtle detail and nuance from any microphone, adding more punch and presence to your recordings, making a difference you can really hear.

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Take a look inside a Green module and check out the classic designs and quality components , you won't find anything like this in your console or anywhere else in your rack.

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TEC 1997 Nominee

RELAYS: Gold plated silver contact relays are used for audio switching to give lower distortion and greater isolation than cheaper transistor methods.

OUTPUT AMP: Each output stage is equipped with mini amplifier chips, like small power amps, designed to drive any cable length, capacitance or load without adding distortion.

At $1,099.00 (RETAIL) The Dual Mic Pre truly represents Affordable Excellence through Revolutionary Engineering.

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appearing loaded with knobs. In addition, alternative, fluid controllers like Bob Moog's Theremin, Don Buchla's touch and space controllers, and Yamaha's breath and wind controllers are making a comeback. These will mean that players' real-time performance gestures are taking on added importance in sequences, which will help make their tracks more organic and convincing. But because they're MIDI, the gestures are repeatable and editable, and that makes all the difference.

Another lesson can be called the "comfort" factor. For a lot of people, it's not really the sound of discrete components that matters, it's simply the fact that they're *there*. Workstations, in which the sound is pumped in at one end, spun around as invisible numbers and spat out at the other, have taken away much of the feel of working with audio: We don't see tape reels spinning any more, we don't physically set up the patchbays, we don't see the processors' flashing lights responding to the signal, and processor settings are buried in menus within menus. That loss of control, even if it's illusory, can be unnerving. I'm not sure that putting a picture of a 40-year-old equalizer on the screen is the best solution to this, but certainly speeding up the displays so that the level meters don't look like they're suffering from spasms; making the signal routings obvious with big, bright lines; and making all active processing controls instantly visible (not just one at a time) can help. In the long run, however, we're going to have to compromise and learn to be as comfortable with virtual patchbays and processors as we are with the "real" things (and don't forget, virtual patchbays don't need cleaning).

Workstations, in which the sound is pumped in at one end, spun around as invisible numbers and spat out at the other, have taken away much of the feel of working with audio.

The third thing is serendipity—finding something in the behavior of a piece of equipment that the designers didn't intend and turning it to artistic advantage. That can be built into digital systems too, although it might not be easy. The Yamaha DX7, you may recall, would go into aliasing under all sorts of circumstances. It could be ugly, but there were plenty of programmers willing to exploit that little weirdness and make some fascinating sounds from it. Perhaps designers could look at ways to "overspec" digital gear, so that instead of hard clipping when you exceeded normal operating parameters, it did something completely different and potentially useful. (Of course, today ugly is in, so the motivation isn't there yet to do anything else, but hopefully that shall pass.)

And what about the sound of retro equipment? Can we really reproduce in a musical way the sound of analog tape saturation, of tube nonlinearities and of unstable oscillators? Well, from what I've seen in the aisles of trade shows

—CONTINUED ON PAGE 232

new compressor. new standard.

Focusrite GREEN RANGE

Focusrite set the standard for compression with the TEC award winning Red 3. Now the unique sound of Focusrite compression is available to all with the new Green Compressor Limiter.

Designed to be the most professional and versatile device available this Green unit has all the features you need for recording and mixing. If you equip your studio with only one compressor it should be a Green Compressor Limiter.

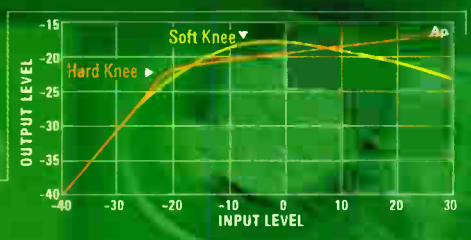
DUAL MONO/STEREO: The device has two independent mono channels of Compression and Limiting with level and compression metering. When switched to stereo the two channels are linked and act as a true stereo tracking Compressor Limiter.

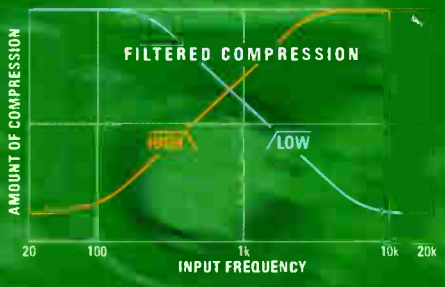
SOFT/HARD KNEE: The contour of compression can be altered to achieve a wide range of compression sounds from only one device.

SOUND: The sound of Focusrite "Class A VCA Compression" is renowned for its smoothness and clarity and is the first choice of many of the worlds greatest recording artists and engineers.

RECORDING: The Green Limiter section includes a unique "Lookahead" detection circuit that allows accurate low distortion limiting. Ideal for preventing A/D overload during digital recording.

MIXING/MASTERING: The compressor section includes high/Low pass filters to allow selective compression of full band material. The filters allow any amount of compression to be applied whilst retaining the original balance of the mix specially useful for bass heavy dance music.





At $1,499.00 (RETAIL) The Compressor Limiter truly represents Affordable Excellence through Revolutionary Engineering.

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ELIZABETH COHEN

PRESIDENT OF THE AUDIO ENGINEERING SOCIETY

Elizabeth Cohen readily concedes that she is a difficult individual to characterize. This is hardly surprising, given that her interests range from musical performance, to the acoustics of recording and live spaces, to emerging technologies for nontraditional means of sound delivery.

Cohen received a bachelor's degree in music and science from Bennington College in the mid-'70s. She later collected a master's in electrical engineering and a doctorate in acoustics from Stanford. From 1980 to 1989, Cohen served as consulting assistant professor of physics at Stanford, where she taught classes in astrophysics and musical acoustics, as well as in values, technology and society. Currently a consulting professor of electrical engineering at Stanford, and president of Cohen Acoustics (a firm she founded in 1981), she has conducted extensive research in psychoacoustics and auditory perception.

Cohen is probably best known for her extensive work on inharmonic tone perception, 3-D sound localization, and standards and measurements of background noise, as well as the implementation of audio technologies on the Internet. For five years, she served as acoustician for the Hollywood Bowl, and she is the former acoustician for the Aspen Music Festival. Her recent design credits include screening rooms for Dolby Labs, Digital Theater Sound, Sony Pictures Entertainment and Paramount Pictures, plus a listening room for Harman Automotive, Indiana. She is also a member of the Walt Disney Concert Hall Committee.

During her recent acceptance speech as the newly elected AES president, Cohen modified Aristotle's phrase "The beginning of philosophy is wonder," to "The beginning of audio technology is music and wonder." She implored the audience "to remind ourselves that we are in a position of great luxury: enabling art. We forget this at our own peril, for music, and the technology that enables it, transforms both the personal and the political. It should be understood that the myriad transformations brought about by means of music can change and renew our lives and our communities." She believes that audio technology extends the reach of music and "gives voice to communications that penetrate the walls between people and cultures."

Our understanding of the auditory system, she considers, has informed the evolution of audio technology to the point where we will be able to understand and use the full range of the human hearing experience. "Our knowledge of sound localization, our knowledge of spatial hearing combined with innovations in distribution and signal processing technologies, have generated this opportunity." A rare mind, indeed.

BY MEL LAMBERT

You are interested in a variety of aspects within professional sound, from the science of acoustic environments to leading-edge developments in audio delivery. What is your primary motivation?

I think that what makes me tick is a love of music and a love of art. I see myself creating spaces for artists, or tools for communications. There are so many things in the world that separate us; music is one thing that can serve to unite and inform people very directly. If you look for what engages me creatively, it's the love of music and fascination with the power that music has to affect and move people.

Do you play?

I play but not very well. My heart's in it, because there is something that happens when you play with others; that kind of ensemble communication is a very powerful experience and something I enjoy. I have a degree in music from Bennington College. I came from the performance arts arena and moved into acoustics and computer music that way.

How did you become involved in professional audio?

I was doing a lot of art pieces while I was in school and working with an instrument builder, Gunner Schoenbeck. At the same time, there were folks at Bell Labs who had heard about me, and vice versa. I got an invitation from Max Matthews at Bell Labs when I was an undergraduate. Max was there with John Pierce and Manny Schroeder; I started making frenetic squeaks and buzzes on computers. I had been studying electronic

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Logic Audio Discovery 2.0* – Entry level price with a professional feature set. 960ppq real-time sequencer with surprising scoring and printing. Simplified MIDI environment with virtual mixers and automation. Even real-time DSP.

Audiowerk8 – Complete Digital Audio Recording Solution. 2 in, 8 out, S/P-DIF I/O, PCI busmaster digital audio card & VMR control surface software for MAC or PC.

Unitor8* – 8 x 8, single rack space, cross platform MIDI interface. Stack up to 8 for a maximum of 1024 MIDI Channels. Read/write SMPTE for LTC/VITC .

Logic – The MIDI Masterpiece. The most integrated 960ppq real-time sequencer to date. Professional scoring and printing and a totally user definable interface. Unlimited virtual mixers and editors. Full automation, full SYSEX support and more.

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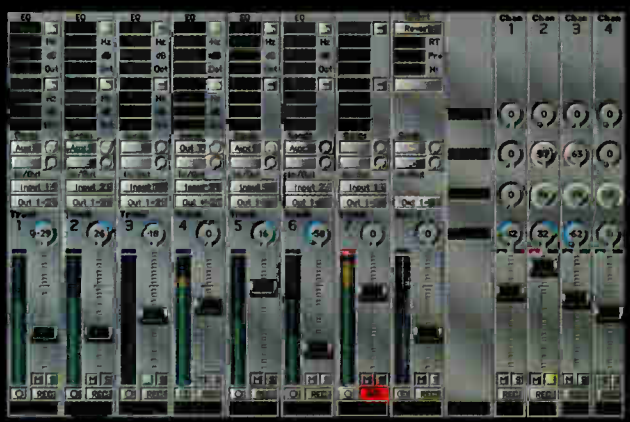
SoundDiver – The Ultimate in Synthesis Patch Management. Universal Editor/Librarian for Mac or Windows 95.

* Available Third Quarter 1997

Logic Audio 3.0
Cutting Edge, Again

Logic Audio, the professional's choice and the flag ship product in the award winning Logic System just took a giant step forward. After pioneering integrated DSP with Logic Audio 2.0, Emagic's new Logic Audio 3.0 does it again with professional quality Real-Time DSP, EQs, Flanging, Chorus even Reverb built right in. Used with Logic Audio's already powerful feature set you can possess the cutting edge in Audio, Scoring and MIDI all in one integrated package.



Real-Time DSP, Enhanced Automation and Scoring, & Built in Simultaneous hardware support. The Pros ask, Logic Audio 3.0 responds.

When used in conjunction with Emagic's new Audiowerk8 PCI digital audio recording card, you can achieve up to 24 tracks of digital audio. But there is much more. Just look at a few of the powerful enhancements of Logic Audio 3.0:

- Real-Time Equalization with high and low pass filters
- Real-Time professional Reverb, Chorus and Flanging
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music at Bennington. There was a lot of music exploration going on at that time at The Kitchen in New York. I started working at Bell Labs late at night, entering notes for scores. This was back in the early '70s—the days of learly software composition programs] Groove and Music Five, where a bank of oscillators took up half a room!

How did that interest develop into your designing recording and performance spaces?

They're just larger instruments—at least in my mind. You treat [environments] as if they were a musical instrument. The basics of engineering is something that someone can acquire with elbow grease and taking classes. Physics always fascinated me; I could never figure out whether I wanted to be a physicist or musician. This is one of the ways I can have my cake and eat it, too.

Really, it was just one of those things that appears as an accident. I had gotten into consulting because one of my professors said that I could get paid for what I was doing. I answered a phone call one day in a Speech and Hearing Sciences lab. Somebody was building a studio and had some questions—I don't even remember now what exactly it was. There are people born with an incredible talent, and they know that if they don't play their violin they don't breathe. But my gift is a natural curiosity about how things work, and an ability to be fascinated with the simplest things.

DTS screening room, designed by Cohen

The basics of room acoustics were fundamental and part of my formal education. However, not being part of a particular school of thought, I don't think I had regimentation—I wasn't sitting there reading about Live-End/

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Dead-End or any of these type of [design theories]. Audio does have a trendy component to it. I tend to deal with the [basics] and then let my imagination soar. I take a very hands-on approach to things. I attribute the success of my projects to [the fact] that I'm a notorious hand-holder through the construction process. I work closely with the contractor to get what is down on paper built.

How do your clients describe what they're looking for?

In many different ways. I have clients that are musically literate and clients that are technologically literate. I also have clients that don't read a note of music or know very little about technology, but who make great music.

Do you find that musically inclined people have a better sense of the aesthetics of a recording/performance space?

They have a better vocabulary of describing what they want. It's much easier when they say they need to have the room handle a low-D, or that it has to respond to a particular frequency, rather than someone saying that they like it "warm." We have a very sophisticated visual vocabulary, yet an auditory vocabulary that can be relatively impoverished. Once you start educating people as to what the various synonyms are, it's kind of like watering a plant.

One of the other things I'm known for is the programming phase of the project. Programming is where you sit down with the client and find out how they are going to use that space—the "reality check." When you find out whether they need to [accommodate the requirements of] an auto show, for example, to support their concert hall in the same space, or whether the studio designed as a film room, let's say, is actually going to be for music most of the time. Or they think they're only going to do pop music, yet it turns out that they're doing lots of commercials for TV. You really need to find out what they like, what they're trying to achieve.

In a home room, you find out if the theater for critical listening might turn out to be where Junior also practices his violin—it could be a double-purpose area, or more. Then you find out that they have this wonderful space for their listening room, but the exercise room is on top of it so you need to deal with adjacency problems.

It's really a matter of knowing what they can go for, and what they can afford. I believe in doing value engineering up-front rather than during the course of the project, which results in disappointment for the designer and the client.

You've designed recording studios, post facilities and quite a few listening rooms, including ones here in L.A. for Dolby Laboratories and DTS. How did they come about?

They came about because I had been the lead on a project for the Academy of Motion Picture Arts and Sciences. David Schwind and I had done that project for [the acoustical and architectural firm] Salter Associates, and I'd also done a lot of work in the film industry.

What's the main challenge in designing a listening room?

There are at least two major modes of listening: an analytic and a synthetic mode. You want a room that allows you to achieve a "gestalt" of the event that's occurring, as well as analytically hear all of the sonic details. You want a room that supports the music.

Does the choice of monitor influence how you design the room?

When you build a room, ideally, you like to know exactly the size of a [monitor soffit] cutout. But you also can build a good room giving them leeway. This year's speaker is this year's speaker;

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Geno Porfido, Boulevard Recording Co. New Milford, NJ

"Other consoles I've worked with in the past just couldn't deliver the levels of punch and clarity I felt the music deserved. I never have this problem with my Soundcraft Ghost. The Ghost gives me the flexibility I need over a wide range of frequencies and has the body and warmth to really bring my music to life."

Johnathan Moffett, Drummer with Michael Jackson and Madonna

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there's tremendous innovation in terms of speaker manufacturing and driver technology. I try to design rooms that sound good so that my clients aren't harnessed into a particular trend that we're trying this year. In an intelligently designed space, you should always integrate the loudspeaker and the room. That is the key element of the room-tuning process. The loudspeaker and the room are an interdependent system; neither of them functions in isolation from the other.

Do you try to avoid soffit-mounted speakers, to bring them a little forward into the room?

No. You try to design in a soffit space or build a [monitor] wall that leaves enough space so you can make changes if you need to, yet make sure you have the proper absorption. I consider it intelligent design with the ability to optimize. What you're going for is what sounds good yet allows you to do the work in that space.

Of the various environments you've designed, which was the most challenging?

The space that I'm proudest of is the Aspen Concert Hall. It was a dream project because we were working with architect Harry Teague. Our client was Robert Harth, who used to be with the L.A. Philharmonic and is now the general manager of Aspen. Everyone there loves music and understood the function of the space—it was for music with a degree of flexibility. I also worked with David Schwind on this project, and we were really able to do what we wanted. I continue to work with Aspen; the Concert Hall is very close to my heart because it's a wonderful space to work in. You want to make music there. It was both a humbling and beautiful experience for me because a member of the Emerson Quartet said

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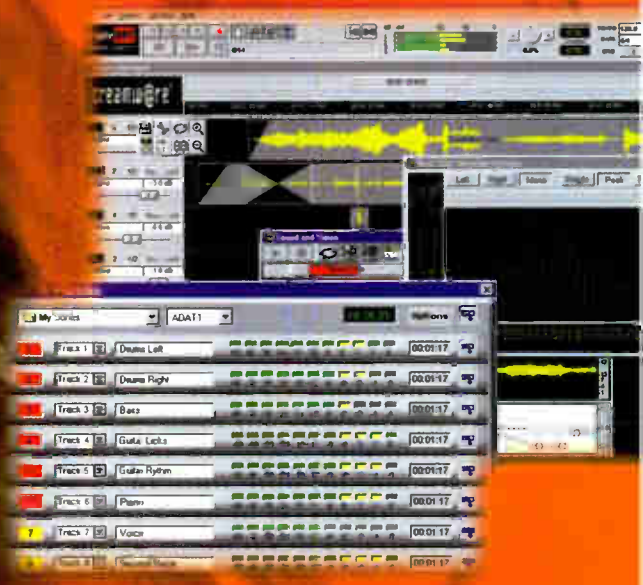

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that he considered [the hall] to be a musical instrument.

When was Aspen Concert Hall built?

It was finished three years ago.

As a woman in a male-dominated industry, do you see yourself as a role model?

I didn't elect myself to be one, but I've been a role model since graduate school. Decisions I've made might not have been made if I didn't have that responsibility. Right now, we have a core of women that came in through the AES at a certain time. We're all around our early 40s, and then there's a gap again. I would really like to see lots more individuals become involved throughout our industry; this is a wonderful area to function as an engineer for the arts. I don't think we have publicized it too well.

Very often, people see "audio engineering" as a bunch of guys with plastic pocket protectors worrying about the needles for their old LPs! I don't like to categorize people because it's a very foolish thing to do. Clearly, if people have fun with building things, and like music, it's got lots of opportunities. The merging of communications and telecommunications is really a hot area right now and will continue to be so.

I understand that, while you still consult on acoustic projects, you're also heavily involved in developing audio opportunities for new media?

Yes, I do a fair amount of technology assessment and strategic planning. I'm opening up communications channels to allow as many artists to be as creative as they can be.

Give me an example.

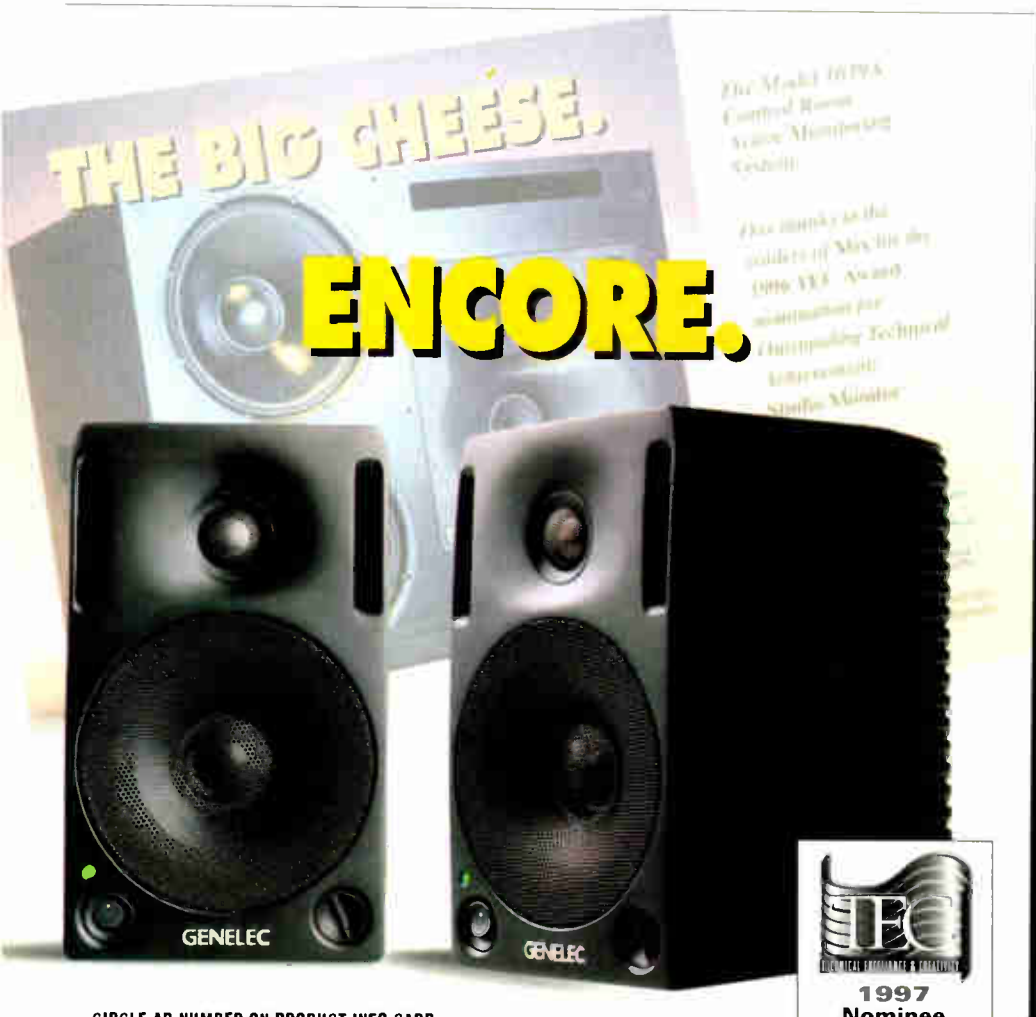
Three years ago I went to the Jazz Festival in New Orleans and introduced a radio station there as part of an outreach program I was doing in developing the National Information infrastructure. I had served a year on the National Economic Council. Part of my portfolio was development of the information infrastructure for arts, for Americans with disabilities and for telecommuting—these are the three things I worked on.

One aspect of the outreach program [involved] talking to artists in a local community. It was very clear to me then—and even more so now—that the Internet offers a tool for artists to remain a vital part of the local community. Traditionally, musicians have been essential to the fabric of a social community. In New Orleans, public radio station WWOZ is an essential ingredient; it is part of the [city's] brass band district, part of the soul and the lifeblood of that community. They've been broadcasting and netcasting over the Internet. I think that they are one of the best radio stations, if not the best, in the country in terms of having an incredible library of American roots music that can now be heard all over the world.

So the station provides online access to rare roots music?

Yes, local music. I guess a part of my feeling is this whole idea of "cultural grayout." When I was doing field work in China in 1980, one year there was almost no radio or TV, and the following year you could hear Pink Floyd in Inner Mongolia. But then what happens to that local music? It is our cultural heritage. From a business point of view, it is one of the greatest products for any nation. As of mid-May, there are 3,000 stations netcasting.

There is all of this new music out of Africa, combinations of African rhythms and pop music—look at it the same way as blues and jazz developed here.



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Let's nurture all these influences that we can. Hundreds of radio stations in Europe are on the Internet.

My major concern now is for the audio community to use its voice. In all of new media, audio has been the bastard child for picture. The broadcast lobby has strong political groups [interested in pushing through profitable developments in HDTV and Advanced Television, with sometimes little concern about the fate of multichannel audio]. We take whatever bandwidth is left over and, to a certain extent, humbly accept it. But certain companies have said, "No. What's left over isn't good enough for music." And it's not just a matter of data compression—some data compression schemes sound better than linear PCM. What the audio community is doing for the Internet is to say that [future-generation] Advanced Internet systems should offer the potential for quality reproduction. You want the artist to have the opportunity of the best conduit for their art.

Personally, I'm a very strong supporter of the computer-based paradigm in terms of open platforms. Look at the rapid acceptance of Smart Cards in Europe; electronics manufacturers cannot continue to use the argument that we're all couch potatoes and can't do anything active. Constantly pressing buttons on our remote control is interactivity at a level that does not preclude choice and quality in audio.

Do you think there is going to be a paradigm change in the quality of delivered audio over the Internet?

Absolutely. The AES has organized an Internet Audio Conference in June. One of the things we're going to discuss is enhanced quality and the technology available to allow this. There are various groups working on what the different headers should be and providing the basic message that we carry. We've been asked by the different applications engineering committees: "What do we need?" In the artistic community, there is no reason why quality shouldn't be part of any Advanced Internet standard.

Do you foresee changes in production techniques—the way we record music because we know it's going to be delivered via different media?

You're going to see it delivered every way—through the air, through wires and so on. I look for instance in the innovations in GPS—Global Positioning System—[digital broadcasting] technologies that will deliver a digital broadcast to my car by pressing a button and having it downloaded to my computer storage device. And, of course, I'll record this tune in lovely multichannel sound. That [capability] isn't very far down the line; all the technologies are there to do that now.

Multichannel audio will enable the driver to be immersed in a sound field in a very realistic or surrealistic way, depending on the intent of the composer. You're no longer restricted to flat, spaced stereo. The greatest innovation we're seeing now is the end of spatial deprivation; composers are now being given the tools for composing in space. We have the delivery medium, we have enhanced-efficiency speakers—the different pieces are coming together. The bandwidth, the compression technology, diversity of competing delivery media and innovations in speaker design.

What you were talking about is interactivity from the point of a listener as the final composer—in a way, an extension of karaoke?

Essentially, yes. The portable computer

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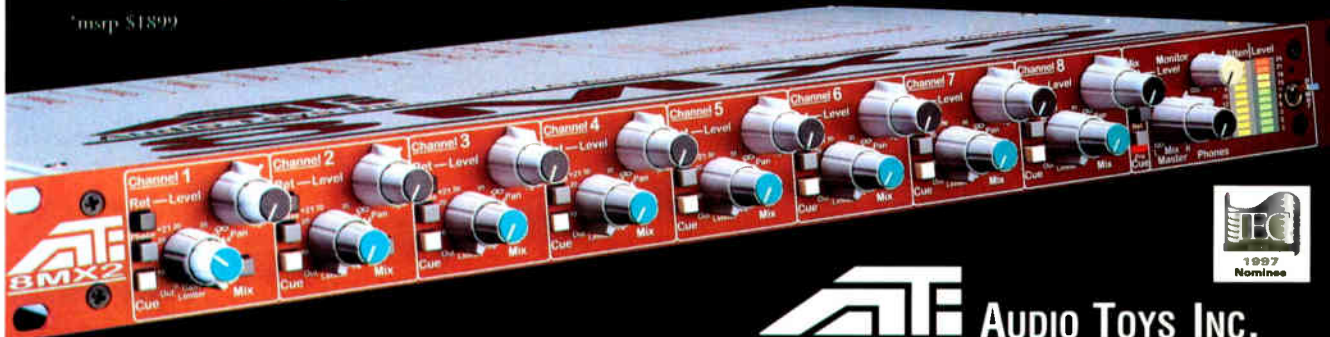

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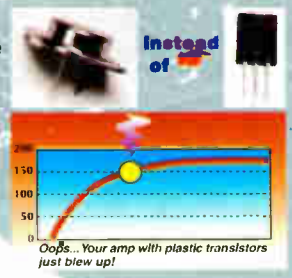

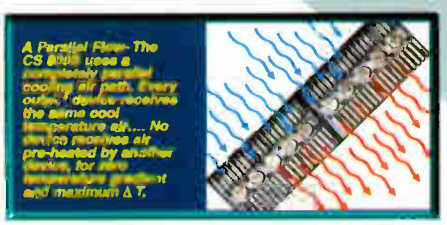

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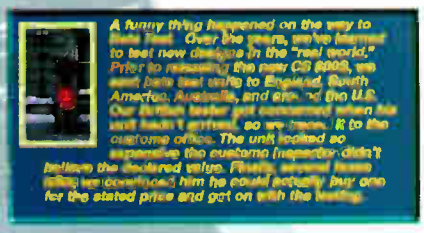

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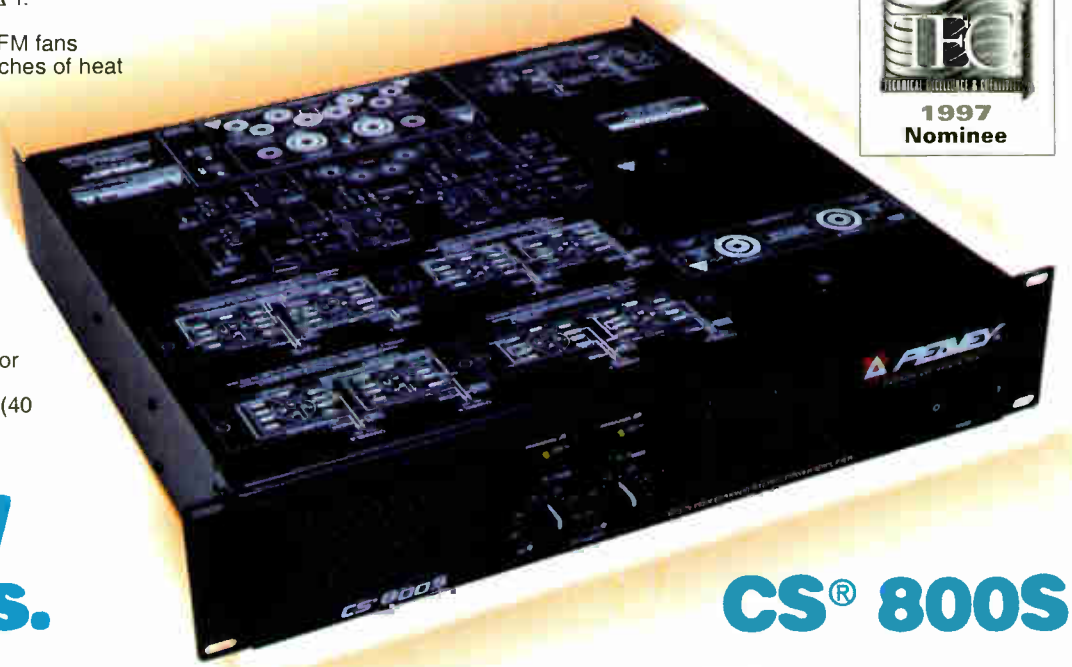

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on my desktop is a tremendous and powerful musical instrument. I can compose, score, send that information out over a phone line. One of the things we'll be talking about at this [AES Internet] conference will be examples of how people are providing music instruction over Advanced Internet—we're not talking about 14.4 [kbaud] modems, where quality is limited. But these are engineering obstacles that people are aware of and are being worked on. Advanced Internet or broadband backbone services will make this possible.

What is Advanced Internet?

Advanced Internet means provision for broadband services, high-speed delivery and [bandwidth] reservations. Right now, because of packet switching, there are all kinds of timing issues on the Internet. And the breaking up of audio packets messes up things in a big way. In the planning stages are ways to develop subscription services that will handle 96kHz, 24-bit, 6-/8-channel audio.

Let's talk about your current role as AES president. What have you done in your year?

My basic goal was to focus AES [into] providing technical leadership in audio and to enable us to serve as the forum for discussion, and act as the voice for audio. The evolution of new media is a priority for the AES. We will let them know what matters to us; that the AES serves as the voice for a wide-ranging group of very creative people, from the dub stages, to speaker designers, to mixers, to inventors. We are responsible for providing the creative tools for artists. It is my commitment to make sure that we have the best tools possible and that we're responsive to all of our different constituencies, from students to doctors of philosophy.

My focus has been to respond to the shifting creative technical paradigm. It's not just traditional digital audio I see as the agent of change, but a lot of these advanced technologies, including music and radio distribution over packet networks. We're going to have multichannel audio. All sorts of distance recording technologies. Innovations in compression and coding are coming fast and furious. The focus of the AES is that we are a society of engineers, and we respond to their interests. ■

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

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Broadway Sound's newly opened Studio 4 (New York City) houses an AMS/Neve Logic 2 96-input console, which includes a 24-track, 24-bit AudioFile digital workstation with full OMF capability and 5.1 Dolby Surround mixing. The studio includes a voice-over booth, two Foley pits, an overhead projection system, an array of samplers, musical instruments for sound design and a selection of new and vintage mics. Studio 4 was designed by architects Kapell, Kostow & Wasserman, and the acoustic designer was Robert Hansen. Broadway Video chief engineer, David Radin, was the technical designer and supervised the in-house equipment installation.

PHOTO: ROBERT WOLSCH

PHOTO: FRED HOUSEL

Mackie Designs training director Keith Medley collaborated with designers Studio Pacifica Ltd. in the creation of this multipurpose training and production facility at Mackie headquarters in Woodinville, Wash. The facility comprises the control room pictured, a large classroom/ studio, an iso room, a video edit suite and a video production room. The control room is equipped with a 56-channel Mackie 8-bus console (soon to be replaced with a new Mackie digital console) with UltraMix automation, Genelec 1035 and Mackie HR824 close-field monitors, and 24 tracks of ADAT XT locked with 16 tracks of Pro Tools 4.0.

PHOTO: MICHAEL PARTENIO

Direct sunlight shines into The Green Suite at New York City's Chung King Studios. Designed by owner John King and Frank Comentale, the room opened this past February and features the world's largest Neve Capricorn, two Studer A827s, a Studer D827, Sony PCM 3348, Sony PCM 9000, Augspurger dual 15-inch main monitors, Tannoy DMT 12 midfields, Auratone near-fields and a view of the Manhattan skyline.

PHOTO: ED FREEMAN

In collaboration with designer Chris Pelonis, late last year, film composer Brad Fiedel converted a guest house at his home near Santa Barbara, Calif., into this new studio. Fiedel's setup includes a Sound Workshop 334 board with DiskMix 3 automation and two Fairlight Series 3 CMIs. He records on an Otari 24-track with SR and mixes to an Otari MTR10 3-track with timecode and SR for his film projects. Monitoring is via Yamaha NS-10s and Tannoy AMS 12 mains.

World Radio History

THE CLASS OF '97

A Look At 22 of The Year's New Rooms

Last year at New York City's Right Track Recording, studio owner Simon Andrews, manager Barry Bongiovi and technical director John Herman collaborated on the refurbishment of the facility's largest tracking room, Studio A. Frank Filipetti tuned the room, and the studio installed a 96-input AMS/Neve winged VX console. Other equipment includes Studer A800 MkIII analog and Sony 3348 digital recorders, and Genelec 1035A mains. The room came back online in January.

PHOTO: MICHAEL PARTENIO

PHOTO: ALACTRONICS INC.

Bob Alach of Alactronics Inc. designed this audio post suite, which opened in July 1996, as an addition to the video post and production facilities of The Troupe, Windham, N.H. The console is a DDA Forum/Composer; the control room is fitted with Genelec S-30C monitors and was designed to provide high resolution and accuracy. The narration studio has a noise floor below NC-9.

Bob Schott Sound in New York City (located at Unitel Post 38) opened in December '96 and is used for recording voice, mixing sound to video and music composition. The Downtown Group handled the architecture, acoustics and interior design. Major equipment includes Pro Tools 4.0, Synclavier PostPro, Yamaha 02R console, Quested monitors and an array of vintage tube gear. The custom-built equipment console has a low profile to control monitor reflections.

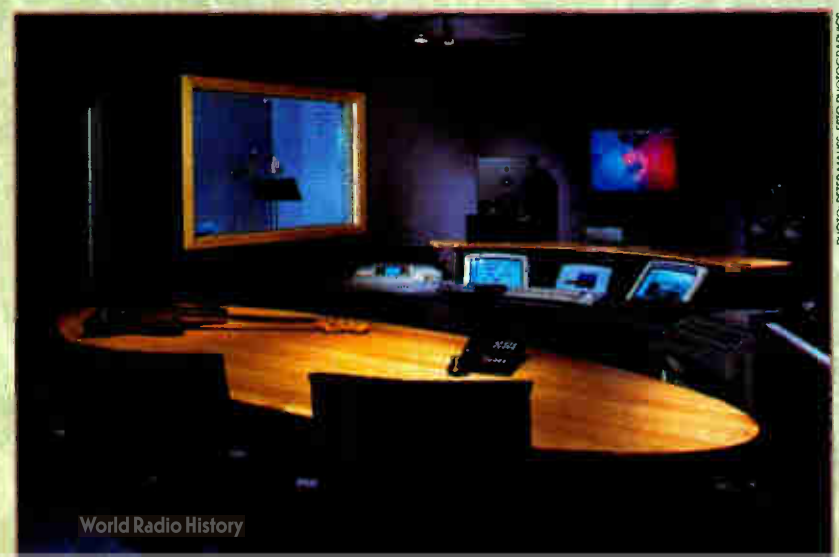

PHOTO: PETER MAUSS, ESTO PHOTOGRAPHICS

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PHOTO: STEVE BRADY

THE CLASS OF '97

For the rebuild of Battery Studios' (New York City) Studio A, acoustician/designer Neil Grant of Harris, Grant Associates specified stripping and replacing the room's entire isolation shell and completely restructuring the front wall. The studio installed Boxer T5 monitors of Grant's design, hung from isolation mounts suspended from a custom frame built into the wall. Completed last spring, the room also includes an SSL 4046G with Ultimation, and two Studer A827s and a Studer A820.

New York City-based Effanel Music worked on the Grammy Awards broadcast for five years, using two trucks. For this year's 39th Annual Awards, the company was able to handle the live broadcast music performances of 14 different artists (using more than 500 channels) entirely from one truck—its new expandable mobile music studio, L7. Designed by Effanel, L7 features an AMS Neve Capricorn console, Sony 3348 48-track and Tascam DA-88 recorders (all modified for 24-bit recording), and Meyer HD-1 monitors.

PHOTO: MICHAEL PARTENIO

PHOTO: PAT CUDAHY

In spring '96 Big Bang Productions in Lolita, Calif., brought in designer Chris Pelonis of Pelonis Sound & Acoustics to remedy some acoustical problems. Pelonis completely renovated and remodeled the control room, which reopened that June. The residential studio is located in a hilltop house on 15 acres of property in the northern part of the state and features an Oram BEQ 32 console, 32 tracks of ADAT and Tannoy AMS 10 monitors.

The contractor for Warner Bros.' new Dubbing Stage 5 (Burbank, Calif.) was Tectonics; the architect was HLW International LLP; the acoustical designer was Charles M. Salter Associates Inc. Built for 35mm film and ¾-inch video formats with the Warner Bros. proprietary sound system, the stage also offers an adjacent ADR room. Major audio equipment includes an SSL 8088 three-person dubbing console with Ultimation, Otari MTR-90 recorders and playback, and Fairlight DaDs, Waveframe DAW-80 and Pro Tools for digital playback. The speakers are a Warner Bros. custom three-way film system consisting of Turbosound TSW-124s, Community M4s and JBL 2446s. The stage was completed in September '96.

PHOTO: TOM BONNER/COURTESY OF WARNER BROS. & HLW INTERNATIONAL LLP

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PHOTO: MICHAEL HOILAND

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New York's Quad Recording Studios opened Studio 3 in January, installing the facility's second SSL SL 9000J in the newly constructed room. Designed by owner Lou Gonzalez, Studio 3 includes a large tracking room, three large iso booths, Studer and Otari 24-tracks and UREI, Tannoy and Yamaha monitors.

PHOTO: DAMION CLAYTON

Aural Fixation, a new, 2,000-square-foot post facility at First Edition (New York City) was designed by the Walters-Storyk Design Group. A modified SSL OmniMix console integrates Avid's AudioVision digital audio workstation, while 12 Avid Media Composers and two online edit suites directly access the audio suites via an AvidNET fiber-optic link.

PHOTO: JOE PABAN

George Augspurger designed this audio post room at Atlanta's Doppler Studios. The room, Studio G, was a large tracking space, which Doppler gutted and completely renovated, floating a new floor. The studio was opened in spring '96. It is used mainly for posting advertisements and is equipped with a Euphonix CS2000 and a Dolby Surround monitoring setup with Genelec speakers.

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PHOTO: SCOTT ZIMMERMAN

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Counterpoint Studios in Salt Lake City opened in March of this year. The 5,000-square-foot facility was designed by studio bau:ton and comprises two complete studios. Studio A, pictured, is a 30x25-foot tracking space. Control A features a 44-input Amek BIG console, a Studer A827 24-track with Dolby SR, and Genelec mains (1039s) and near-fields (1031As). The studio offers album production as well as complete post-production services.

PHOTO: GEORGE HALLOWELL/STUDIO PACIFICA LTD.

The Jungle, Seattle, Wa., designed by Studio Pacifica Ltd., is a surround sound audio post-production facility for television, film and multimedia. This facility opened in June of '97. The two control rooms share a skylit, variable acoustics tracking room and two vocal booths. Control Room A, pictured, features a Soundcraft DC2020 Surround console and Dolby Surround, Genelec monitors and sub, Avid AudioVision, Pro Tools and DA-88s.

PHOTO: EDWARD COLVER

Acoustic and architectural firm Studio 440 designed MCA Music Publishing's (West Los Angeles, Calif.) new 1,800-square-foot demo music studio. This room, which opened in March, includes a tracking room, iso booth, tape storage vault and control room. Featured equipment includes an API Legacy console, a Spectral System hard drive recording system, a Sony MCI 2-inch 24-track, UREI 809 monitors with tri-amped Massenburg crossovers, a selection of new and vintage effects processors and a wide variety of keyboards. Wiring design and installation were handled by Vertigo Recording Services.

PHOTO: GEORGE ROOS

Mirror Image West Studios (New York City) completed this new SSL 4000G Plus mix room in January of 1997. The studio was designed by Francis Manzella Design and features JBL 4430 main monitors paired with 4645 subwoofers on each side. Other equipment includes two Studer A827 24-tracks and a full complement of MIDI and sampling gear. In addition to the main live room, there are two iso booths offering a variety of acoustic recording options.

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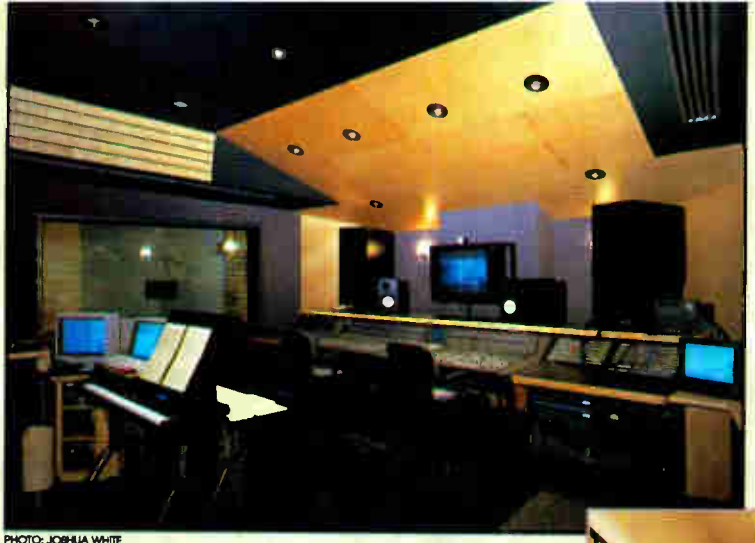

PHOTO: JOSHUA WHITE

THE CLASS OF '97

Studio bau:ton designed this 4,000-square-foot, Santa Monica, Calif., personal recording facility for film composer and record producer James Newton Howard. This studio was completed last November. The large control room features studio bau:ton's custom diffuser panels and broadband diffusion elements and accommodates a Euphonix CS2000 console, a PMC monitoring system, Sony 24-track analog recorder, Tascam DA-88s, Synclavier and a large collection of outboard gear. The control room has windows looking onto the machine room, the engineer's office and the 320-square-foot tracking room.

This is the 14x25-foot control room at Creative Music Recordings, offering a Trident Series 65 console, a Studer A80 24-track recorder and monitors by Westlake and Dynaudio Acoustics. The West Palm Beach, Fla., facility opened this past October and includes an 18x15-foot tracking room, a large iso booth and lounge. Owner Marilynn K. Seits and Fernando Levi designed the studio, in consultation with Ross Alexander.

PHOTO: JOHN LEE MONTGOMERY III

Nashville studio Love Shack moved into new facilities last October. Built primarily for overdubbing, the studio was acoustically designed and tuned by Steven Durr and Michael Cronin, with additional design, layout and construction by Randy Robinson of Robinson Construction. Equipment includes a Trident 80C console with Uptown automation, Otari DTR-900II 32-track digital and MX-80 analog recorders, and Steven Durr custom mastering monitors.

PHOTO: JAMES WILSON

Well-known for their production of the Barney and Wishbone *TV series, Lyrick Studios relocated to this new facility In Las Colinas, Tex. (a suburb of Dallas). The 1,800-square-foot technical facilities were designed by the Russ Berger Design Group and feature a Harrison Series 12 board, Genelec 1038 monitors, Studer A827 and six Sony PCM 800 recorders, NVision Router and Sync Generator and two Waveframe workstations.*

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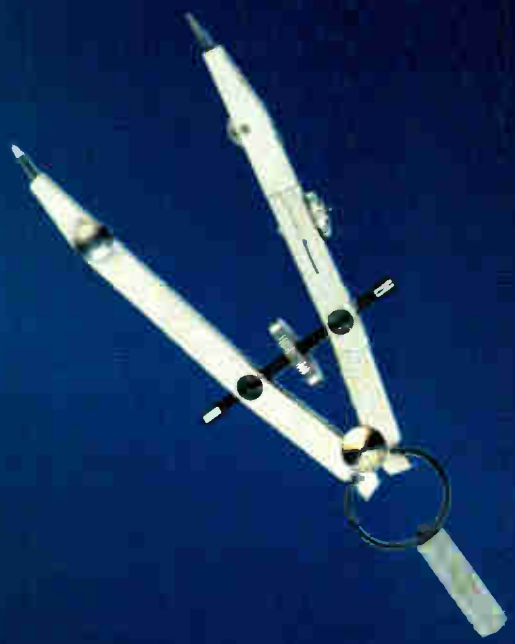

TEC AWARD NOMINEES DISCUSS

BY DAVID SCHWARTZ

IN the beginning, there were egg cartons. Tacked to walls, bumper-to-bumper, those early absorbers were an attempt to soak up stray sound waves and keep the room from getting in the way of the direct sound from the monitors. As studio acoustics began to evolve, experts such as Leo Beranek and Tom Hidley began to point the way toward

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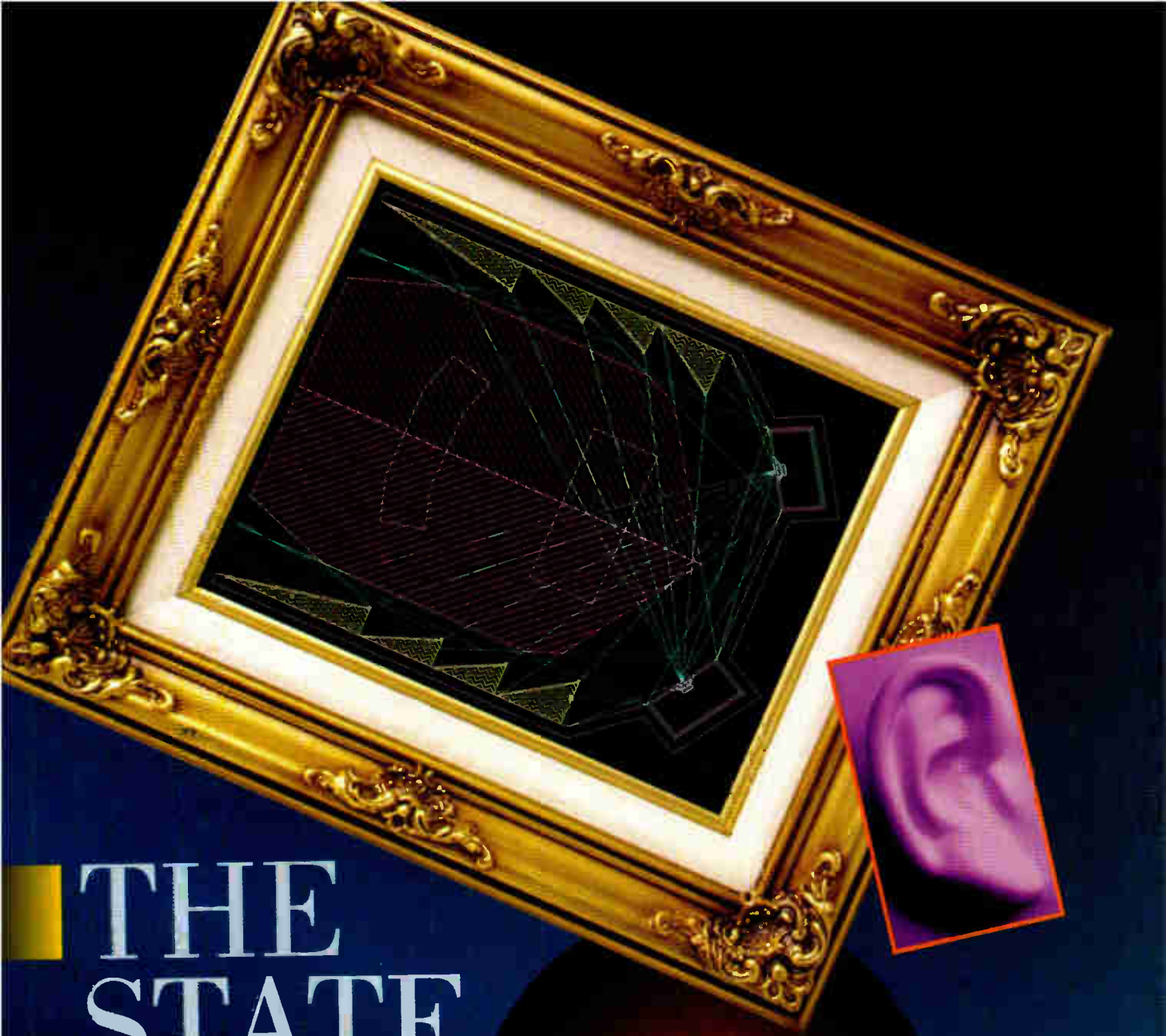

THE STATE OF THE ART IN CONTROL ROOM DESIGN

World Radio History

precision tuning of sonic environments: They developed geometry, materials and scientific tricks that enabled sound engineers to employ acoustics as variables in sound recordings, rather than constraints. The passing years brought designer sound environments that went way beyond solving acoustical problems, allowing music recording to flourish in virtually any physical space that happened to be convenient to the musical source.

Today's studio designers are dealing with more subtle problems. Very often, designers deal with someone who has selected a building or site based on its low purchase or lease price, a great location, or some other factor than its acoustical advantages. The owner then hopes to minimize the impact from noise on the acoustical environment through "silver bullet" fixes. "Although we have found clever, cost-effective ways of maximizing sound isolation through special acoustical construction," says Russ Berger, of the Russ Berger Design Group (Dallas), "we have yet to figure a way of defying the laws of physics. There is usually a good reason why the land at the end of the airport runway is so cheap."

But costs are coming down for many of the tools and materials used to address these challenges. "In the past five years, there have been great developments in both inexpensive surface-mounted acoustical treatments and in software, both at the testing and design end," says John Storyk, of Walters-Storyk Design Group (Highland, N.Y.). "New materials by RPG, SDG, Wenger, IAC and virtually the entire universe of prefabricated cheap materials have taken a decimal point off their previous costs. Auralization software, and CAD computers in general, have been an overwhelming help. The JBL SMAART is a very inexpensive software-based testing device that has really given the testing tools to everybody once and for all."

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IT'S IN THE AIR

Other technologies have become available for dealing with some common problems, such as Heating, Ventilation and Air Conditioning noise. According to Berger, "A practical use of phase cancellation has been developed to help control unwanted HVAC system noise. The Active Noise Control system consists of three components. The first is a series of acoustical sensors such as accelerometers to measure the vibration, microphones to measure airborne sound, or a combination of both. The second component is an electronics package to analyze the noise and produce an out-of-phase canceling signal. The third component is a delivery system of amplifiers and loudspeakers or vibration shaker transducers.

"DSP technology has made this noise control technique possible, practical, and most importantly almost affordable for use in reducing the effects of unwanted HVAC system noise," Berger continues. "This is not to say that this manner of noise control system is either cheap or a panacea for all noise problems. In fact, a practical implementation will correct only a small fraction of the problems normally encountered in the field."

Many of the most positive advances in studio design have been the result of consumer pressure, according to Neil

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Grant of Harris Grant Associates. "The latest design pressure is for us to deal with the whole-scale adoption of multiple monitoring formats around the world. For some time now, post-production, film dubbing and mastering facilities have required support of a number of multiple-channel formats, but now all of the otherwise conventional music facilities require that we consider a nominal 5.1 surround format. The problems are really rather challenging and interesting—partly from an acoustic point of view, partly from the visual and aesthetic.

"How do we deal with a center monitor, and a requirement for extended vision, yet maintain lateral and vertical compatibility between the left, center and right channels? How can we sustain the illusion of distant left and

FIVE COMMON CONTROL ROOM MISTAKES

by Chris Pelonis

1. Sight before sound. If you're building a control room, consider the sound first. You can always make it look pretty, but that should not be the first priority.

2. Placement of equipment. Racks that are too tall and in the direct line of fire from the monitors, asymmetrical placement of equipment, a machine soffit on one side in the front region or a 5-foot rack to one side can be like a cold slap in the ear.

3. Inadequate or improper bass-trapping. Broadband bass absorption in the proper places will increase the punch and accuracy of the low end. If done in the wrong areas, it can do the opposite. If not done at all, it can affect the entire spectrum disastrously.

4. Poor quality interconnect, speaker cable or any other wire that carries signal. Proper matching of amplifiers and monitors is also very important.

5. Trouble-shooting of control room problems. It takes experience to know where to look first. I often see engineers blaming speakers for room problems or rooms for poor mic technique or mic pre's for bad mics, etc. Fixing the part that's not broken means you just broke something else. Be systematic in your trouble-shooting, and get some help if you're unsure. ■

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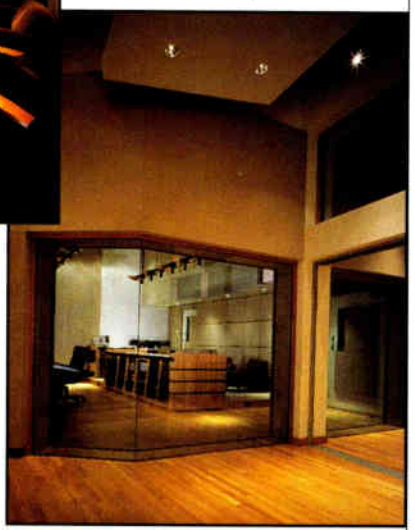

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right rear sources, with the same bandwidth and dynamic range as the forward speakers? Where should the low-frequency effects speaker(s) be located? The solutions to these questions are producing some of the newest and most challenging facilities that have been designed to date," says Grant.

Studio bau:ton's (Los Angeles) Peter Maurer has seen the rush in Hollywood to convert to the 5.1 surround format since about the beginning of this year. "There's not enough space in some of these rooms to put in the side speakers, the rear speakers, the subwoofers, extra amplifiers, and still keep the control room uncluttered. It requires physical changes to the structure, and it's relatively expensive to do these retrofits. So we're suggesting to everyone that even if they don't put in a 5.1 format for any new room that they're building, at least prepare for it so it's easily added later on.

"The biggest problem we see in control rooms," says Maurer, "usually deals with the upgrade of technology. The digital domain means most people have to upgrade their playback systems to account for the lower noise floor and wider frequency response, especially in the low end. You can record a very low frequency that is below the hearing threshold, maybe generated from the air conditioning or a railroad track in the area, that you never had a problem with before, and when you play it back the harmonics of those low frequencies can add noise to your tape.

"It's fairly expensive to resolve those problems, and unfortunately studio owners can't really charge more for the time. When we as studio designers or architects tell studio owners about this, we're really in a bind. It may sound like we are doing a sales job, but that's not really the case. These are expensive problems to fix, and they're necessary with where the technology has taken us."

SHRINKING ROOMS

Some of the most common problems in today's control rooms stem from the equipment becoming smaller, and people tending to think that, corresponding-

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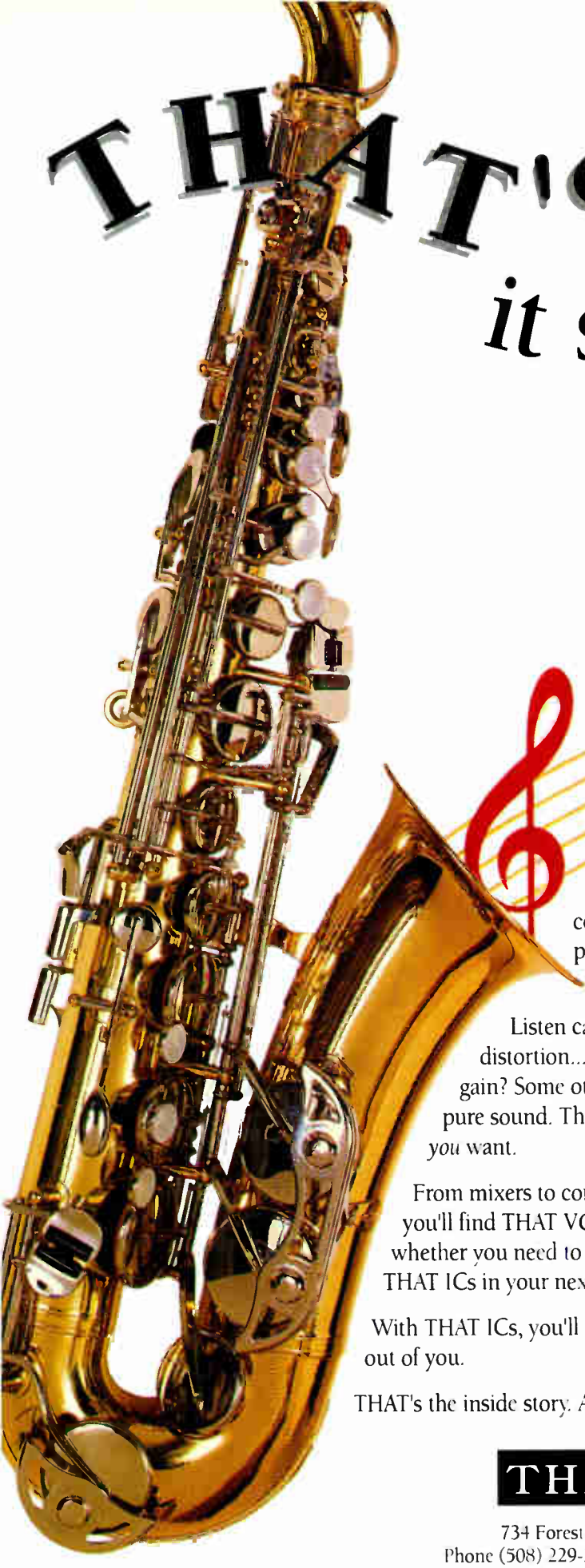

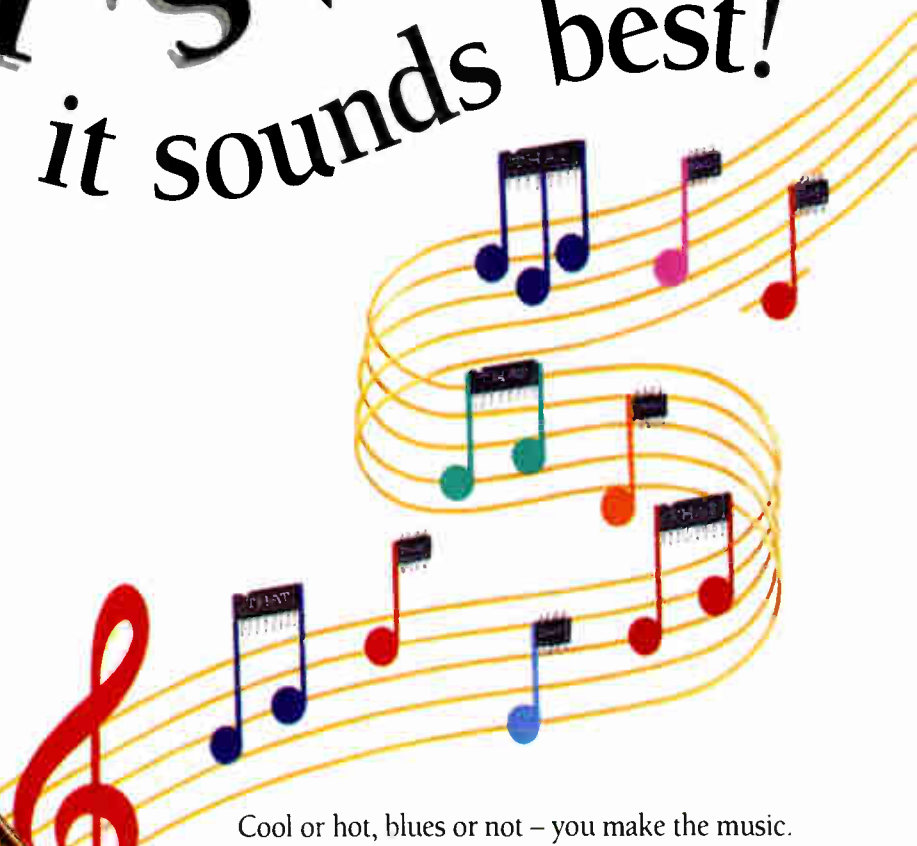

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ly, critical listening spaces can shrink as well. "Fans of the 'Dilbert' cartoon strip will recognize this common theme, where office space will shrink to the point that the worker will step into his office like a suit," says Berger. "Scott Adams [Dilbert's creator] projects that soon we will have offices only slightly larger than our heads that we will put on like helmets—allowing our bosses to stack us like cordwood in a warehouse."

"The age of the giant studio is waning," says Storyk. "It's not over, but it is waning and being replaced by desktop audio. More places have more control rooms and more studios—more production facilities. We're doing facilities right now where I'm not sure if it's a video or audio facility—you can't even tell anymore. We see more computers and televisions, and fewer tape machines, if any. Streaming audio and streaming video are now being replaced by streaming media. It's forcing us to put more of these facilities into more office-like and desktop-like environments—a whole other set of challenges."

"The problem with critical listening environments is that they must perform to a level suitable for their intended use," says Berger. "For example, the acoustical requirements for a simple speech-only editing booth where the operator will be listening to primarily prerecorded mid-spectrum sounds are vastly different from the type of acoustical support one might need from a room for multichannel music mixing. The important thing is that these are spaces for people to work in; they should be humane. It is also important to know how many people will be in the room and, of that number, how many will be making critical listening decisions."

We're doing facilities where I'm not sure if it's a video or audio facility—you can't even tell anymore. We see more computers and televisions, and fewer tape machines.
— John Storyk

HEAR YE, HEAR YE

Chris Pelonis, of Pelonis Sound, in Santa Barbara, Calif., has focused much of his attention on developing designs that allow people in different parts of the control room to hear the sound similarly. "The goal is to achieve accurate frequency and phase response from all usable areas in the control room," says Pelonis, "including the back end where producers are usually swallowed up in an uncontrolled swamp of lingering low frequency.

"This has been achieved by first addressing proper bass trapping in all pressure zones. Low frequencies search for the point of least resistance in an effort to escape the room. In a sealed room, the lows accumulate in these areas which, in effect, become a secondary source for low frequencies to interfere with the original source.

"In our ceiling design, emphasis is placed on the front and rear areas where the wall meets the ceiling, using the proper amount of cubic footage in these areas to eliminate low frequencies. Full frequency absorption in the front end eliminates early reflections, and less absorptive combined with diffuse surfaces in the rear create natural ambience. The side walls are absorptive in the mid and high frequencies up to the arm of the console where life is slowly introduced.

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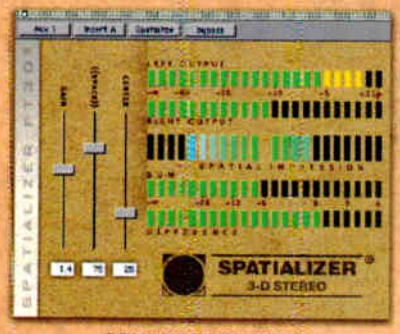

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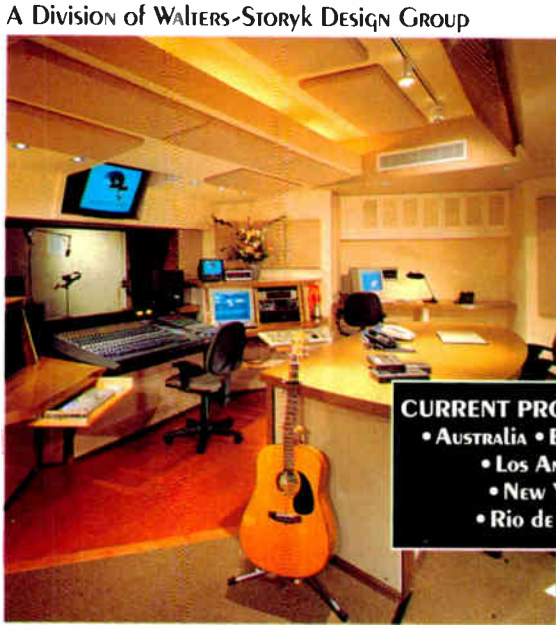

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patented a low-frequency device called The Edge," Pelonis continues. "I have found that the characteristics of this device, when used for back wall treatment, deliver remarkable results. The device is about 95 to 100 percent absorptive from around 400 Hz down and becomes progressively reflective as the frequency rises. The curve is very smooth, and the ambient quality is very natural. In larger rooms where extended low-frequency absorption is required, a cavity with loose Fiberglas behind the trap is applied.

"It is very important to keep things symmetrical in the control room so that imaging is precise," adds Pelonis. "I prefer a point source monitor, where the tweeter is recessed within the woofer, so that the full spectrum is originating from a central point. In monitors where the highs and lows are generated from separate origins, the time arrival will be constantly changing as you move around the room. The result is a change in frequency and/or phase response off-axis."

ROOM FOR IMPROVEMENT

The frontier for studio designers has as much to do with guiding a client through the process as solving the physical problems. "Often times, owners bring to the project budgets, schedules or expectations that are unrealistic," says Berger. "We are constantly trying to find ways of more effectively communicating the results of the design process. One particularly effective tool we have found is the use of animated flythroughs and electronic models to help the owner and design team visualize the virtual-built environment.

"Of course, the Internet is an integral part of our everyday design life. We can now ship a drawing or change to the other members of the design team almost instantly. For example, we can modify and send a design drawing or document and have a design team member in another city receive and review the drawing—all during the course of a single telephone conversation. The communication of design solutions and ideas is what we are about, and we are

—CONTINUED ON PAGE 226

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ROOM ACOUSTICS

Basic Principles of Reflection, Diffusion and Absorption

[Editor's Note: The following is excerpted from a book due out this month written by Charles Salter Associates Inc., San Francisco. Published by McGraw-Hill, Acoustics in Architechtural Design and Planning *is immense in scope, covering issues from "Psychoacoustics and Hearing" to "Office Acoustics and Speech Privacy," along with plenty for the recording professional. The following is a portion of Chapter 6, "Room Acoustics," written by CSA's David Schwind. Problem-solving sidebars are included, excerpted from Chapter 17: "Case Studies."]*

Room acoustics as a discipline involves the study and analysis of direct and reflected sound. Appropriate room acoustics are essential in all spaces where sound is to be transmitted to a listener; this includes both speech and music. Room acoustics design criteria are determined according to the room's intended use. Acoustic, unamplified music, for example, is best appreciated in spaces that are "warm" and reverberant. Speech, by contrast, is more intelligible in rooms that are less reverberant and more absorptive. It is possible to create suitable acoustics for both speech and music in the same space, although this is rarely accomplished without some degree of compromise.

The term "room acoustics" typically brings to mind spaces where music is performed and recorded: concert halls, recording studios and scoring stages, for example. While acoustics are especially important to the success of these spaces, a much wider variety of facilities benefits from well-designed acoustics. Lecture and convention halls, classrooms, board rooms, council chambers, courtrooms, places of worship, theaters, cinemas and

by David R. Schwind

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DUBBING STAGE: SKYWALKER RANCH, NICASIO, CALIF.

ARCHITECT: BACKEN ARRIGONI & ROSS, SAN FRANCISCO

The dubbing stage, along with the various recording, mixing and editing rooms in this facility, was engineered to meet the owner's acoustic criteria for sound isolation, room acoustics and background noise level. Floating floors, double-glazed windows and masonry walls combined with furred drywall construction achieved the sound isolation requirements. The background noise level in the dubbing room was controlled to a maximum of NC 15 using in-duct silencers, plenums, oversized ventilation ducts and a plaque air diffuser supply system. The reverberation time was controlled to 0.4 seconds. A portion of the Technical Building was constructed over a parking garage. Acoustical tests were conducted and construction de-

—CONTINUED ON PAGE 60

PHOTO: DOUG SAHLIN

broadcast studios all depend on their acoustical quality. Speech intelligibility is essential in all of these spaces. Different acoustic design criteria are required for rooms where music is to be played, where "natural" acoustics help support unamplified musical instruments.

DESIGN CRITERIA

The design criteria for any room should be based on its estimated percentage of use for a particular function. This is particularly important for multipurpose spaces that may need to serve, for example, both as a lecture facility as well as for music recitals. Often, such different requirements pose a design conflict that is difficult to resolve, especially if the room is large. As a general rule, speech is intelligible in rooms having a reverberation time of one second or less. Conversely, music is composed of a wide variety of repertoires and genres, each of which has its own desirable range of reverberation or "liveness" provided by the room.

In addition to criteria for reverberation time, spaces used for critical listening should be designed with concern for the audio signal's imaging and echoes. Imaging includes the apparent size and location of sounds that are part of audio reproduction. Ongoing psychoacoustic research has attempted to define the early sound field thresholds for perception of reflections, changes to the audio image, and echoes based on the sound level of reflections and their delay after the direct sound (See, for example, Toole, Floyd, 1990, "Speakers and Rooms for Stereophonic Sound Reproduction," AES Eighth International Conference Proceedings).

If a critical listening space is designed to be "neutral," that is, without added "coloration," then the early reflection levels should lie at or below the threshold for image shift, as shown on page 60. The threshold for

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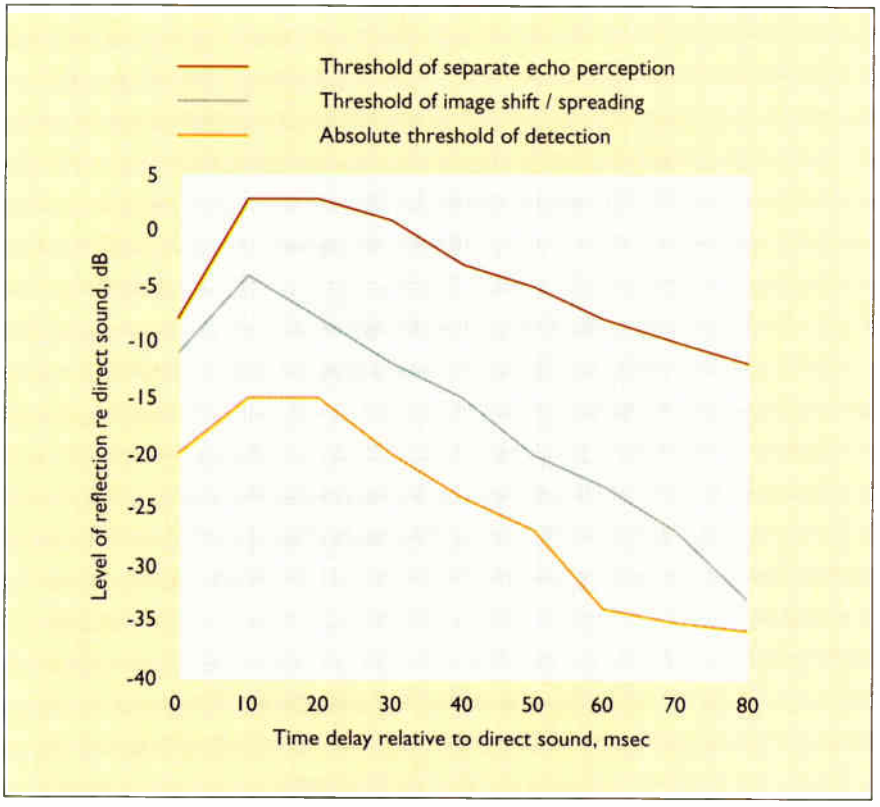

In an "uncolored" critical listening space, the ratio of reflections/direct levels should fall at or below the threshold of image shift perception (gray curve).

image shift is the level at which a sonic image appears to move from its actual location. Achieving these relatively low reflection levels in a studio control room requires treatment of all surfaces involved in providing first-order sound reflections to the listener. One surface that cannot be treated by the studio design consultant is the upper surface of the mixing console. Future mixing console designs should consider using control surfaces made of porous material, such as sintered aluminum.

Another consideration in the design of critical listening spaces is eliminating "rattles and resonances" often associated with metal fixtures, such as lighting, ducts, diffusers and furniture. Difficulties are often resolved by applying visco-elastic damping material. Damping is normally available as sheet material with a self-adhesive backing or in liquid form. The sound intensity produced by a vibrating surface is normally proportional to the velocity of the panel vibration. Damping reduces the panel velocity and, hence, the sound.

BASIC PRINCIPLES OF ROOM ACOUSTICS

The main difference between indoor and outdoor sound propagation is in the level of reflected sound. Indoor environments naturally create more reflected sound than do outdoor environments. Reflected sound can be divided into three distinct categories: early and middle-reflected sound, reverberation (late-reflected sound) and standing waves.

Early reflections contribute more to the subjective perception of reverberance, or "liveness" of a space. Early and middle reflections occur within the first quarter of a second after arrival of the direct sound. Early sound is considered to be 40 ms after arrival of the direct sound for speech while for music 80 ms is more appropriate. Once sound reflections have built up to a point where they are not discernible as discrete events, the late reverberation process takes over. In most well-designed spaces, reverberation is a statistical phenomenon, no longer relying on specific room shape and sound propagation paths. For this reason, the statistical study of room acoustics, which ignores the path of specific reflections but considers reflected sound as an aggregate probability, is employed with respect to reverberation. Statistical analysis methods are applicable to rooms with relatively uniform sound absorbing material distribution and reasonable aspect ratios.

In spaces having a diffuse sound field where sound is uniformly distributed throughout the space, reverberation decays logarithmically, although the decay sounds even and consistent to the human listener. The reverberation time is defined as the time for reflected sound to decay 60 dB. Generally, it is necessary to avoid assessing early sound reflections as part of reverberation since the reflections contribute to sound build-up, rather than to sound decay. The first 5 to 10 dB of decaying sound reflections are generally not used to determine the reverberation time, which is determined from the remaining decay.

Specular Reflections. The manner in which sound reflects depends on the

—FROM PAGE 59, SKYWALKER RANCH

signed so as to control the noise intrusion of car engines.

It was desired that arches be part of the room's design. Cost studies conducted during the value engineering phase of the project dictated that the arches be constructed of glass fiber-reinforced gypsum rather than plaster. A 1-to-10 scale model was built as both an aesthetic study model as well as an acoustical testing model. A 3mm (⅛-inch)-diameter microphone was used to receive the test signal in the model, and the sound reflection patterns in the model were displayed on an oscilloscope screen. The test indicated that the arches as designed would diffuse the sound, not create echoes. These test results were confirmed after the room was built.

During the construction phase, onsite field visits were conducted every two weeks to review the various sound-rated constructions and the installations of the ventilation system. Post-construction measurements of background noise were made in all noise-critical spaces to verify that the design criteria had been met.

The acoustical design of this building received an Honor Award from the American Consulting Engineers Council in 1988, in part because some of the recording spaces in the complex are among the quietest in the world. ■

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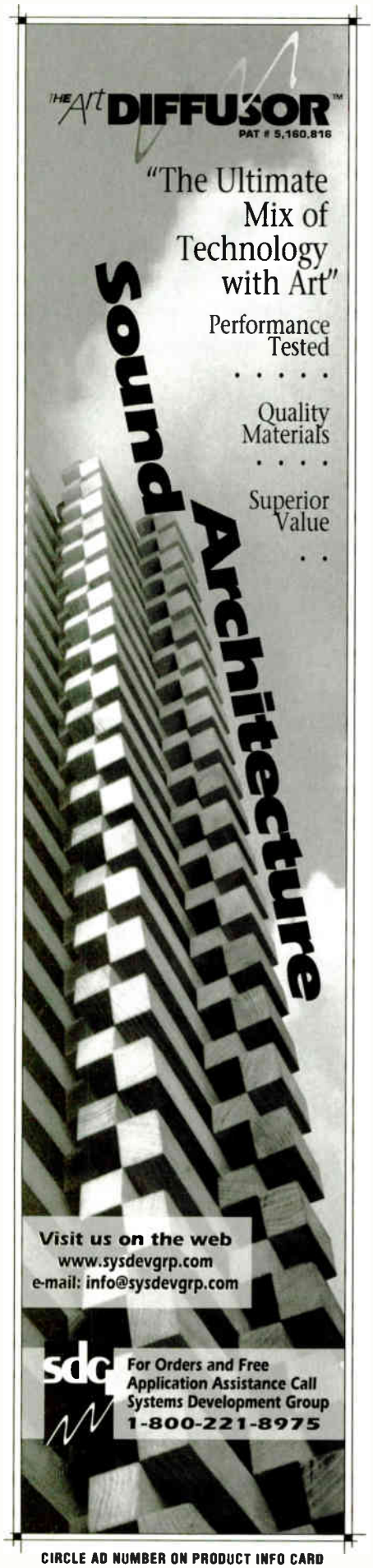

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shape, texture and material of the room boundary. Specular reflections, those reflections conforming to Lambert's law of reflection, where the angle of incidence equals the angle of reflection, typically occur at smooth and relatively flat surfaces. For a surface to be a good reflector of sound, its dimensions should be at least one wavelength or larger than the lowest frequency being reflected. For instance, the wavelength of the musical note middle C (256 Hz) is approximately 1.35 meters (4.5 feet) long. Two octaves higher, a little above 1 kHz, the wavelength measures just over 0.345 meters (13 inches). In order to adequately reflect low-frequency sounds which have larger wavelengths,

SCREENING ROOM: DOLBY LABORATORIES, SAN FRANCISCO

DESIGNER: BERRY REISCHMANN, SAN FRANCISCO

This room is used for film screening, presentation, audio recording and for training. New products for improving motion picture sound are demonstrated, evaluated and developed here. It is located on the third floor of a building originally constructed in 1910. The size and shape of the room were optimized for motion picture presentations. The coffered ceiling creates a desirable aesthetic and helps to diffuse sound evenly throughout the room. To achieve Dolby's reverberation time criterion of approximately 0.3 seconds in the mid-frequencies, about 70% of the wall and ceiling areas were made sound absorptive, using 25 mm (1 inch)-thick sound absorbing material over deep air spaces. The acoustical quality in the room can be varied using retracting sound absorbing quilts in the side walls.

To develop structure-borne vibration control design standards for the 35mm and 70mm projectors in the projection room, vibration measurements were made on similar projectors at a nearby theater. The screening room projectors were mounted on a floating concrete slab, isolated from the surrounding floating floor.

Double stud walls, a sound-isolating gypsum board ceiling and 75mm (3-inch)-thick acoustically gasketed doors control noise intrusion from the outside as well as from the theater to adjoining areas. Double glazing with a 200mm (8-inch) air space was used to control projector room noise transfer into the screening room. The background noise in the room varies between NC 15 and NC 20 depending on the ventilation fan speed and thermal load. The office space below the screening room has an exposed ceiling for aesthetic reasons. The entire screening room is isolated from the office space by a concrete floating floor. ■

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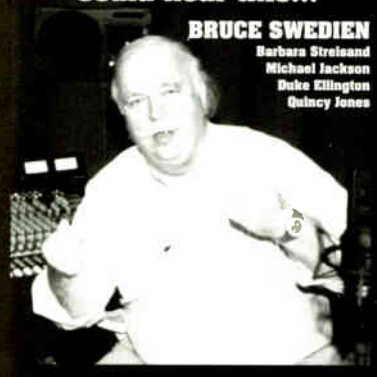

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THEATER, DRAMATIC: FAIRFIELD CENTER FOR CREATIVE ARTS, FAIRFIELD, CALIF.

ARCHITECT:
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This 420-seat community theater accommodates both dramatic and musical productions. Multipurpose theaters like this typically present acoustical challenges to designers. Such theaters should be able to effectively present a variety of shows; this necessary versatility often calls for an ability to adjust the room's acoustics.

The Fairfield stage was designed to be large enough for a 50-person orchestra, and the orchestra pit was sized to accommodate about 20 musicians. NC 20 was selected as the criteria for the theater and stage. A sliding glass window in the control room was provided so that the audio engineer responsible for mixing live shows could hear the sound being created in the theater by the sound reinforcement system. This window is sound rated to control sound transfer from the control room into the theater when the window is closed.

The reverberation time in the theater was made variable by installing retractable velour draperies in an attempt to optimize the sound according to the program. These draperies, which were installed along the side walls, allow the reverberation time to vary by approximately 20%. When the theater is empty, for example, an average time of 1.2 to 1.4 seconds is achieved depending on the position of the drapes. Speech intelligibility measurements conducted at various seating areas determined that with the side wall curtains extended, the quality of speech intelligibility was measurably improved, as expected. When unamplified acoustic instruments are played, the drapery should be fully retracted so that the room can achieve its most reverberant condition. The stage house walls were treated with 25mm (1-inch)-thick faced sound absorbing material to control excessive sound buildup.

In addition to the work done to improve the theater's multipurpose functions, roof drains over the stage and theater were isolated to control waterflow noise through the drains. Sound-rated doors and windows were also specified to control sound intrusion from the adjoining spaces, the lobby and the busy street that borders the theater.

Acoustical measurements were taken to determine the level of noise intrusion due to aircraft flyovers from the nearby Travis Air Force Base. The theater's concrete block walls and insulated concrete roof, however, were sufficient to control the noise intrusion into the theater. ■

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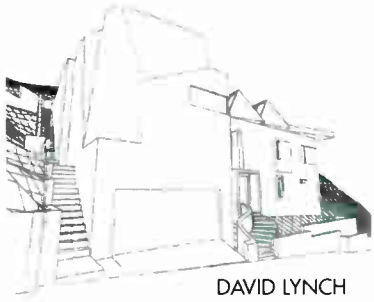

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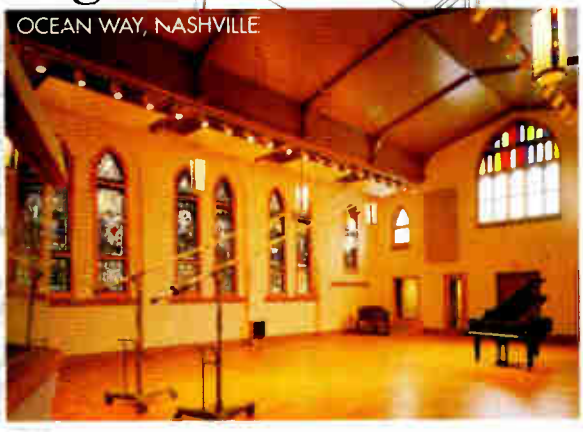

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the reflectors must be relatively large.

Diffusion. Sound can also reflect in a diffuse manner. The reflection is fragmented into many reflections having less intensity, which are scattered over a wide angle, creating a uniform sound field. Diffusion can be created in a variety of ways, most often by introducing surfaces having irregularities in the form of angled planes or convex surfaces sized at least as large as the wavelength being diffused. Three-dimensional surfaces such as ornamentations, columns and statuary serve as diffusing elements and were integral to the acoustics of 17th, 18th and 19th century performance spaces. The depth of the diffusing undulations must be at least one-tenth the wavelength being diffused. However, it is possible, if attempting to create a relatively low-frequency diffuser (for example, the octave below middle C, which has a wavelength of 2.7 meters [9 feet]), to have specular reflections at higher frequencies. For this reason, in some concert halls, there are macro as well as micro diffusive elements to accommodate diffusion in different frequency (and therefore wavelength) ranges. Most common diffusers work well between 800 Hz and 4 kHz.

Echoes. Echoes are reflections that can be heard distinctly and separately from the early reflected and reverberant sound. For most general purposes involving speech communication, echoes are normally heard due to intense reflections arriving 40 ms and later after the direct sound signal has reached the listener. In other words, the difference in path length between the direct sound and the reflected sound is at least 13.8 meters (46 feet) corresponding to a propagation time of 40 ms or greater. Ironically, echoes are most commonly detected in the front rows of an auditorium and onstage. This results from the front row being farthest from the rear wall, thus generating the largest path length difference between the direct sound and the sound radiating directly from the rear wall or the combination of the ceiling and the rear wall. Sometimes, only a performer or lecturer is able to perceive an echo! Typically, such echoes can be suppressed using sound absorbing or diffusing materials. Even surfaces as small as $10m^2$ (100 $feet^2$) can require treatment to suppress an echo. Generally, very absorptive rooms must be designed with extreme care in regard to the placement of reflective materials.

Flutter Echoes. A flutter echo results when sound travels back and forth between two parallel surfaces and is attenuated much more slowly than reflections from other surfaces. Flutter echoes, which are usually perceivable at frequencies of 250 Hz and greater, largely rely on parallel room boundaries to be sustained. Angling room boundaries, therefore, can help eliminate high-frequency flutter echoes.

Focusing. The cardinal rule in the design of rooms is to avoid sound reflectors that focus in the plane of listening. A focusing surface concentrates sound energy, which may then be intense enough to be perceived as an echo. Surfaces such as domes, barrel-vaulted ceilings and concave rear walls can cause sound focusing and are notorious for generating strong echoes. Such architectural elements should be designed with extreme care to avoid acoustical defects.

Reverberation. Reverberation is directly proportional to room volume, inversely proportional to the surface area and inversely proportional to the amount of sound absorbing material. It is possible to reduce reverberation by the following means: adding sound absorbing material, reducing room volume or increasing surface area.

Reverberation time is the measure used to quantify reverberation and is the time required for sound reflections to decay 60 dB, one-millionth of their original amplitude. The Sabine reverberation formula, named for the physicist who first recognized this relationship, applies to rooms that have a relatively diffuse (uniform) sound field: $T = 0.05V/S\alpha$ where T is the reverberation time; V is the room volume in ft^3; S is the room surface area (ft^2); and α is the average absorption coefficient.

While there are other reverberation time equations, such as those described by Norris-Eyring and Fitzroy, for example, the Sabine equation was the first developed, and it remains valid in most cases. In order to determine the reverberation time in a diffuse room, it is necessary to sum up all of the room's sound absorption due to each material's contribution. This can be accomplished in each frequency range by multiplying the surface area by the sound absorption coefficient for a particular frequency range, and then summing in that frequency range for all materials located within the space. Just as reflections are not entirely specular or diffuse, no material is entirely sound absorbing or reflecting.

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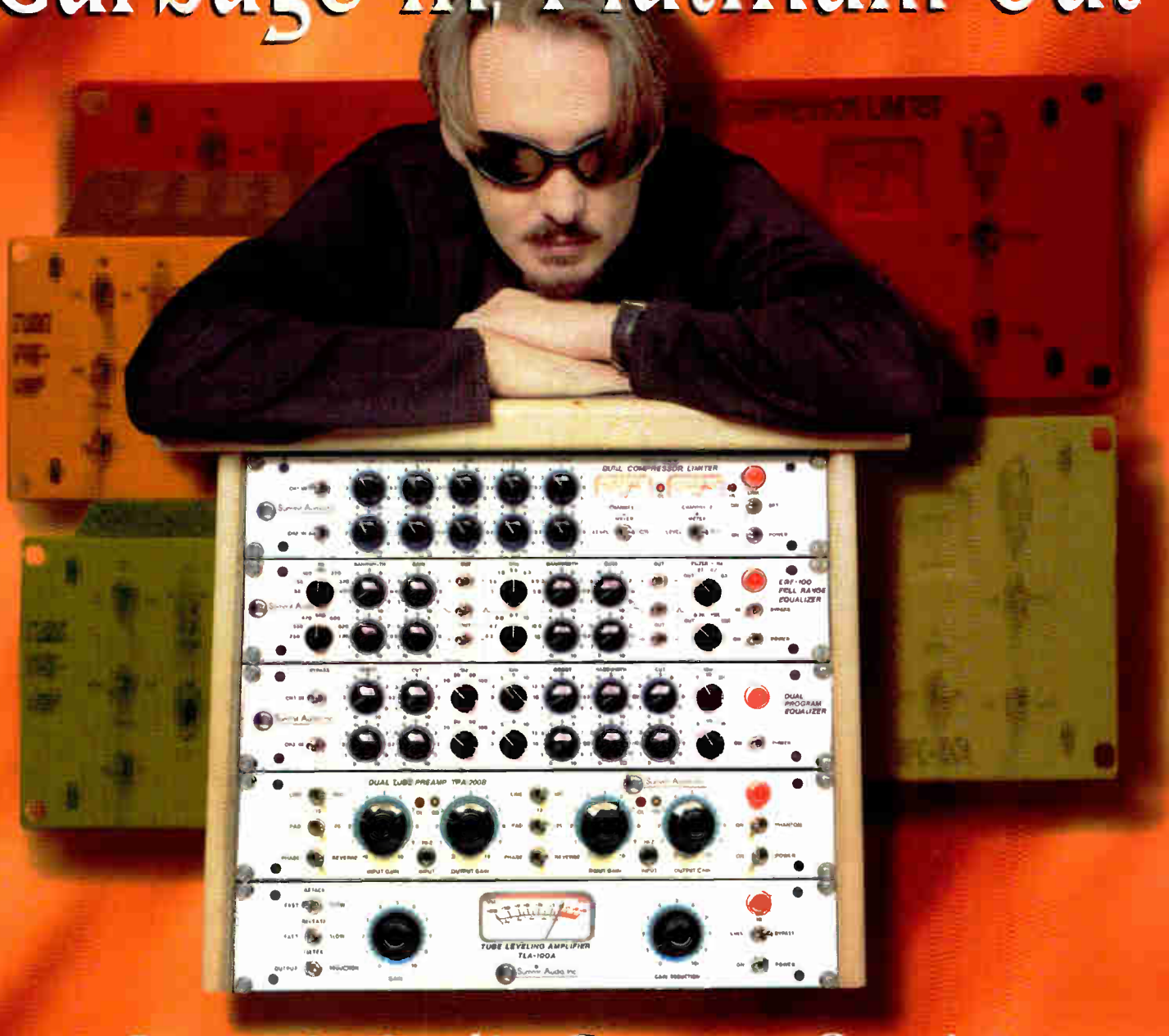

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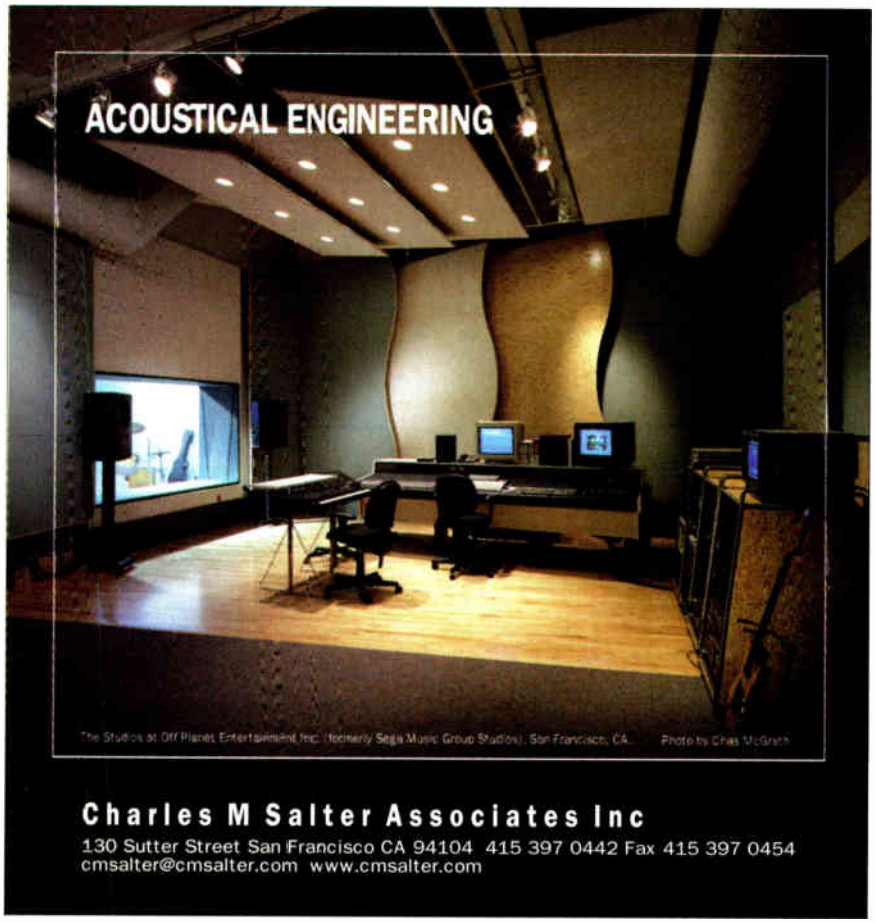

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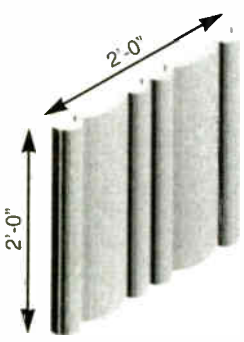

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As a general guide, it is not advisable to concentrate large amounts of sound absorbing material on one surface only, particularly where that surface is distant from a group of listeners. In order for a diffuse sound field to exist, sound absorbing material needs to be distributed over both the wall and ceiling surfaces. In a rectangular space, for example, it is not good design practice to concentrate sound absorbing on two parallel surfaces or on two pairs of parallel surfaces. This simply reduces reflections coming from the absorptive surfaces and may result in an echo by enhancing the audibility of the reflected sound from the remaining pair (or pairs) of room surfaces. The reflections from the absorptive surfaces are decreased in amplitude, resulting in a relative increase in the amplitude of the remaining reflections.

Standing Waves. Standing waves are also known as room modes. Room modes are most easily perceived when listening to low-frequency tones in small rooms having hard surfaces. Standing waves usually occur between hard parallel wall surfaces and are of particular concern in relatively small rooms, such as music practice rooms, voice recording booths, small audio control rooms and other spaces used for recording or for monitoring recordings. In an ideal case, it can be assumed that walls are infinitely rigid and stiff, so that minimum sound absorption occurs and there is little phase difference between the incident sound and the reflected sound at the point of reflection. Rooms in which two or more major dimensions (for example, length, width and height) are equivalent to multiples of half-wavelengths are notorious for causing additive standing waves and undesirable resonances. The frequency of resonance is higher in small rooms due to the smaller dimensions and shorter wavelengths. For this reason, standing waves are a much more important consideration in small rooms where the frequency of interest lies within the normal speech range of 100 Hz to 5 kHz. It is noteworthy that standards require acoustical laboratories to have the lowest useful ⅓-octave frequency band contain at least ten modes (standing waves) to assure reasonably accurate measurements. This requirement results in a smoother frequency response (i.e., less amplification of a single frequency), due to overlapping modes. The lower limiting frequency is usually 100 Hz. For this reason, laboratories do not usually measure below this frequency, in spite of the fact that there is

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a growing need for data below 100 Hz.

In studios used for the production or reproduction of audio material, sufficient low-frequency absorption is important. The sound absorption in this case acts as damping, reducing the amplitude and broadening the frequency range of the resonance.

Sound Absorbing Materials. All materials have some sound absorbing properties. Incident sound energy which is not absorbed must be reflected, transmitted or dissipated. A material's sound absorbing properties can be described as a sound absorption coefficient in a particular frequency range. The coefficient can be viewed as a percentage of sound being absorbed, where 1.00 is complete absorption (100%) and 0.01 is minimal (1%).

Incident sound striking a room surface yields sound energy comprising reflected sound, absorbed sound and transmitted sound. Most good sound reflectors prevent sound transmission by forming a solid, impervious barrier. Conversely, most good sound absorbers readily transmit sound. Sound reflectors tend to be impervious and massive, while sound absorbers are generally porous, lightweight material. It is for this reason that sound transmitted between rooms is little affected by adding sound absorption to the wall surface.

There are three basic categories of sound absorbers: porous materials commonly formed of matted or spun fibers; panel (membrane) absorbers having an impervious surface mounted over an airspace; and resonators created by holes or slots connected to an enclosed volume of trapped air. The absorptivity of each type of sound absorber is dramatically (in some cases) influenced by the mounting method employed.

1) Porous absorbers: Common porous absorbers include carpet, draperies, spray-applied cellulose, aerated plaster, fibrous mineral wool and glass fiber, open-cell foam, and felted or cast porous ceiling tile. Generally, all of these materials allow air to flow into a cellular structure where sound energy is converted to heat. Porous absorbers are the most commonly used sound absorbing materials. Thickness plays an important role in sound absorption by porous materials. Fabric applied directly to a hard, massive substrate such as plaster or gypsum board does not make an efficient sound absorber due to the very thin layer of fiber. Thicker materials generally provide more bass sound absorption or damping.

2) Panel Absorbers: Typically, panel absorbers are non-rigid, non-porous materials which are placed over an airspace that vibrates in a flexural mode in response to sound pressure exerted by adjacent air molecules. Common panel (membrane) absorbers include thin wood paneling over framing, lightweight impervious ceilings and floors, glazing and other large surfaces capable of resonating in response to sound. Panel absorbers are usually most efficient at absorbing low frequencies. This fact has been learned repeatedly on orchestra platforms where thin wood paneling traps most of the bass sound, robbing the room of "warmth."

3) Resonators: Resonators typically act to absorb sound in a narrow frequency range. Resonators include some perforated materials and materials that have openings (holes and slots). The classic example of a resonator is the Helmholtz resonator, which has the shape of a bottle. The resonant frequency is governed by the size of the opening, the length of the neck and the volume of air trapped in the chamber. Typically, perforated materials only absorb the mid-frequency range unless special care is taken in designing the facing to be as acoustically transparent as possible. Slots usually have a similar acoustic response. Long narrow slots can be used to absorb low frequencies. For this reason, long narrow air distribution slots in rooms for acoustic music production should be viewed with suspicion since the slots may absorb valuable low-frequency energy.

Is room acoustics an art or a science? Recent technology has refined the acoustician's ability to predict a room's acoustical requirements. It is now possible, for example, to provide active acoustical enhancement by introducing synthesized sound reflections through an array of loudspeakers, thus improving the quality of the transmitted sound dramatically. More specific design criteria are also evolving to suit different uses. Acknowledging the uniqueness of the design criteria required for each space is vital to the success of the facility, especially if it is multipurpose.

Art implies intuition and mastery. Science can aid in the development of both. But what role does luck play? Were the grand masters simply lucky? Is it luck or skill that allows an artist to appeal to a broad audience. It is in fact a combination of both. Today's room acoustics, like many arts, is an opinion-dominated field, one that is influenced as much by history as it is by technology. ■

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BY CHRIS DAVIS

High School TRACKING

Bellevue High's Pro-Level Recording Studio

[Editor's Note: George Hallowell of Studio Pacifica called the Mix *offices last spring to inquire about our "Class of 1997" photo spread. In passing, he mentioned acoustic work he had done on a 5,000-square-foot recording facility for a public high school in the Seattle area. A public school spending money on any arts-related program these days is news, we thought. And though we regularly cover college-level recording programs, we decided to spotlight a high school this year, one that is preparing students for college or for a vocational track. With this in mind, we contacted Bellevue High School journalism teacher Jim Talbert and asked him to recommend a student who might give us an inside look at this brand-new facility. Here then, is graduating senior Chris Davis' report.]*

Bellevue High School has "it." And although many high schools in this nation lack "it," "it" is becoming a necessity as more and more students are seeking careers in communications. "It" is a full-blown, professional-level communications department, complete with a live, 10-watt radio station, a television studio and a new recording studio.

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PHOTOS: GEORGE HALLOWELL/KAREN BRATTMAYER/STUDIO PACIFIC A, LTD

Audio tracking room. Note the upper and lower wire trough "trim band" around the room and removeable acoustic access panels between windows. Also note the production rooms viewing into the room.

Shown here is a typical production room setup for audio editing.

Bellevue High is one of only two public schools in its district to have such a department. However, last year the school district perceived a need to upgrade the facilities. The school already had the radio and TV studios, but as teacher Juris Jansons and head of district vocational education Jack McLeod began planning, they decided to push for the addition of recording facilities.

So plans were developed, and a proposal was set forth to move Bellevue High's 10-watt radio station (KASB) and television production functions, and install them, along with new audio recording equipment, in a renovated facility within the former wood shop classroom, which was run-down because it had been out of use for about five years.

"This project was done in conjunction with the need for seismic upgrade in that particular area of the school," says Peter Wall, Bellevue School District real estate director. "It was Juris' and Jack's vision to have the vocational program and a new

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recording studio built into the space that had formerly housed the wood shop. This was a pretty simple task because it allowed us to change the infrastructure, and, in essence, we simply took advantage of a great opportunity."

This major undertaking was viewed as a huge step for the program—one that would help students meet their goals. "What we would like to have students do is leave here with an understanding of how to produce a program," Jansons says. "And while there might be some that aren't interested in taking on the entire role of producing a program, at least they'll learn what the steps are: how to begin, how to finish and the considerations that need to be made to go through this entire process."

That first step, according to Jansons, was for him to "learn about the operation of the equipment." He compared two audio boards, the Yamaha PM1000 and a Ward Beck radio console. "The two are similar, but their scale is incredibly different," he says. "The same rules between the two apply, and the same considerations are there. Once you understand board number one, you can apply that knowledge to the other board and have a notion about what to do with it. The key is what you do with those boards as a result of the knowledge you have gained."

The move from a cramped, 2,250-square-foot radio/television studio to a spacious, 4,500-square-foot, brand-spanking-new facility involved a lot of hard work and planning. The architectural firm of Studio Pacifica Ltd. in Seattle was selected to design the project. George Hallowell, AIA, one of the design firm's principals, notes that, "The philosophy of the school district, the school itself and Juris was that this facility needed to be continuously flexible, and everything in it needed to be about education. There was a purpose to leaving mechanical and structural fixtures, such as ductwork and wiring, exposed. Awareness of the infrastructure of the building is, in itself, a teaching tool."

Along with Studio Pacifica, there were a number of other architects and engineers involved in the total building renovation. Cummings Associates Architects Inc. were the architects of record for the entire 15,000-square-foot building, which included facilities beyond the radio/TV/recording areas. Studio Pacifica joined the architectural team as a design consultant for the two large studio rooms, the main control room, the radio/TV offices and all associated production areas. After a number of meetings between the design team and the school district, a schematic booklet and plan were prepared that established and described the spatial and functional needs of the facility. After this was approved by the school district, things rapidly began to come together: Studio Pacifica's drawings were incorporated by Cummings Associates into a larger set that was ultimately submitted to the city for the building permits.

PHOTO: GEORGE HALLOWELL/KAREN BRAITMAYER/©STUDIO PACIFICA, LTD.

Master control room. Shown here is the vintage Ward Beck M2484 console and views into the audio tracking room and the FM master room.

"What Jansons and the school district asked us to do," says Hallowell, "was to create two large tracking studio rooms to record any live audio or video source or to run live audio feeds from either room directly to the radio studio. Between those two rooms was to be a control/distribution room containing an M2484 Ward Beck console and numerous punch blocks, patchbays and video gear. From this control room, they wanted the ability to route audio or video to smaller production rooms, transmitters or even remote trucks."

Studio Pacifica worked with acoustical consultant Michael Yantis on a cost-effective design of the oak trim, wire troughs and acoustic panels that would be integrated throughout the studios and main control room. The wire troughs hinge open, and fabric-covered acoustic panels can be removed so that signal wiring can easily be reconfigured. Mic inputs are routed from below the windows to an open wire tray running above the windows and around the perimeter of each room. "Mousehole" panels and oversized conduit penetrations complete isolated wire paths between all of the rooms.

"We were delighted with the existing poured-in-place concrete roof barrel vaults in the building and the exciting spatial forms they made possible," says Hallowell. "Potential problems of focusing caused by the concave forms were dealt with by heavily spraying absorptive material on the inside of the concrete vaults. The increased height in the room up in the curve of the vaults allowed us to mount theatrical lighting grids in both large studio rooms, and the light-colored spray enhanced overall lighting. The absorptive spray was also a very cost-effective method of controlling reverberation time."

Staggered-stud, double-layer sheet rock walls, double-glazed relites and special cam-hinged door frames met isolation requirements between production areas. To keep within the budget, specialty door frames were used with off-the-shelf wood doors and drop seals. Large-volume, low-velocity exposed ductwork; special ballast fluorescent fixtures; and isolated theatrical light dimming kept tracking-room NC numbers to a minimum. The energy-efficient fluorescent fixtures can also be turned off during noise-critical audio sessions.

Karen Braitmayer, AIA, also a principal of Studio Pacifica, says, "We carefully selected durable, inexpensive finishes throughout the majority of the facility with Brenda Ross at Cummings Associates to offset a few higher-budget, attractive details such as the oak trim and wire troughs." The project was finished on schedule and well within the school district's budget.

Up to this point, the facility described here might resemble many professional installations. However, the teaching requirements set it apart. For example, eight small production rooms surrounding the two tracking rooms and main control/distribution room act as "miniature control rooms." Within these rooms, small groups of students are able to work with each other or an instructor to create program material from the main control room feed or in-

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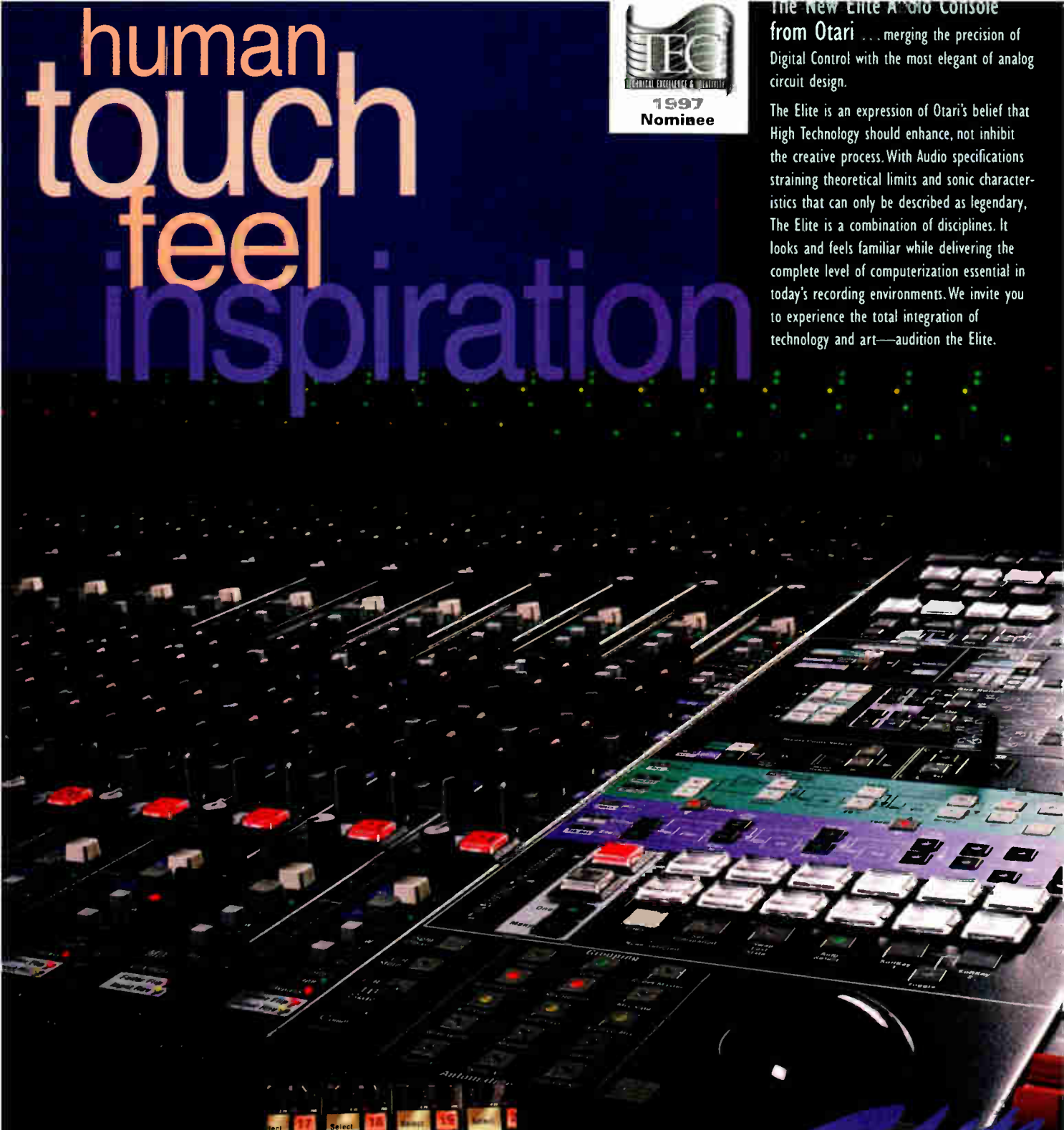

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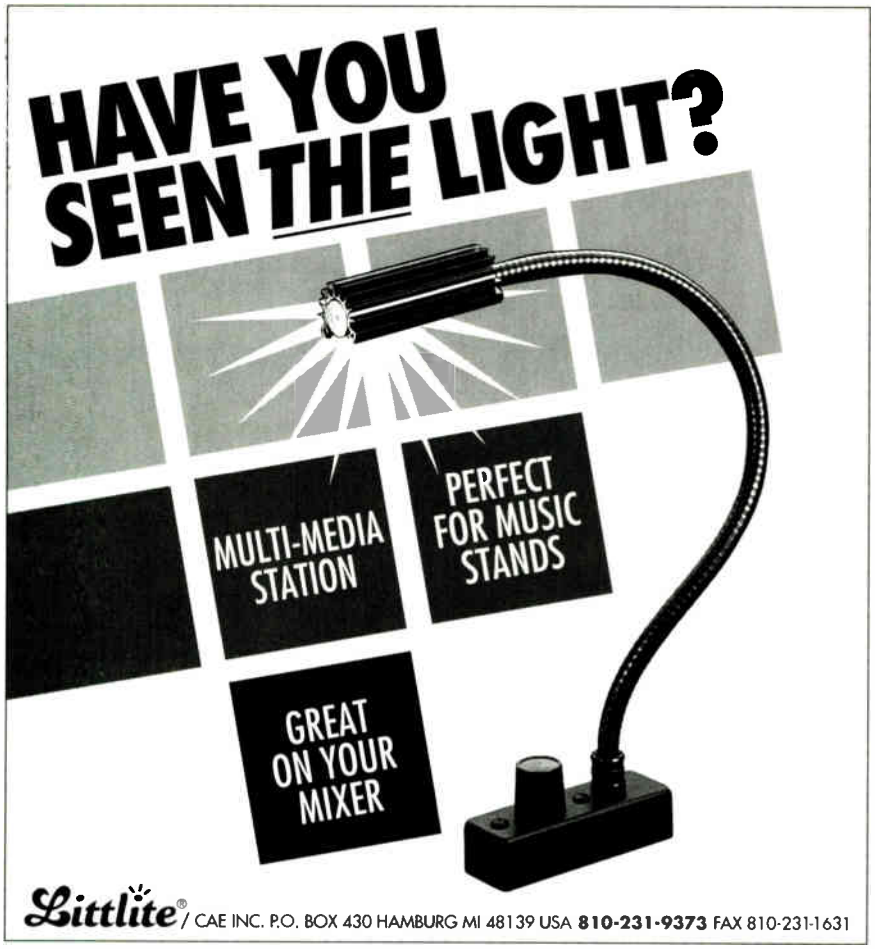

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dividual mic panels. A separate FM master production room allows open microphone radio broadcasting and audio programming to the transmitter. In addition, the tracking studios must have the ability to double as classrooms or video shooting stages.

"A lot of the equipment is donated or scrounged and different in virtually every room, making the need for constant flexibility and maintenance imperative," explains Hallowell. "The constantly changing and varied equipment can be a nightmare of signal wiring for Juris." The school's equipment includes vintage radio and TV gear, Tascam DA-30s, an Otari MX5050, an Akai DR4D, a Yamaha PM1000 and various Mackie consoles.

Jansons and the program were fortunate to receive a donation of Compaq computers, supplied by Microsoft, that enabled them to install Gallant SC66 sound cards and Voyetra Ultimation Software for performing direct-to-disk recording. The donated computers, placed throughout the production rooms and tracking rooms, also enable students to do word processing and other support functions. "Juris is hoping to train students on a Pro Tools or Avid system in the facility and is always grateful to generous donors," Hallowell hints.

Things are now going smoothly at the new Bellevue High radio/TV/recording facility. However, there are certain areas that Jansons hopes to expand, such as broader community use. "We've had very little outside use, mainly because this is a new facility. One way we are starting this process is by producing programming for channel 55, a government-access television channel. While this is the full extent of community involvement at this point, we expect to eventually do some recordings of school functions such as choir and band concerts, as well as other activities along that line."

So, an enriching and desirable program has evolved into an impressive facility. "This is completely extraordinary," Jansons says. "It's very rare to have something like this happen, probably because it is rare to be in the circumstances that we were in, and for us to have even been considered to get this was simply remarkable." ■

Chris Davis graduated from Bellevue High in mid-June and is busy preparing himself for college. He says his major will be journalism. Mix *thanks him and wishes him all the best.*

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JOE STRUMMER

GENERATION ROCK

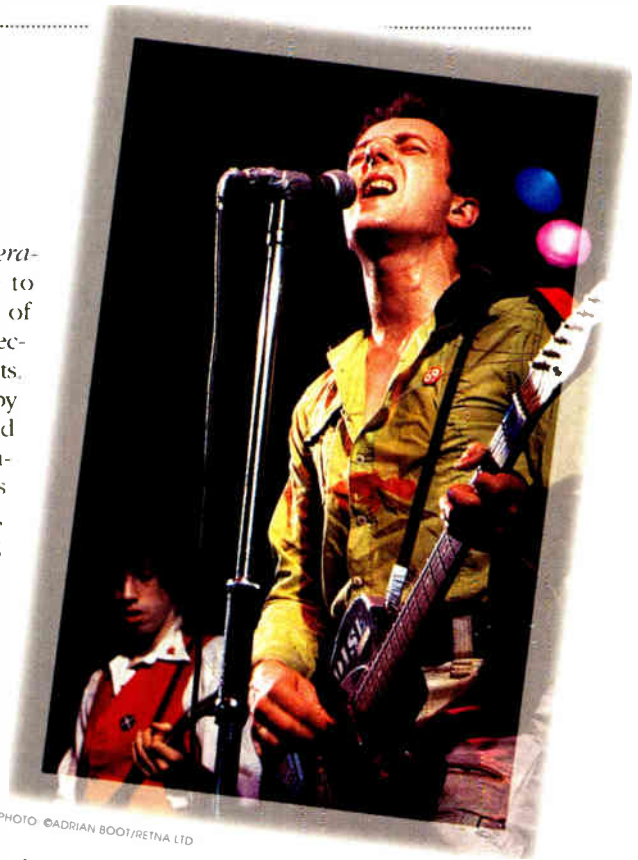

PHOTO: ©ADRIAN BOOT/RETNA LTD

Let sleeping dogs lie, I always say, and The Clash is definitely a sleeping dog. Last year's Sex Pistols reunion tour, for all its foul and now barely remembered charm, prompted a new barrage of rumors that The Clash would reunite for a similar outing—maybe as part of Lollapalooza. But the former members of the greatest-ever English punk band had the good sense to let it be. Anyway, the former bandleaders, Mick Jones and Joe Strummer, don't need to look back to keep busy.

Jones, as modern rock fans know, has been cutting pop/punk/dance songs with Big Audio Dynamite and configurations thereof for several years. And Strummer, eschewing the pop star route, has made his presence felt piecemeal, in some excellent film music

(*Walker, Sid & Nancy*), as an actor (*Mystery Train, Straight to Hell*), as a solo artist (*Earthquake Weather*) and for a few minutes as producer and lead singer for the greatest-ever Irish punk band, The Pogues.

More recently, Strummer (heading a group called the Electric Doghouse) created the title track to a collection called *Generations*, a punk tribute to the 50th anniversary of Eleanor Roosevelt's Declaration of Human Rights. The album, compiled by activist Jack Healey and producer Jason Rothberg, also features songs by the John Doe Thing, the Red Aunts featuring Exene Cervenkova, The Vandals, the Bad Brains, and a goofy punk take on Neil Diamond's "Coming to America" sung by Billie Joe of Green Day. But Strummer's track, a sort of techno meets Clash meets blues song about the environmental and spiritual legacies of generations, really stands out. One hates to accuse a real rocker like Strummer of having matured, but the song shows the way his views and musical mastery have grown.

The Clash always worked varying musical influences into their songs—especially reggae and soul—and their lyrics were often political. Strummer's new music has those qualities, but uses more tools, as you'll see. In 1988, Strummer told the *L.A. Times*' Richard Cromelin, "I have two children...When you see yourself become part of the cycle of generations, you lose your ego in the process, because you ain't nothin' special. You're just another cipher in the generations." That's in there, too.

Mix got in touch with Strummer to find out about the recording of "Generations" and found out that aside from being a legend and a great songwriter and performer, he is a closet recordist (almost literally). He had also just composed and recorded the incidental music for *Grosse Pointe Blank*, John Cusack's black comedy about a hit man's trip home for his ten-year high school reunion; the rest of the soundtrack is pure '80s nostalgia, including a couple of Clash songs. Nostalgia...was it really that long ago? When you listen to Joe Strummer, you're not sure if it was a million years ago or just yesterday. That's the thing about generations.

What are you working on now?

Hold on. [He moves away from the phone and shouts] Dave...Davey...Hawkins...Hombre...Put on Horace Andy singing "Living in the Flood." It's for the US of A, come on...Just give us a 5-second blast...

[Back on the phone] Horace Andy has been singing the best reggae records since before Bob Marley, even, till now, and he came down here yesterday. I ended up trying to write a set with Horace, and you've got to listen to this track. It's what we managed to do yesterday.

That would be awesome. Thanks.

BY BARBARA SCHULTZ

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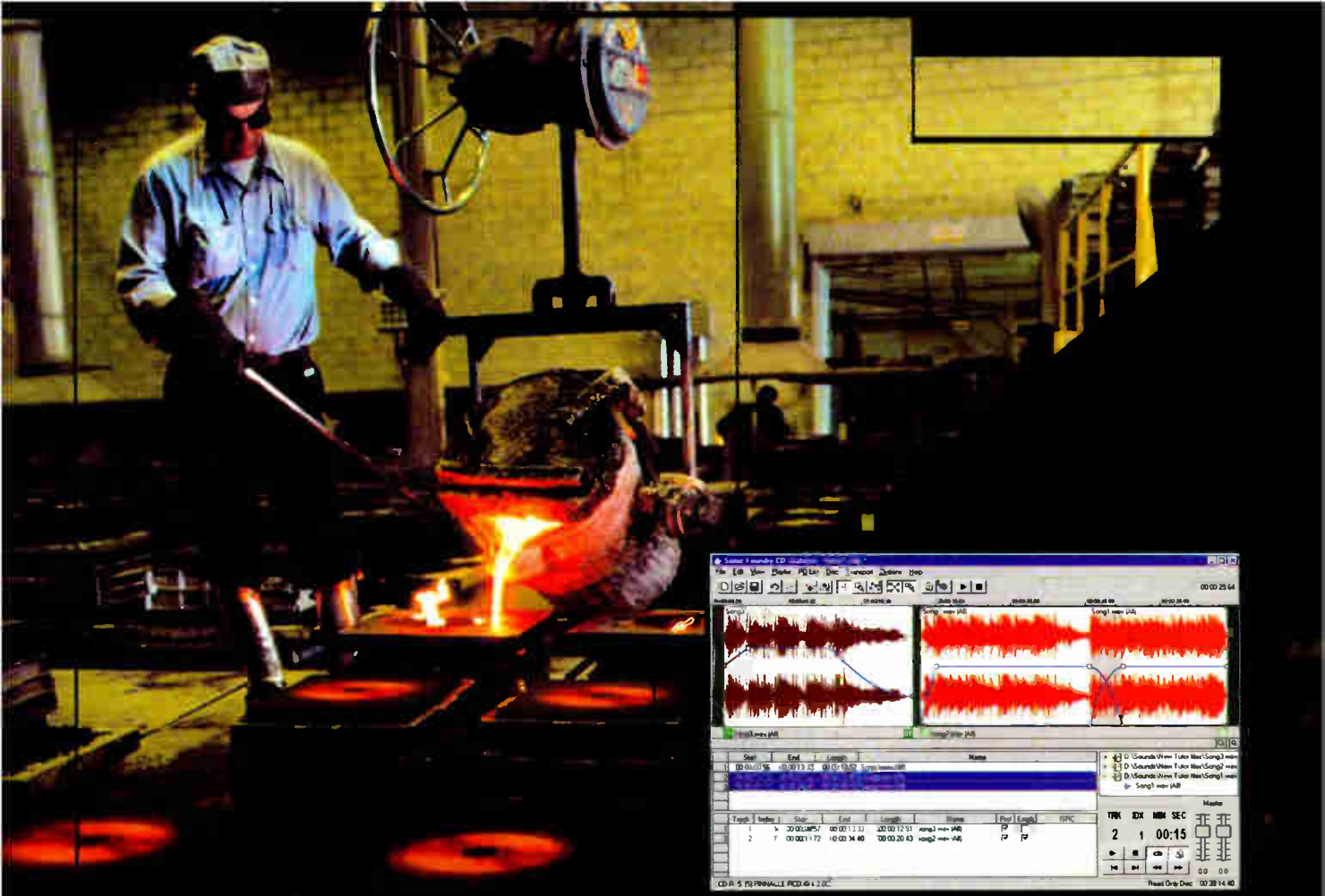

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It's sort of like having Aretha Franklin down, but of that genre. The voice. This is just something we knocked off down here. Okay, just give a five-second listen to this...

[The music starts. Through the phone, there's the sound of reggae-beat drums, some eerie guitar and the voice of Horace Andy, who, on this track and through the telephone sounds incredibly like a middle eastern Smokey Robinson.]

It sounds amazing. Is that a brand-new song?

It was just something we'd written last week and recorded yesterday. Imagine having a voice like that come down.

It's scary, because not only have you got an artist like that, but you've got to make sure all the equipment works, you know? That is stressful.

Where are you working?

It's my home studio here, so I have no backup. If a wire doesn't work, it's up to me to find another wire.

Tell me about your studio.

I call it The Woodshed. I live in like a typical English cottage. It's just rented, actually, but I've been here so long, I've put a studio in the woodshed. It's like a tiny cupboard. I've got a 24-track, an American board, a Mackie, which is fantastic quality but so compact you could pick it up. That's good because I'm literally in the place where they used to pile wood; space is limited. And I've got a Fostex one-inch tape recorder. It works because honestly I wouldn't—I mean I wouldn't want to swing a cat anyway, because I wouldn't kill an animal, but there's no way you could even swing a hamster.

I've divided the space into three parts. There's a control room bit—just enough space for three people to stand and work at a mixing desk. I have some outboard in a rack, and then there's another little room behind you with sliding patio doors to isolate it, but it's hardly six foot by six foot. You can just about get a drum kit in there if you're mad. And there's another small segment with a bass amp. It's right silly.

What kind of speakers do you have?

I was using PCM speakers, but because it's such a small room, there's no way you could get a fix on the mix, you know what I mean? And so just lately I put a pair of Bose Interaudio, which I would imagine to be living room speakers, because I didn't want the PCMs to give me too much bass and get me to thinking that small devices could take as much bass as we're happy to live with in the control room. But even lately I think we're putting too much. Even though the LEDs are still about legitimate, from now on I'm going to pull the main fader down on the Mackie desk and I'm not going to look at the LED readout. I'm going to listen.

Did you put all the equipment in yourself?

PHOTO: ©VIRGINIA TURBETT/RETNA LTD.

The Clash, circa 1978

Well, I had to get help. I have run an 8-track for about ten years that I plumbed in all myself, and I actually sort of liked that better, because now everything is moved into a patchbay. I used to like it better when I could walk round and round going, "Okay, switch over, now we're going to straight from a group insert into echo..." and I could talk my way through it and it would always work. With a patchbay, I'm a bit nervous, because it's such a configuration of plugs, you don't really want to get in there. It just freaks me out too much looking in the back of the patchbay when something isn't working. I'm fairly fluent in the area of recording—I've been doing it for a long time, actually—but very untutored.

Are you working on an album project?

I've decided to call it a compilation. For a while I couldn't understand what I was doing; I'd get working with these really interesting people and knocking out great tracks, but then things would sort of drift off, and a film would come in and distract my attention, and I began to notice that I was littered with tracks. But I just recently hit upon the idea of trying [to put together a compilation]. It would be difficult taking tracks from hundreds of different situations—you know how messy it can get with business—but I think I'll be able to pull together an interesting compilation, and I'm going to put it out under the name Strummerville.

Are the musicians you're working with right now the same people who worked with you on the "Generations" song?

No. I've been knocking out some film music with a very interesting London musician called Pablo Cook, and it's myself and him that were sort of handed the project to write a song for Horace Andy. But before that, we were working on film music for various things that are coming out.

Like what?

Well, God almighty. Jesus, I don't know where to start.

Just tell me a few things.

The next bit of music that we're going to try to do is for a French film called *Doctor Chance*. It's one of those new hip French films. And we've also done music for a London new hip sort of short called *Tunnel of Love*, and there's a bunch of things I don't want to particularly name, but they're coming in from Hollywood thick and fast. And also *Grosse Pointe Blank*, of course. That's the main one that's coming out. It's a suburb of Detroit, Grosse Pointe. It's a John Cusack/Dan Aykroyd vehicle from Disney.

And they thought of you, huh?

Yeah, because it's about an '80s reunion dance, which is why I suppose a couple of Clash tracks are in as well as stuff I've done recently.

What Clash songs are they using?

They've got "Armagideon Time" and "Rudie Can't Fail," and they've got Specials and Jam, Violent Femmes. They're trying to get whatever was happening then, and good choices, too.

How did you get involved in the* Generations *project?

Jason Rothberg rang me and said, "Look, Jack Healey is doing this thing to mark the 50th anniversary of Eleanor Roosevelt writing the Declaration of Human Rights," and I kind of said "Yeah, yeah, yeah, yeah," you know?

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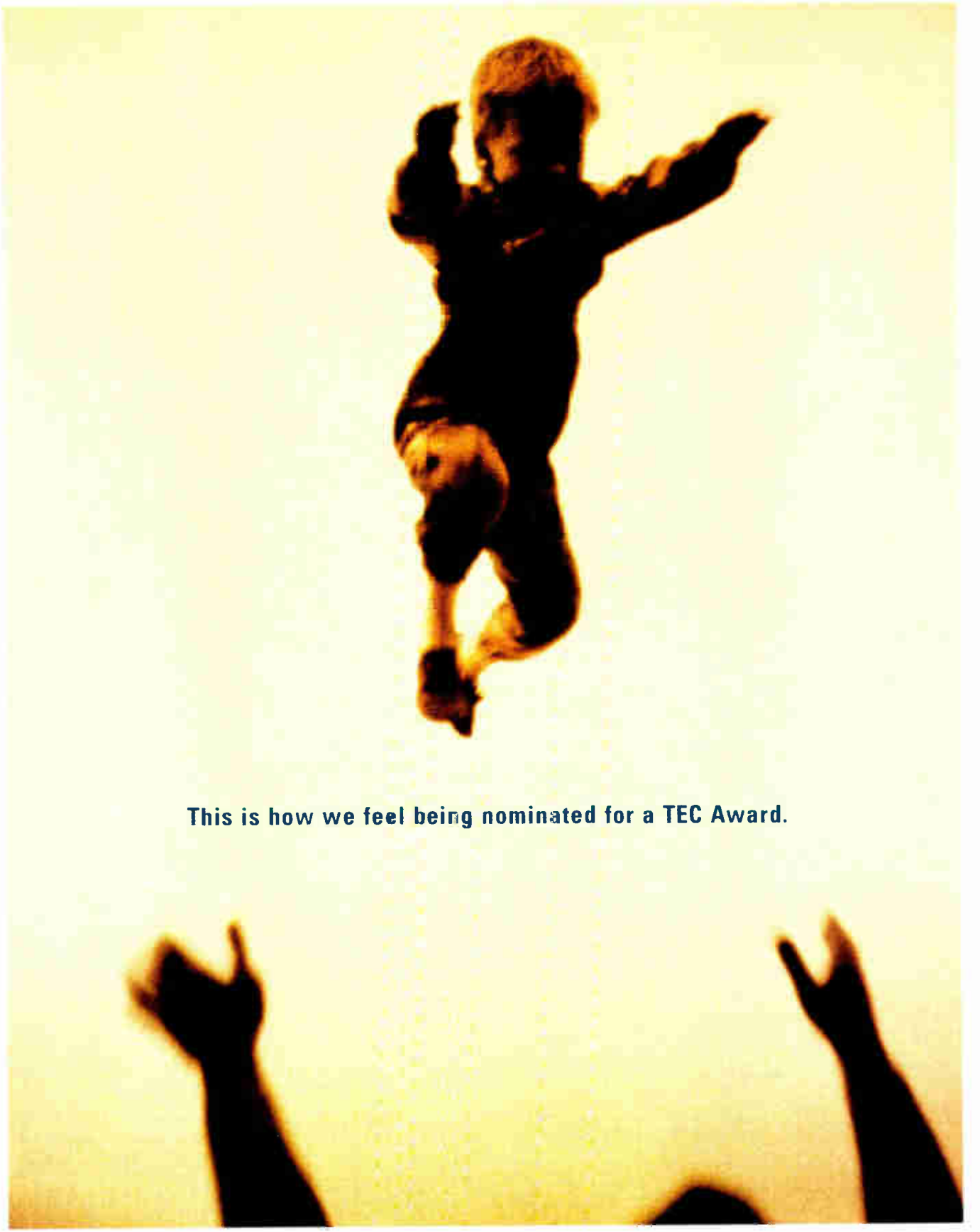

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Because I thought yeah I'll do it, with the best intentions, but it's the sort of thing you leave on the shelf, thinking I'll get around to it. But then I just happened to be over there in Los Angeles [at Westlake Studios] recording some music for *Grosse Pointe Blank*, and they give you a day to strike, which is like: get your gear out of the studio before the next guy comes in. And I realized that we could cut the song, because, obviously, this is a charity record—the kind of thing you don't want to spend money cutting.

We cut it fast in the down time, and it came out really fresh because of that. It was literally like the bass player's [Seggs, of the Chemical Brothers] cab driver was waiting in the control room to take him to the airport to fly back to England, but I knew we needed one more take to get the track down, and we were cutting it live, so I went, "Hey, somebody take the cab driver in the control room and amuse him. I need another ten minutes here."

As a rule, do you like to play live with the band when you record?

Well, until this moment, that has been my modus operandi, because it was true to what I knew, but everything now is born in the computer. This isn't a bad thing; I'm not slagging that at all. In fact, I'm going to get into it. Everyone has to realize that cutting in between the two is really where it's at. There's a way between live performance and computerized music that's great. Hip hop and techno and jungle are really happening.

When you've recorded live with The Clash, did you sing and play live?

Normally I'd play with the band and sing a rough vocal and then cut the vocal immediately after, which I think is crucial—not a long gap of time between. Or sometimes if I wasn't playing on the track, I'd cut the vocal live while the band were doing the track. But we could do anything on the spot, on call. That's what I loved about us. We could do it on the floor.

Do you help make technical choices for your recordings? For instance, is there a certain kind of microphone that you like best for your voice?

[The Clash] had no idea about any of that, but now I know about it. With my 24-track thing in the cupboard here I've got an Electro-Voice main mic, and I'm beginning to understand D112s. I'm in the infancy of my microphone knowledge, but it's certainly a big direction I want to go, microphone placement. All I've done in the past ten years is sit and record with a live mic. It's obviously bedroom recording, but I'm working really hard on it.

What kind of guitar did you play on "Generations"?

That was my trusty old Fender black Telecaster. I think it's a '62.

The liner notes have someone called Chaz playing something called Guitarzilla. What's that?

Chaz the Biker, he's called, and he's playing a machine. Try and imagine this: He's sitting in front of a lap pedal steel, but he's built four of them, and one of them is a bass. Some of them are nine-string, some of them 12. They're all in different chordings, and they're all fed into Harmonizers, one each. And this guy's a welder, so these are all beautiful steel and iron and wood. Porsche couldn't possibly make it more fine, you know? And he looks like a biker. He's got a ponytail and motorcycle boots and tattoos and aviator sunglasses, and I just said to him on "Generations," "Lash out, Chaz. Plug that thing in, man, and let it

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rock!" We just opened the portholes and let him pour it in.

And he does these things like huge rotating magnets underneath lyre-type things with hundreds of pickups all over them: space-age, mutant bass guitars. This guy built all this stuff. He's unbelievable. He's a one-off.

What are the percussion sounds that are on that song, other than the drums?

To be honest, it's a suitcase. Rat Scabies [of The Damned] is standing, and the suitcase is splendidly displayed on a kind of percussion rack of some sort. He's standing with headphones on with a pair of drum sticks. But the secret weapon, the most secret of all was a square water bottle. You know like you have April Mountain Spring water...

You're making fun of me now.

I'm not joking. This one was the most lethal one of all. This one's on every single thing we did: the square Mountain Spring, the quite big one—empty obviously. He plays it with his hand, and he plays it with his knees. Imagine it upside down with a mic up inside the spout, and somehow we stopped it from knocking on the mic, and it just seemed to fit really cool—so much so that we kept that one bottle. We were convinced that the other Mountain Spring empty bottles in the studio weren't good enough.

They'd have a completely different sound.

Yeah. That's no joke. You can see it's real now.

And you mixed it yourself?

No. That was John X!

The liner notes say you mixed it.

Well, that's wrong. John X mixed it. Obviously, we were there, but I don't think you can hear after recording a song.

Was it mixed there at Westlake?

Yes, and he was wearing green lipstick at the time. This guy, this guy...blond hair with black roots, cropped. Zulu leopard-skin print skirt on, and kind of San Francisco granddad's T-shirt on, green lipstick, blue nail varnish, and sandals, and a smirk on his face and shades. That's the engineer.

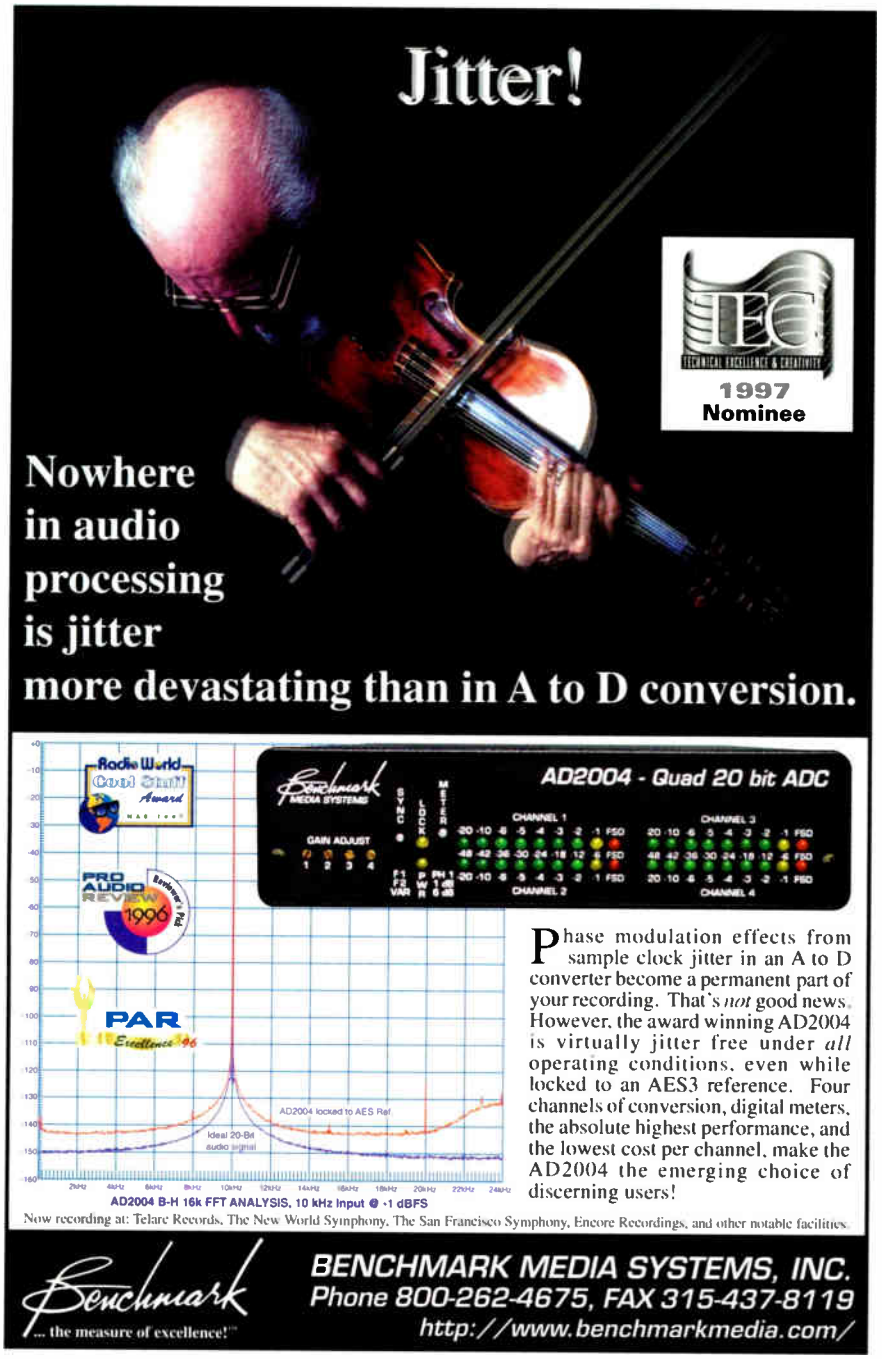
I want to ask you some questions about songwriting. Do you write in your studio?

Yeah. And I'm always trying to make little records when I'm doing it. Maybe I'm a closet case, but I really like being on my own, in my house, be relaxed, have a couple glasses of wine. I work on a lyric, run the machine, and if I'm running a machine all the time, it's a big deal, isn't it? You've got your headphones on, the microphone's on, you're going into *record*, and now you've got to *say something*.

Also, I really open up more by about the seventh track of singing. Because on my own I've tried out the lyric, and by about the fifth time, the lyric's getting a bit right—I'm getting it spot-on, and what I used to hate with the 8-track was having to worry about, "Well should I record over that?" Because you have to sit down then, don't you? You have to stop in full flight and say, "Hang on a minute now, should I record over that? Or was that better than what I'm doing now?" This is really important because you're getting in the roll mode and you've lost your flood. But the 24-track gives me a chance to just keep rocking on, just record track after track. I can sing 12 vocals in a row, and I know my way so well that I can move it to the next track while the thing is still rewinding, and then I'm still in my concentration.

Do you ever hit dry spots when you just can't write for a long time?

Yeah, but I think that's good, because sometimes a dry spot just means you have a deep train of thought and it takes a while to come back around. I love that saying, train of thought, be-



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cause I imagine trains going on long loops that might come back into the depot five years later. Imagine you've got a toy train track in your mind with hundreds of loops. Imagine trains going out, and sometimes they all come back into the station together, and that's when you have a brilliant, kinetic idea.

Let's talk about your brief producing career.

I don't do any producing. That's hearsay.

You produced The Pogues, isn't that right?

But that was sort of...midwifery? How can I put that...I was only aware that I loved the sound of the group as they played all together, yeah? So it was more like photographing them. You've got a great-sounding eight-piece band: mandolins, pennywhistle, drums, guitars, accordion, bass, the whole thing. I didn't want to change them, just to capture it—to get them to play as live as I could.

How did you start working with them?

Well, nobody else would touch them. I'm not joking. Listen to me: Four days before they were booked into Rockfield, the manager rings up and goes [in a stiff Irish accent]: "Hey, it's Frank Murray. Hey, d'you mind producing The Pogues? They're booked in Saturday night. Rockfield. They want to do an album, okay? Okay?" And I said, "How come it's so late in the day?" And he went, "Steve Lillywhite didn't want to do it."

But you knew those guys. This wasn't the first time you'd met them or anything.

No, no. I'd been on tour with them. When Shane was too sick to do a tour, like a fool I agreed to jump in as temporary vocalist. See, there are seven other guys in the band. They've all got families, children, rents, mortgages, whatever...

They needed you.

Yeah. Shane got too sick, and they had the whole tour booked, but if you cancel a tour, you have to pay cancellation fees to every venue. So, I jumped in. And it got good. We really started to rock the house in Europe and in America, too, but then it stopped being fun. In Germany, The Pogues are huge, and I was faced with hundreds chanting "Ve Vant Shane! Ve Vant Shane!" And I said, "Look, he's too sick to come, alright?

I'm going to sing the best I can here," and that's when I realized, it's no good trying to fill someone else's shoes. If this thing's going to crash, let it crash.

When you're the artist in the studio working with a producer, what sort of things do you hope they'll help you with?

The simple things like how to pitch a vocal...Like yesterday I had Horace Andy in the studio, and suddenly I was in that position of Horace Andy saying to me, "What do you think, mon, about this harmony? Where should I put it?" And I was going, "Oh, well, Horace, I think you should just jam with it." It was strange being in that position. Life creeps up on you. Sometimes you have

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no time to prepare. It's best to just play off the cuff, I guess, and try to be true to yourself.

See, yesterday was really momentous for me. I was panicking because he's so great and I didn't want to record it badly. It was quite stressful. I'm still reeling, actually. I haven't recovered yet. Honestly, I've got to sit down and watch *Beavis and Butthead* or something. Yeah, that's what I need—for like three hours.

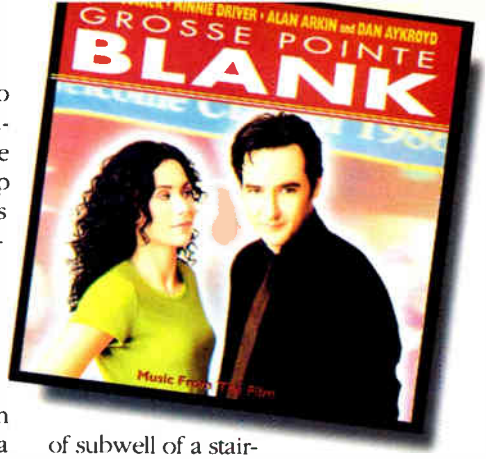
Can you think of some of the good producers you've worked with, people who really helped you?

Well, I'd say Guy Stevens. He's credited with producing *London Calling*, but like this doesn't really fall under the umbrella of production as is known today, right? Say you're trying to cut a track, and suddenly a lunatic would run into the studio and see a pile of metal chairs all piled up and push them over while you're trying to record a track. You've all got headphones on and you're recording in a big studio, and this guy'd run in, push over a stack of metal chairs and grab one and flail it 'round his head. If you're struck by one of those metal legs in your head, you're going to go *down*. And you've still got headphones on, and you're in the third verse of some song, and you're trying to keep up with the drummer, and everyone's trying to play proper, and you're ducking at the knees. And then he found like a ladder, and he started to swing that 'round his head. This was the kind of thing he would do, and that is no exaggeration.

I've seen terrible scenes like grown men fighting in the control room over a fader. You think you're in the group, you're supposed to be the wild ones, right? You go back into the control room to hear some tape back, and you see the producer and the engineer just punching each other in the face and rolling on the floor, because the engineer is not going to let the producer touch that particular fader. I've seen that. Bill Price, who was the engineer at Wessex, was the one that really mixed it and got the sound, but Guy *inspired* it.

What was the first time you ever went into a professional recording studio?

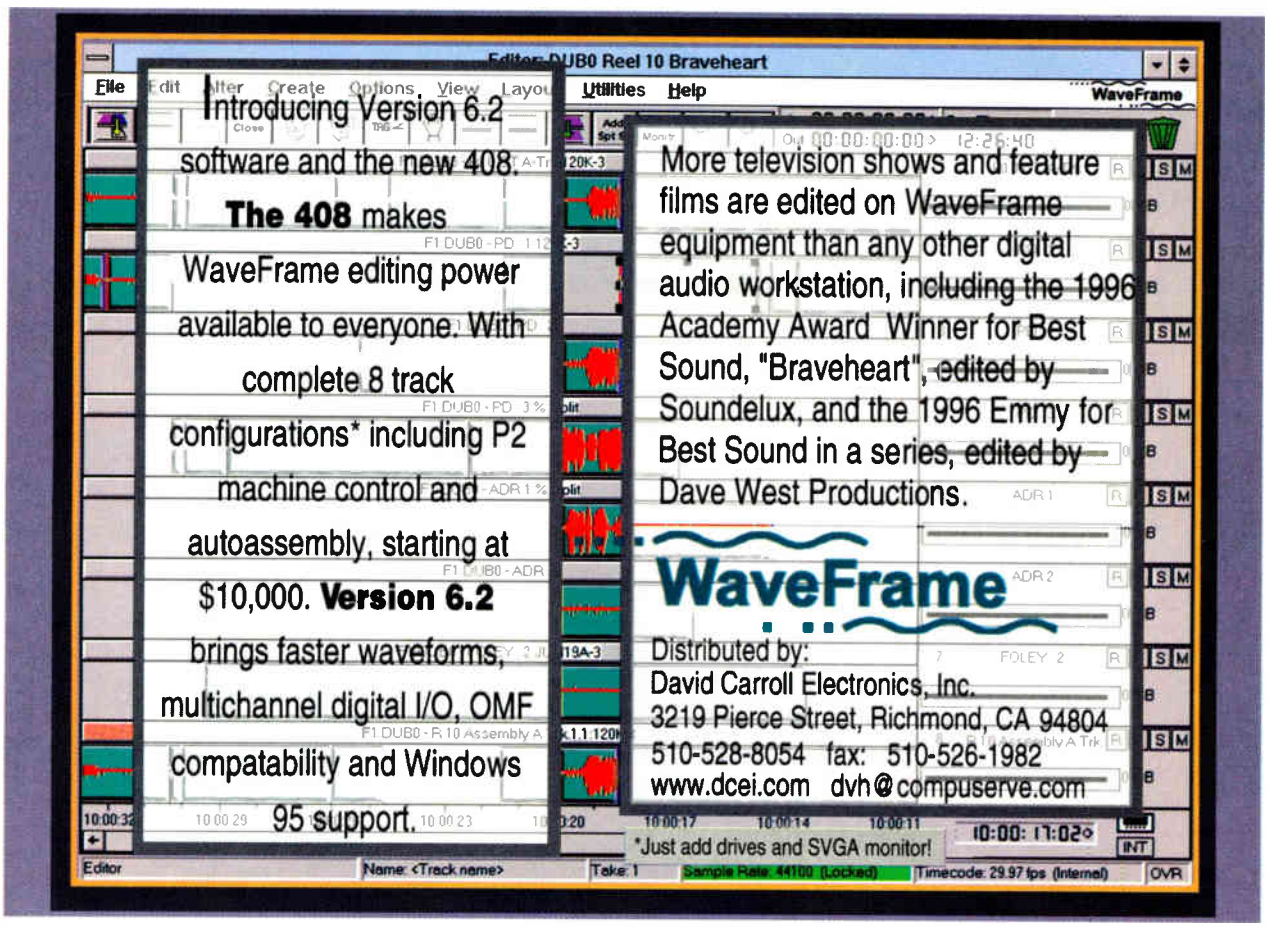
It was a joint called Pathway, and the kick about it was that everyone had to stoop over because it was in some sort



of subwell of a stairway. You could put your amps in these bays, and there was a sort of alcove for the drummer, but if you were standing up with a guitar, you had to stoop over 45 degrees, because there was a wall head behind you at that angle. That's where we cut the 101ers' [Strummer's band, pre-Clash] "Keys to Your Heart."

Can you describe the contrast between what it was like working in Pathway and how it went with later recordings like* Sandinista*?

Well, *Sandinista* was in Electric Lady Studios. We moved in there for three weeks, and I'm talking three weeks we never left the joint. I think we were recording around the clock the whole time.



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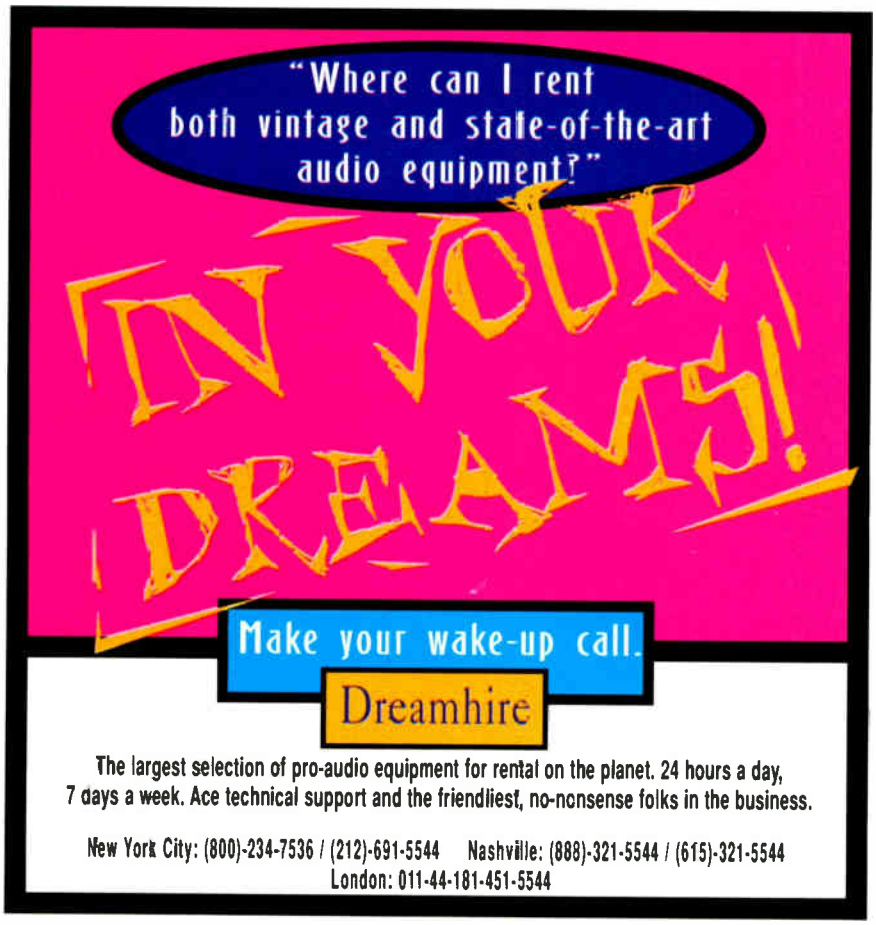

Was there pressure from the label to make that record after London Calling***?***
No. The kick about *Sandinista* was we'd come off a tour in America, so we were hot. And other groups could pay attention to this: Imagine, you come off a 90-day tour. Your chops are hot, ain't they? We ended the tour in New York. Paul [Simonon, bass player] went off to make a film in Vancouver, but me, Topper [Headon] and Mick forced the record company to buy us time in a studio, and they just did it to humor us, because they just figured, "How much can that cost us? We'll shut the limeys up."

So they weren't expecting anything to come out of it.
No. And that's why we weren't following any pattern. We had Mickey Dread in there with us—any musician passing by, you know what I mean? Every day was like a holiday. We were just writing in a group. We wrote the whole thing right then in the studio. It was fantastic. I would just sleep under the piano.

And that's when I built the Spliff Bunker [apparently a little baffled-off space in the studio]. The spliff bunker is a place to smoke and chill out, and it's also a place to draw the musicians and their crowd away from the mix room. You build it out in the studio somewhere, and it keeps the crowd out of the control room. I quite like a party vibe. The Clash always had a scene onboard; otherwise, we wouldn't have Allen Ginsberg on the record. You've got to mix with the people, but keep the f—ing party out of the control room.

What else do you want people to know about what you're doing now?
They only thing I could tell people as a last message is that...Well, I've given it away that I've been recording with tape machines all these years by myself, and what I've learned from that and from the techno people and the house people and the jungle people here is that sound is sound. I've been guilty in the past of trying to keep it hand-made, but I've really learned from these past two years of soaking myself in everything that they're doing here in London that sound is sound and to hell with what made it. Let's concentrate on the way the sound affects the soul. ■

Mix *associate editor Barbara Schultz thanks Joe Strummer for the great stories, and the great music.*

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MusicServer

Mention the word "Muzak"

and most of us probably think of elevator music: 101 Strings playing "Yesterday." But despite the intentionally unremarkable music with which the company's name is associated, Muzak is remarkable for the reach of its distribution system, which services stores and other venues across the country. Seeking to capitalize on its expertise in capturing and preparing music for distribution to its customers, the company has recently started delivering music to a new kind of store: the online music retailer.

Because Internet audio streaming technologies offer consumers a convenient way to try-before-they-buy, music retailing on the Web is a natural place for online commerce. But the process of extracting and preparing audio clips for Web playback can be time-consuming and, as a result, costly for an individual retailer, especially considering the tens of thousands of titles that a good-sized store carries. With the formation of its Enso Audio Imaging Division last year, Muzak is offering an alternative model to that of each retailer building up and maintaining its own server full of audio samples. Enso has set out to build a comprehensive library of clips on its own MusicServer, and then to offer access to those clips to its customers for use on their individual retailing sites.

BY PHILIP DE LANCIE

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"MusicServer is a collection of audio samples in digital format for use on Web sites," says Erika Leber, Enso's manager of sales and marketing. "Its purpose is to provide support to music retailers who would like to allow their consumers the opportunity to sample the music before they purchase it. Our server currently contains 275,000 sampled songs. Those samples consist of a 30-second hook, which is the piece of the music that gives the best representation of the entire piece. We also provide the album cover images and full operational support."

PREPPING AND DELIVERING CLIPS

The process of preparing the clips for delivery on MusicServer begins with capture and on-the-fly conversion from Red Book CD-Audio to MPEG Layer 2 audio. "We have a piece of software that we had written for us to automate the MPEG capture," Leber says, "because we are capturing the entire song for every track on a CD. That way if the record labels say at some point that it is okay to use 45 seconds, then we don't have to go back to the CDs. We can simply lengthen the sample we take from the track. Or if Liquid Audio or StreamWorks or some other delivery format becomes a standard we want to support, we could simply take the start and stop times that we have for our samples, go back to the MPEG master and roll out those same samples in the new format."

After the CDs are captured in MPEG audio, Enso's "audio specialists" make the choice of what 30-second portion of each song will be used for the sample. "They will listen to the MPEG songs," says operations supervisor Eric Nielsen, "and mark the song with in points, out points, fade ins and fade outs. Then they QC that and accept it as the hook for that song. When we have a number of those hooks made, we can then initiate a batch process that will maximize the level and convert those segments to the RealAudio format—or a format of our choice in the future—and save them as individual RealAudio 3.0 files." The final step for the audio, says Nielsen, is for the RealAudio files to be "transferred to our MusicServer, where they are made available on the Internet to our customers."

Simply having the clips on the MusicServer is not enough, of course, to make them accessible to the end-user. For that, Enso's customers (the music retailers) must have the proper URL (the exact filename and the path to its location) for each clip. The URL provides the link from the retailer's Web page to the audio file. This information, Leber says, is "delivered to our customers in a database format, in tab-delimited ASCII text. One of the fields is simply the audio link, and we have two additional fields. One is the URL for a small JPEG image for the album cover, and the other is for a large JPEG.

"Our customers simply drop those links into their pages," Leber continues, "and when the consumer clicks on a link, it opens up a RealAudio player. It is seamless, so the consumer doesn't know that the audio being streamed to that player is coming from MusicServer rather than directly from the retailer's site."

At the time Enso got underway, RealAudio was pretty much the only game in town when it came to choosing a streaming audio format with widespread player distribution. But while RealAudio's hold on the market may lessen as new, competing formats such as Shockwave, Liquid Audio and Beatnik come on the scene, Leber says that Enso's systems are designed to be easily adaptable.

"We are not really tied to any one technology," Leber says. "The reason we make all our masters in MPEG is so that we can support future streaming technologies by simply using a batch conversion process. Our reason for using RealAudio at this point is that we want our customers to be able to reach the broadest possible base of consumers, and right now the RealAudio player has the highest number of consumer installs out there, estimated at 15 million."

With both Enso and Progressive Networks—the maker of RealAudio—based in Seattle, Leber says the two have developed a close working partnership. At Enso's request, Progressive Networks modified their player software to allow clients with 14.4 modems to hear RealAudio 2.0 and 3.0 samples, though rather than streaming, the clips must download completely before they begin to play. That capability, says Leber, "is extremely important to the consumer base because the research shows that anywhere from 30 to 60 percent of at-home consumers are still using a 14.4 modem. So because [Progressive Networks] were willing to change the software to accommodate our needs, that was a very important factor."

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Leber is also enthusiastic about Progressive's new RealMedia player. "It allows you to stream either audio or video," she says. "So we will be offering streaming video for home movie purchases, as well as for music videos."

CUSTOMERS AND COSTS

Enso already counts among its customers some of the biggest names in online music retailing, including Tower Records, CDnow, Music Boulevard and Microsoft Music Central. Rather than charging them a flat fee for access to the MusicServer clip library, Enso charges based on the amount of audio served.

"We ask our customers to enter into a one-year agreement with us that is renewable in one-year terms," says Leber. "We charge our clients based on the total amount of time media is served to them off of our server. Our pricing starts at two cents a minute, which makes one penny for every 30-second sample that is listened to. If the listener bails out after ten seconds, we only bill our customer for ten seconds. The pricing goes down by volume. If a customer has over 100,000 minutes in a month, the rate goes down to 1.8 cents per minute."

To help cover the overhead of providing the service, Enso charges a monthly minimum, which is currently $1,000. "That is the equivalent of 100,000 full 30-second samples," Leber says. "Some of our clients are new and are building toward that amount of usage, but we do have clients who are far in excess of that." Leber says the minimum monthly billing is likely to rise in the near future to $1,500.

One might think that some of Enso's larger customers might prefer to do their clip preparation in-house, but Leber argues that they chose the MusicServer route because it offers substantial benefits, starting with cost.

"From a cost standpoint, nobody can do this on their own and do it any cheaper," Leber says. "We do not charge our customers based on a per-sample rate, because we do not own that content. We are basically charging them for the support that we are providing as far as bandwidth and streaming licenses and the digitization process. To set up the studios that we have, to go out and get access to the 80,000-plus CDs, and to provide the servers, you simply cannot do it any cheaper."

Part of the cost, Leber points out, arises from the time it takes to choose a sample that really represents the musical selection, as opposed to just taking the first 30 seconds of each song. "There are some other sites who thought that maybe they would do their own digitizing for their retail operations," she says, "but they simply do not have the professional music people to go through and actually 'ear-pick' a 30-second hook. If someone is going to listen to a 30-second sample and they are going to be moved to purchase the music they really need to get a sense of the music. Some of these other sites do an automation process where they take either the first 30 seconds or the second 30 seconds, and that can give you a really inappropriate sample."

Because Internet audio streaming technologies offer consumers a convenient way to try-before-they-buy, music retailing on the Web is a natural place for online commerce.

Leber also claims that Enso offers an additional level of security to protect against unauthorized appropriation of music samples. "Normally, you can go into someone's site and copy a RealAudio file from it," she says. "We certainly do not want the samples that we are producing to be altered in any way or used on anyone else's site without us actually being able to track that. So we have a validation process so that when a request for a sample comes in we can validate that it is a real request coming from one of our customers' clients."

Finally, Leber says that Enso is able to add value to the samples it serves because of MusicServer's built-in tracking functions: "The software also allows us to track very closely what samples are being listened to, how long people are actually listening to the samples, and to compile that important information for the record labels and the retailers."

Despite the advantages Leber cites, however, the record labels apparently are not lining up to get their own sites served by MusicServer, though they are taking advantage of Enso's audio sample preparation services. "At this point, we are not officially doing any record company sites," she says. "But we are working very closely with the 'Big Six' labels. Most of the labels have started out doing the digitization process themselves and, as most people find out, it is a very time-consuming, costly and space-intensive endeavor. So we provide some support to them in that area."

One area of support that Enso is not currently providing to the labels, however, is to pay them for the use of the sampled music. "When we started this business," Leber explains, "it was assumed that the use of 30-second-and-under samples on a Web site fell under Fair Use provisions, because it is a promotional use to actually sell music. But we have been working with the Big Six labels and the independents over the last year to help define Internet licensing. To date, there has been no formalized licensing for someone in our position.

"Being part of 62-year-old Muzak," Leber continues, "we have very long-standing established relationships with ASCAP, BMI, SESAC and the record labels, and this is an issue that does need to be addressed. We are certainly open to accommodating the wishes of the recording industry. I think that we will all be able to come to some sort of formalized understanding of it all in the near future."

As for the possibility of being sued by a songwriter or publisher for unauthorized use of music, Leber does not seem particularly worried. "I think that risk will always be there," she says. "But we have made everyone possible in the industry aware that we are doing this. In a store, you can play entire songs. You can do what you want because it is on a promotional basis. The whole Internet world is using music samples to sell music." ■

Media & Mastering editor Phil De Lancie is a mastering engineer at Fantasy Studios in Berkeley, Calif.

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RECORDING "CHO"

STEVE TIBBETTS DOES SOME REALLY REMOTE RECORDING

"I suppose it would be like if somebody from Tibet came over here and recorded me in my early 20s, noodling on guitar in a coffee house somewhere at an open mic, and then took the recordings back to Tibet and added crashing cymbals and chanting monks and created a CD out of it and sent it to me and asked me what I thought of it." That's one way musician/recordist/producer Steve Tibbetts views his latest project, *Cho*, on Rykodisc's Hannibal label. He seems slightly sheepish about the album. But the recordings, which blend the plaintive voices of a group of young Tibetan Buddhist nuns with atmospheric instrumentation by Tibbetts, have a quiet strength and innocence that stand up as original and pure music.

PHOTO: DAVID WARREN

Choying Drolma (left) with Steve Tibbetts

The album *Cho* began during Tibbetts' travels to Asia. Every year or so, he works for a study-abroad program sponsored by the Naropa Institute of Boulder, Colorado. "Some of the students were studying at a small monastery at Pharping in the southern part of the Kathmandu valley [Nepal] in 1993," Tibbetts says, "and I stayed there nights to make sure they were greeted, fed and seen off each day. I'd spend the evenings sitting on top of the monastery with a couple of the translators and some friends and watch the sun go down over the valley and listen to people in the surrounding villages bang pots and pans, and hear cows and chickens and enjoy the time. One of those evenings, one of the translators asked me to come down and hear the nuns sing."

PHOTO: CLARKE WARREN

Drolma recording with two other of the Tibetan Buddhist nuns

Tibbetts brought a portable tape recorder down to the shrine room of the monastery, "but I was so entranced by the sound I was hearing, I forgot to take the tape deck off 'Pause,'" he recalls. The nun whose voice Tibbetts heard was Choying Drolma, who is the soloist—for lack of a better word—of the group of nuns who reside at the Nagi Gompa monastery. The nuns' singing is part of the way they worship, part of Cho, which literally translates as "cutting." It is a system of Tibetan Buddhism practiced by the religion's nuns or monks in which the follower mentally offers his or her body as a means of severing attachment to the ego. The sacred songs the nuns sing represent, for them, a way for them to seek transcendent knowledge. "These are teenaged nuns singing thousand-year-old songs," says Tibbetts. "It's just what they do."

When Tibbetts returned to the monastery the next year, he brought a small Denon DAT machine and two AKG SE5 microphones to capture some of the

—CONTINUED ON PAGE 100

BY BARBARA SCHULTZ

World Radio History

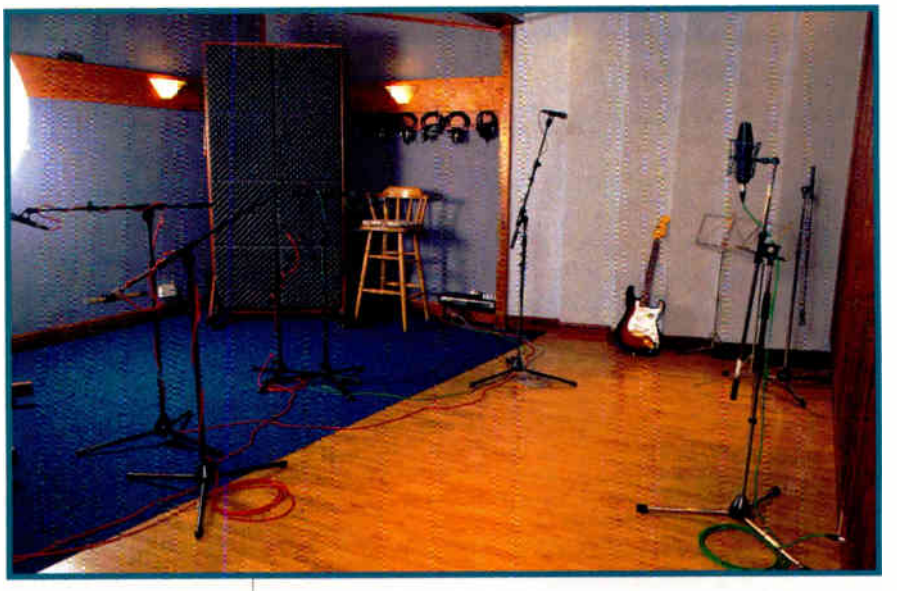
GRACIELAND

Lisa Stansfield's Private Studio Goes Commercial

As a writer, I find that studio reports are often the hardest articles to write. Most studios contain similar equipment and tend to be built along similar architectural and aesthetic lines. Finding an original angle can be rather difficult. So it's always a welcome surprise to find out that the studio in question has some inherently interesting features. Gracieland Studio in Rochdale, near Manchester, North England, was such a surprise.

PHOTOS: TIM BRADLEY

The main studio at Gracieland features the Rupert Neve-designed Amek 9098 console



Gracieland was previously known in the UK as Lisa Stansfield's private studio, called Rochdale Studio. But it recently opened its doors to the outside world, sporting two unique features. First of all it has the only Amek 9098 in a commercial sound studio. (The world's three other finished 9098 desks are used in broadcasting in Canada and in Japan.) The 9098 is Rupert Neve's flagship—according to the man himself, the best desk he's ever built (see the May '97 *Mix* for more details on the console). It's a monstrous 5x17 feet, and the version that's at Gracieland has an astonishing $1-million price tag. Gracieland's second unique feature is the sound of its control room, with acoustics designed by Andrew Parry according to a novel principle he calls Early Sound Scattering.

Gracieland is named after another famous Rochdale singer, Gracie Fields, who was a legend in the UK during WWII, and the name is obviously a pun on Graceland. It was purpose-built in 1989 by Lisa Stansfield and her co-writer/producer/boyfriend, Ian Devaney, on a former tennis court in the outskirts of Rochdale. The inspiration for building their own studio came from the fact that Devaney and Stansfield had much more success in the early part of their career with songs recorded in Stansfield's mother's garden shed than with stuff they recorded with top-name producers in glossy London studios. "Our first worldwide hit, 'All Around the World,' was recorded in that shed on a TEAC 8-track with a Studio Master desk," Devaney says. "Since then, Lisa finds working in familiar surroundings much more creative. So we convinced Lisa's record company, Arista, to give us money to build our own studio, rather than spend it on expensive commercial studios."

A control room and live area were built and equipped with a Soundtracs desk and Soundcraft 24-track, on which they recorded Stansfield's first album, *Affection* (1989). The pair then upgraded the studio with an Amek Mozart and an Otari MTR90 multitrack for the recording of her sec-

BY PAUL TINGEN

World Radio History

ond album, *Real Love* (1991). In 1995, the Mozart was replaced by the 9098, a move that was accompanied by a radical acoustic overhaul of the control room, plus the addition of two large relaxation areas, including a kitchen and large bathroom, and a small programming suite and tape storage area.

The 9098 contains high-quality Rupert Neve-designed analog circuitry, a multitude of dynamics and EQ options, and an innovative automation system, and it can be configured for 100 input channels and up to five stereo outputs, including facilities for most forms of surround sound. Gracieland's engineer, who goes by only the name Tim, called it "the 747 of flight control. It simply trashes everything else. On this desk, you can hear the differences between similar-sounding microphones that you wouldn't hear on other desks. The desk is split in two, with 48 input channels and a 48-channel monitor half. The monitor half is totally equivalent and above an SSL in sound quality and facilities. The input half blows all that away."

The acoustic design in Gracieland's control room results in an open, extremely natural sound that has an immediately relaxing effect. There's none of the tense, claustrophobic feeling that hampers many control rooms. Acoustic designer Andrew Parry explains that the unusual acoustics of Gracieland's control room were made necessary by the acoustic effect of the huge desk. His idea was that since a reflection-free zone was unachievable with a desk this size, it would be better to mask the desk reflections with as many random early reflections as possible, so that the room would not impose any character of its own on the sound. To this end, he placed large amounts of wooden Schroeder diffusers around the monitors (instead of in the back of the room where they're conventionally positioned). "The rest of the body of the

One of the lounges at Gracieland

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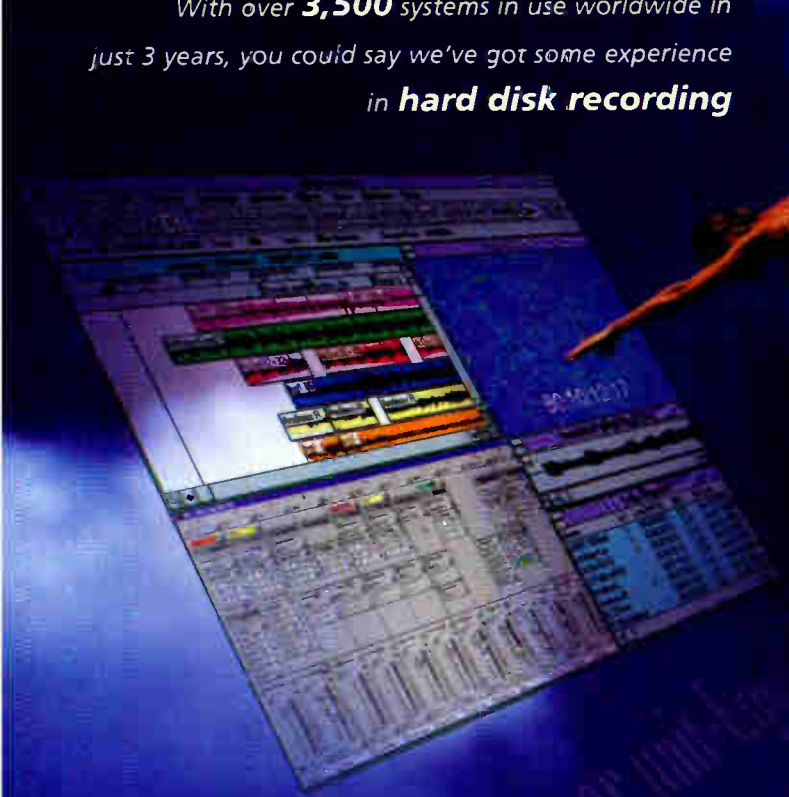

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room provides an appropriate length of decay to make the room comfortable to work in," Parry explains. "I've called this principle Early Sound Scattering (ESS) and have applied it in various other studios as well. ESS is an easy and cheap solution that has proven very popular with all my clients, and I think it's the way everybody will be designing control rooms in five years' time."

Tim also hinted at the 21st-century angle, when he remarked that the 9098 will put Gracieland at the forefront of the international studio world for a couple of decades. Looking around the control room, it was clear that the studio is also ready for the 21st century in many other ways. Multitracks include a 24-track analog Otari MTR90 and three Mark I ADATs, and the machine room has facilities for a Sony 3348. There's also a Macintosh with an 8-output Pro Tools system and StudioVision Pro, plus six fully loaded SampleCell cards with 32MB of RAM in each and TDM cards. Devaney uses the same Pro Tools setup in his home studio near Dublin (which now sports Gracieland's former Amek Mozart), where he recorded and programmed parts of Stansfield's fourth album, titled *Lisa Stansfield*, which should be out by the time you read this.

Gracieland also contains an impressive amount of outboard gear, both old and new, including an AMS RMX 16, 1580S, Yamaha SPX1000, SPX90, Eventide H3000SE, Publison IM90, Lexicon's Prime Time, PCM 70, 224 and 480, UREI 1176N and LA4, Tube-Tech CL1B, TC M5000, Korg SDD2000, Drawmer 201, dbx 563X, dbx 120XP, dbx 162, Joe Meek and Anthony DeMaria units, plus a collection of E-mu and Korg keyboards. Monitors include Dynaudio M-3 wall-mounted speakers and Tannoy System 12s, plus Genelec 1031A and Yamaha NS10 near-fields.

Studio manager Martin Rhodes has been busy making the switch from a funky private studio to a world-class commercial facility, giving the kind of Hilton hotel-type service that clients have come to expect from major international studios. Add a more than reasonable day price, and it shouldn't be long before scores of international customers find their way to Rochdale. ■

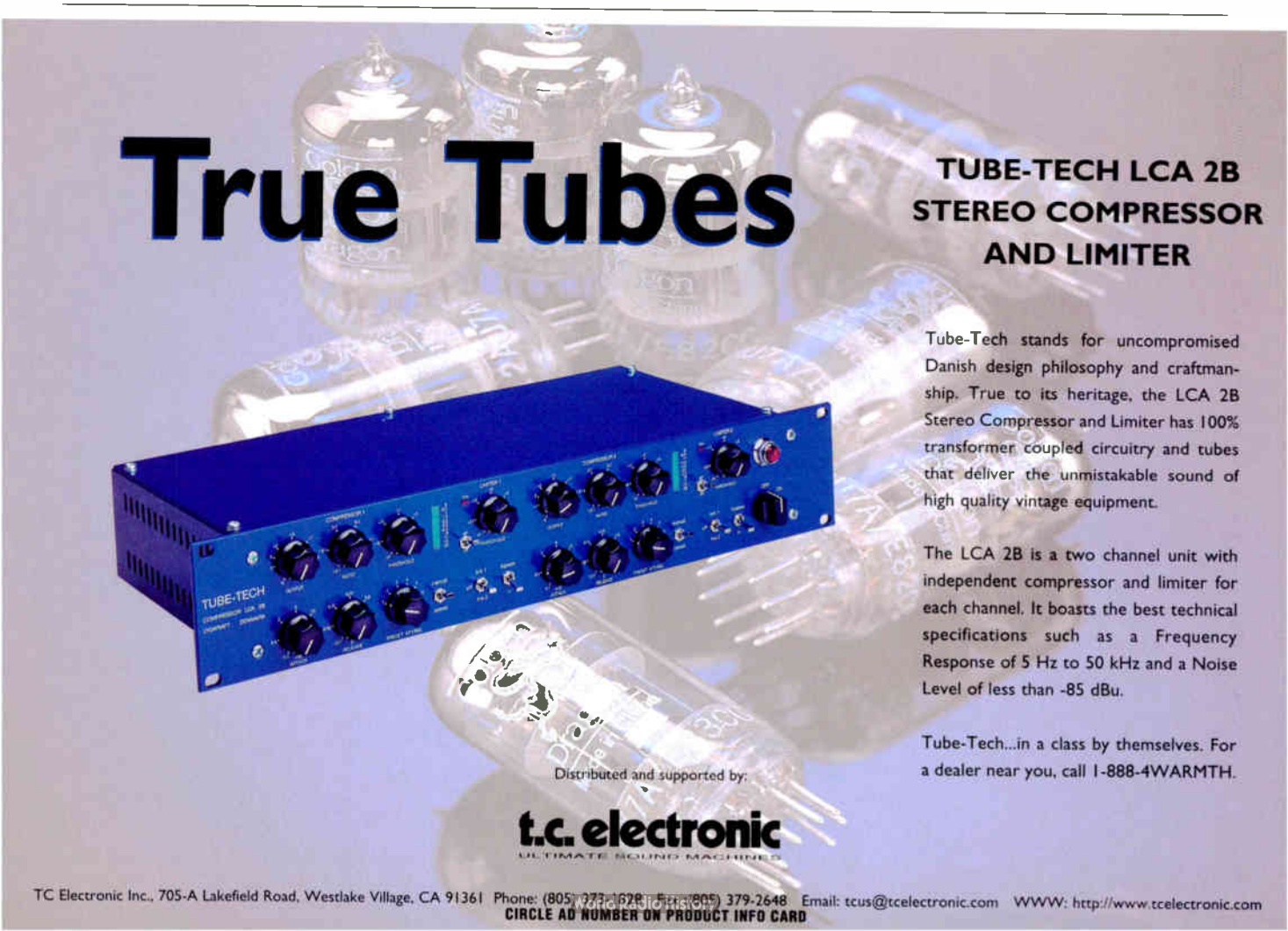
Paul Tingen is a freelance writer based in the UK.

—FROM PAGE 96, RECORDING "CHO"

nuns' songs. "There's always that question in the back of your mind as to whether you're going to do something commercially," Tibbetts says. "But the intent at first was just to get the sound down, have some fun, and then have fun with it in my studio." But once Tibbetts began to play with the sounds in his home studio in Minneapolis, experimenting with combinations of voices and instruments, he became more certain he'd like to record something for release.

So, the next time Tibbetts went to Nepal, he brought along a pair of Neumann KM184 mics and a Tascam DAP1 recorder, though he says if he had it to do over again, he'd use an analog Nagra machine instead. "The sound of the nuns singing would lend itself to analog a little better," he says. "They tended to get a little nasal. Sometimes their voices would float up into the upper part of their heads, sort of around the pitch range of cymbals and breaking glass, and that doesn't sound good recorded digitally."

The conditions under which Tibbetts had to record the nuns were also less than ideal; he basically had to fol-



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low them wherever they went and record wherever and whenever they had time to sing, whether it was in someone's home or in a shrine room. To make these opportunities count, Tibbetts sought the help of some of the Institute's translators, who were more familiar with the nuns' songs. "The nuns have an enormous repertoire," he says. "I didn't know what to ask for, but the translators live there. They would write down something and hand it to me and say, 'Ask them to sing this.' And so I'd hand them the crumpled piece of paper and say, 'Hey, let's do this one!' not even knowing what I was asking for."

There were also some technical difficulties, which Tibbetts says included "phlegm, candy wrappers and burping. They're not trained singers," he explains. "I mean, they don't gig. If they have to clear their throat, they'll do it, even if it's right on mic.

"And just like I do in Minneapolis when musicians show up at my studio, I try to give them a good time, like I might go out and get a box of Pepperidge Farm cookies and coffee, whatever. In this case, I brought candies and Cokes from Katmandu to the nunnery, because they liked to eat things that are not 'right.' But they crinkled the wrappings on the candy while they were singing, drank all the Cokes and burped. So for subsequent sessions, I brought food that didn't make any sound.

"The only other technical problems are just endemic to Asia," Tibbetts continues. "There's always somebody banging on a pipe or a dog barking, people yelling, kids running around or people stomping past the room upstairs. In monasteries, you'd think that people float around in some sort of spiritual haze, but they're just as inclined to bang on a pipe with a wrench as anybody in Chicago. And some of it I just left in there. At times you'd hear a service going on somewhere, and it would just filter into the mic."

Tibbetts' work in Asia was also challenging because of the living conditions. He was there in January, so it was bitterly cold a lot of the time, and he says that monastery food consists mainly of "rice, turnips and little rocks. But the place is also full of high romance. You're in Katmandu, and you walk over a ridge and there are the Himalayas spread out. It's a fine place to have a bad time."

—CONTINUED ON PAGE 233

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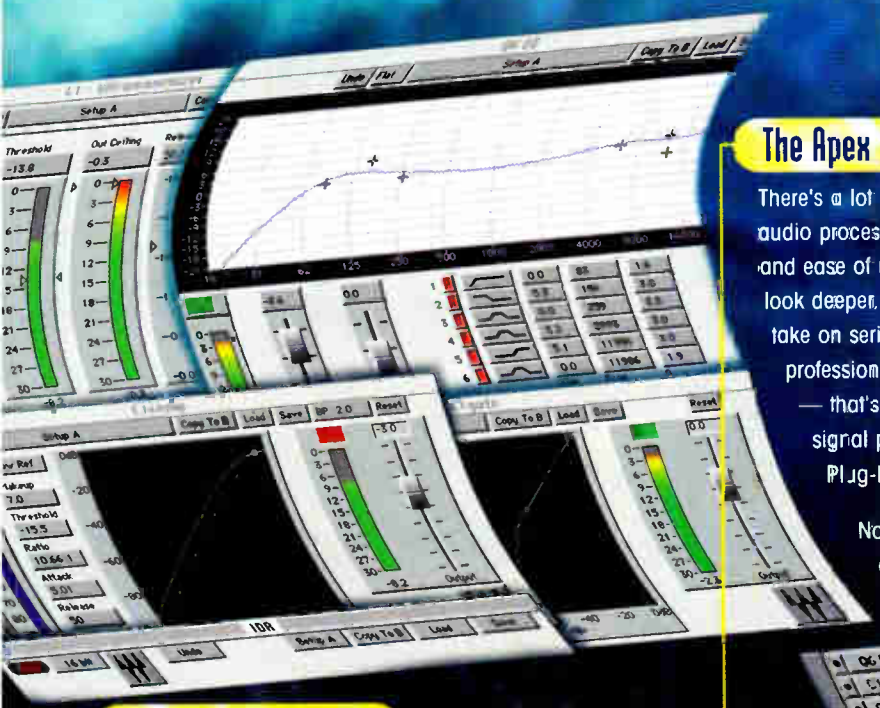
The Waves TDM Bundle



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ZERO RETURN RECORDINGS

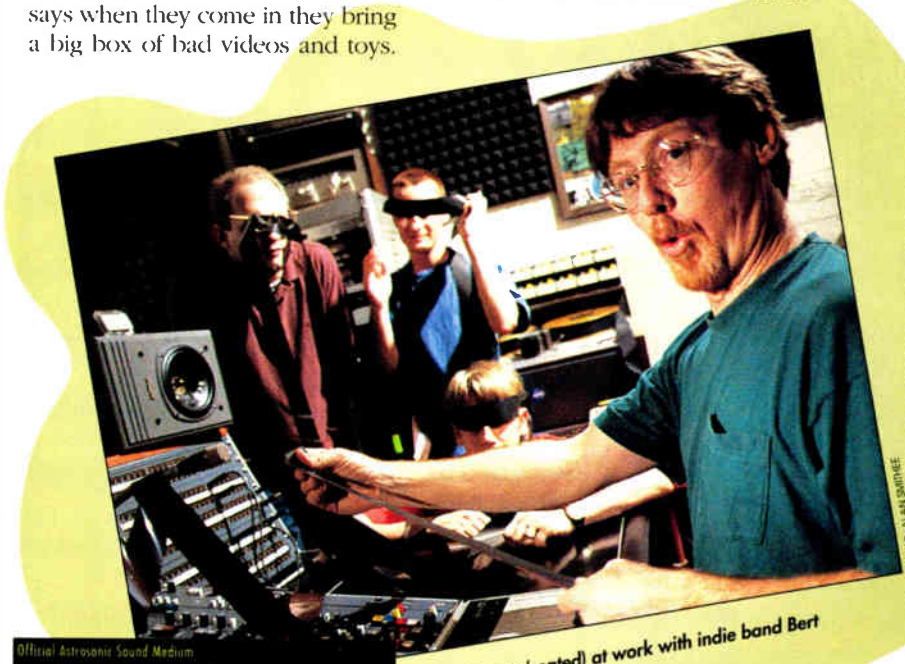
ANALOG ALIENS

Zero Return Recordings: It's not what you would call an ambitious name for a studio. But then owner/engineer Jim Marrer isn't necessarily in it for the bucks. "I started in 1983," he says. "Like most musicians, I got a 4-track cassette and was just out to record my own stuff. It's just in the past five years I got into it pretty seriously, spending every penny I made and putting it into the studio to build it up. Then I just called up my day job one day and said I wasn't going to be coming in for the rest of my life."

Marrer's just enjoying the process, working in a 100-year-old wood-frame house that's about 70 feet west of the CSX rail line in Elmore, Alabama. "I sleep in the corner, and I drive a '77 Volare that uses a quart of oil every 100 miles," he says, "but I do have five old analog machines, including a '71 3M M56 2-inch 16-track and an MCI ½-inch JH110B." Marrer's console is an old Neve 5114 broadcast board, which he uses mostly for mixdown; he records mainly through his stash of preamps, which include six Telefunken V72s, two Neve 1066s and some RCA transistor preamps that he says "sound close to what the Neves sound like, but they're a lot cheaper." His monitors are Tannoys, though he says he's saving up for a pair of Genelecs. He's also got a collection of vintage Neumann, RCA and Coles microphones.

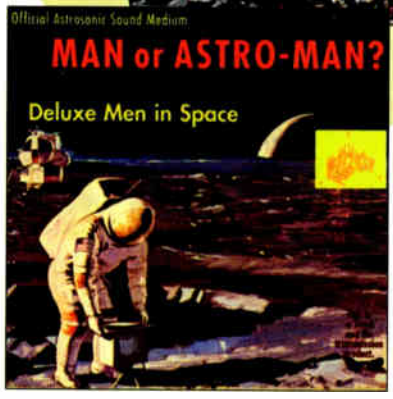
Marrer uses his cherished assortment of equipment to record local indie rock 'n' roll bands, such as cult favorites Man or Astroman, a group that combines surf and psychobilly guitars with clips from reject science fiction movies and the sounds of cheap toys. "That's a fine art there, now," Marrer laughs, "to really bring out the sound of a 50-cent ray gun. I get a little tired of really serious music. I seem to gravitate toward music that's fun. And how many studios get to record space aliens, horrific robots or self-proclaimed ultra-nerds?"

Man or Astroman has recorded ten albums and numerous singles with Marrer (their upcoming record is called *Made From Technicium*, which Marrer says he believes is the first man-made element). He says when they come in they bring a big box of bad videos and toys.



Jim Marrer (seated) at work with indie band Bert

PHOTO: ALAN SMITHEE



They often write as they go, and they've always recorded live with most of the band together in the 20x20x12 main recording room, and the drummer, Birdstuff, isolated in a separate drum room. "When we record, we play with all aspects of it," Marrer says. "On their recent EP release, on the drum kit we had metal things hanging all over the place: big bars, buckets, anything metal that he could bang on. The drum room is really cool. It's just a solid wood room. There's no deadening or anything. It has 12-foot ceilings, and it gets a pretty neat sound." The main room is treated with a little bit of absorptive material (carpet), but it has mainly wood surfaces, too.

"It's a pretty primitive-looking place," Marrer says, "but I really like doing this: working with loud rock 'n' roll bands. And I'm a big analog fan. Even though I'm constantly working on them and trying to keep them alive, I really love these old things—like the 2-inch 16-track and a ½-inch mixdown machine. I think that's just the greatest sound in the world, and I'm sure there's a lot of studios out there like mine: places with old vintage equipment in burnt-out buildings eking out a living recording bands that nobody's ever heard of—making records, which is what

BY BARBARA SCHULTZ

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DIGITAL MULTITRACK

by George Petersen

Twenty years ago, 3M changed the recording world with the introduction of its Digital Audio Mastering System, a 32-track digital recorder. The machine actually sounded pretty good, helped in part by its 50kHz sampling rate. Yet the system's 1-inch tape and 45 ips operating speed proved cantankerous by modern standards, and its unreliability substantially added to the "spirit of adventure" shared by those hardy souls brave enough to venture into this new format.

Fortunately, life in the digital lane is a lot easier today. The Sony/Studer DASH machines and modular digital multitracks are now in their third generation. Even the format wars have leveled off—the number of reel-to-reel formats has declined from three (3M/ProDigi/DASH) to one, while Yamaha and Akai have dropped out of the MDM race, leaving a choice of either ADAT or DTRS. Reliability is up, digital converters and filters are better than ever, and an assortment of digital consoles in all price ranges make this an excellent time to consider buying or upgrading a digital multitrack. With that in mind, here's what's available in the various formats...

DASH FORMAT

In 1982, Sony introduced the PCM-3324, and 15 years later, the format remains strong, with thousands of compatible machines in use worldwide. The 3324 laid the foundation for the

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RECORDERS

State of The Market '97

DASH (Digital Audio Stationary Head) format, which originally supported 2/8/16/24-track recorders using reel-to-reel tape. However, the 8- and 16-track machines never came to market, and the 2-channel (¼-inch) machines are no longer in production.

The DASH specification was subsequently expanded to include double-density, thin-film heads that allow 48-track recording on the same ½-inch tape used by the 24-track machines. The 48-track DASH machines are backward-compatible with the 24-track machines. In fact, a project can be started on a 24-track machine and then completed on a 48-track recorder if more tracks are required, as the data from tracks 25 through 48 is sandwiched into the spacing between the original 24 tracks.

DASH tapes run at 30 ips at 48 kHz (44.1 kHz and other sampling rates are also supported), using either 10.5-, 12.5- or 14-inch reels, the latter allowing up to 46 minutes of recording time. In addition to offering 24- or 48-track recording, DASH also

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provides two analog cue tracks and one track each for control and timecode signals. Today, 24- and 48-track recorders in the DASH format are manufactured by Sony and Studer.

Slated to begin delivery at the end of this month, and designed to work with 24-bit-capable digital consoles—such as Sony's OXF-R3—is the **Sony PCM-3348HR** (high-resolution), a 48-track recorder with 24-bit recording capacity (at 45 ips). When operated in its 16-bit mode, the 3348HR is fully record-and-play-compatible with current DASH recorders. The 3348HR has an RS-422 9-pin serial remote connector for external machine control, and comprehensive remote control of all functions is achieved via the RM-3348HR unit; a fully adjustable stand is also provided.

The PCM-3348HR includes 48 channels of 20-bit A/D and D/A converters, with 1-bit, delta-sigma-type ADCs—64-times oversampling digital filters and 20-bit decimation filters. The unit employs 24-bit, 8-times oversampling interpolation filters and 20-bit multibit-type DACs. The PCM-3348HR carries a retail list price of $300,000 (including remote), and Sony is offering a trade-up program for recent purchasers of standard-model PCM-3348 recorders.

Introduced in 1988, the **Sony PCM-3348** 16-bit, 48-track is compatible with the PCM-3324S/3324A/3324 for recording and playback of digital audio tracks 1 to 24. Features include a multiple real-time ping-pong mode for bouncing up to 48 tracks simultaneously within the machine; built-in SMPTE timecode reader/generator and expanded sample memory—20 seconds of 16-bit stereo audio (or 40 seconds mono), with manual or external source triggering and reverse sample playback.

An internal synchronizer handles sample-accurate lockup of multiple 3348 transports. A digital/analog output function enables predelay adjustment in 1-sample steps to compensate for signal processing delay in external equipment. Also standard is a dedicated electronic edit mode for dual-machine assembly editing in the digital domain. List price is $252,300, with 2-times oversampling digital filtering for both A/D and D/A converters. Over the past few months, Sony has begun offering an upgraded digital filter option for existing 3348s through Sony service centers.

The big news about the **Sony PCM-3324S** 24-track is a recent price cut that brings the retail cost with basic remote down to $55,319. The 3324S can be tailored to a variety of production environments by adding options such as a full-function remote or plug-in boards (AES/EBU or SDIF-2 I/O, timecode chase, 9-pin control, MADI I/O, etc.). The recorder is compatible with double-density 48-track DASH recorders, such as Sony's PCM-3348 and Studer's D827 MCH (the original 24 tracks recorded on a 3324S play back normally, and the 48-track recorder lays down the data for tracks 25 to 48). Standard features include 1-bit A/D and 18-bit D/A technology, V-clock and vari-sync facilities, a multiformat timecode generator, and the ability to pre-stripe or erase tapes at 4-times real time.

The **Studer D827-MCH MkII** is the

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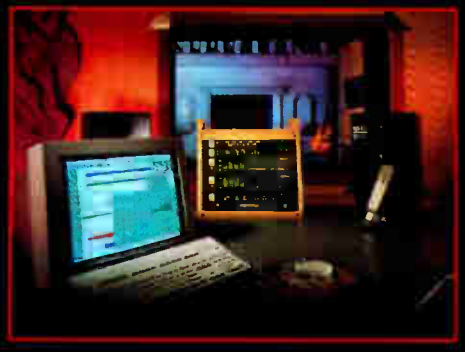

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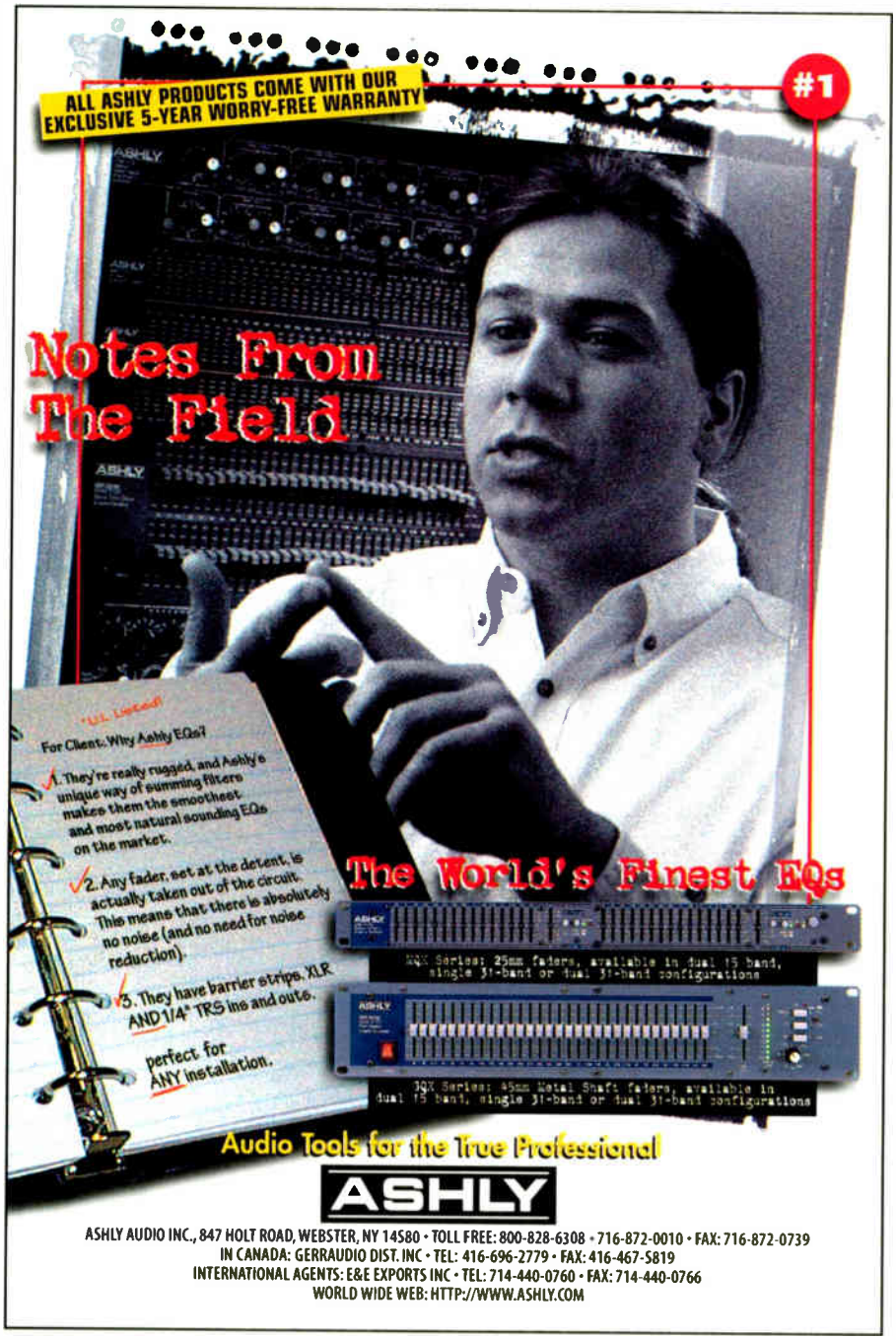
company's fourth-generation 24/48-track DASH-format recorder and features a new autolocator, 20-bit A/D-D/A converters, an improved tape transport, 180-second onboard sampler with edit-track slip and track-bounce features and MADI, SDIF and AES/EBU interfaces. The A/D converters use advanced noise-shaping techniques to impart many of the benefits of 18-bit conversion for storage on the 16-bit DASH format. The A/D converters are available with or without noise shaping. The D/A converters do not require noise-shaping circuitry, as the noise shaping is a single-ended process (encode-only), with no decoding necessary.

Field-upgradable to 48 tracks, the D827-MCH MkII could be ordered as a basic 24-track machine and later retrofitted for 48-track operation. The basic machine (24- or 48-track) includes onboard SMPTE synchronization with full editing capabilities. Optional is a 24-bit EDR (Extended Digital Resolution) function that converts the 48-track machine to 24-bit/24-track operation, where the additional 8 bits for each channel are stored on tracks 25 to 48. This 24-bit/24-track configuration is compatible with standard DASH 24-track decks, so if 24-bit tapes are played on a 16-bit DASH 24-track—say on a Sony PCM-3324S—the session would play back as a normal 16-bit recording. A 48-track D827-MCH MkII retails for $170,000, including locator and a remote meter bridge.



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MODULAR DIGITAL MULTITRACKS

The concept of the modular digital multitrack began in 1987 with the development of the Akai A-DAM system, which recorded 12 tracks on 8mm videotape and allowed the synchronization of multiple decks for 24- or 36-track production. While a groundbreaking product from a technology standpoint, A-DAM's 80-pound rack-mount chassis proved to be somewhat cumbersome by anyone's standards.

Five years later, the MDM was defined by the Alesis ADAT (shipments began in 1992) and the Tascam DA-88 system, which came out the following year. Both systems record digital audio on consumer videocassette formats and provide for interlocking up to 16 8-track rack-mount recorders in sample-accurate (1/48,000-second) sync for up to 128-track recording. Today there are three MDM formats: ADAT I is a 16-bit format (with 67 minutes maximum record time on a T-180 S-VHS tape) supported by Alesis and Panasonic. ADAT-II is a newly proposed 20-bit S-VHS format used in the new Alesis M20 and Studer V-Eight. DTRS, a 16-bit format used by Tascam and Sony, provides up to 108 minutes of record time on an NTSC-120 Hi-8mm videocassette.

ADAT TYPE I RECORDERS

The **Alesis XT** is the second generation of the company's ADAT system. Retailing at $3,499, the XT improves on the original ADAT design by incorporating numerous enhancements, including improved transport control and lockup (four times faster than the original), assembly editing features, onboard track delay (up to 170 ms on any track), auto-punch rehearse functions, a die-cast, one-piece aluminum chassis, servo-balanced analog I/O, ten locate points, and an alphanumeric fluorescent display with three modes of meter ballistics and running time accurate to 1/100 second. Unbalanced analog I/O connections are via RCA jacks; access to +4dB balanced signals is via a 56-pin EDAC multipin connector.

Another ADAT Type I format recorder, **Panasonic's MDA-1**, is similar to the XT but offers a slightly different feature set. Rather than provide a

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multipin connector for access to the servo-balanced analog inputs and outputs, the MDA-1's rear panel has a full set of eight XLR inputs and outputs. The MDA-1 also incorporates muting relays on the outputs, which avoids power on/off transients and improves the deck's signal-to-noise performance while the machine is in Stop mode. Retail pricing of the MDA-1 is $3,499.

ADAT TYPE II RECORDERS

The ADAT Type II format provides 20-bit linear recording on S-VHS tape, and the machine can be switched to 16-bit operation if desired. The latter mode provides Type II decks with full backward compatibility for the recording and/or playback of tapes made on the 100,000 (or so) machines using the original 16-bit ADAT format. The 20-bit tapes will not be playable on Type I ADAT decks. However, up to 16 ADAT decks (of any vintage) can be interlocked in sample-accurate sync.

ADAT Type II recorders feature the Matsushita "IQ" transport used in Panasonic's high-end video editing systems and operate twice as fast as the Alesis XT. Dual direct-drive motors under servo control eliminate the idler wheel, so tape handling is gentler. The new format includes a dedicated timecode track and an analog aux track for cueing. Onboard SMPTE/EBU timecode chase lock sync, MIDI Machine Control, video reference I/O, word clock I/O and "pull-up/pull-down" conversion are standard. Analog I/O is via balanced XLRs (including TC and aux tracks) or the 56-pin EDAC (Elco-compatible) multipin. ADAT lightpipe digital I/O ports are standard; an expansion slot is provided for an optional 8-channel AES digital I/O interface.

Housed in a die-cast, four-rackspace chassis, the **Alesis M20** (formerly code-named "Meridian") ADAT Type II recorder has a large jog/shuttle knob, illuminated transport buttons and a keypad for entering SMPTE data or the 100 locator points. Other features include adjustable delay on each track, autopunch with Rehearse mode, digital routing from/to any track on a machine or within a system, and trim pots for precisely matching operating levels. System status, locator information and metering are on two large fluorescent displays.

An optional Controller Autolocator Desktop Interface (CADI) can control up to eight ADATs (64 tracks) with access to all controls, track arming and sync functions. Communicating to any Type II deck via a single RJ-45 Ethernet-style cable (up to 300 meters), CADI acts as the interface telling the system what to do. Also on the RJ-45 bus is display information for the redesigned 32-track optional meter bridge, which, like the new ADATs, also provides a choice of metering modes as well as error/interpolation indicators. Retail price is $7,000.

Like the M20, the **Studer V-Eight** is an S-VHS-based, ADAT Type II-format recorder. But behind its silver-colored faceplate, the V-Eight is substantially different from the Meridian. The V-Eight employs 24-bit A/D converters from Studer's D827-MCH MkII DASH multitracks and a parallel port for 9-pin control via the Sony P2 standard. For field listening or machine room applications, the deck also has a front panel 8x2 monitor mixer, with headphone out and a cascade function for monitoring multiple machines. The V-Eight will retail at about 10% more than the M20. Deliveries are slated to begin this fall.

DTRS RECORDERS

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you read this, the **Tascam DA-98** is the company's third-generation modular digital multitrack. It uses the same 8-track, 16-bit DTRS format as the DA-88, DA-38 and Sony PCM-800. Designed with audio post users in mind, the DA-98 features 20-bit A/D and D/A converters, built-in SMPTE/MIDI chase-lock synchronizer, dither switching, jog/shuttle wheel, 0.1% "pull-up/down" sync adjust for film-chain applications, selectable sampling rates, individual delay on any track, a choice of three operating levels (EBU, SMPTE or Tascam), several metering modes, rack handles and a read-after-write confidence monitoring function.

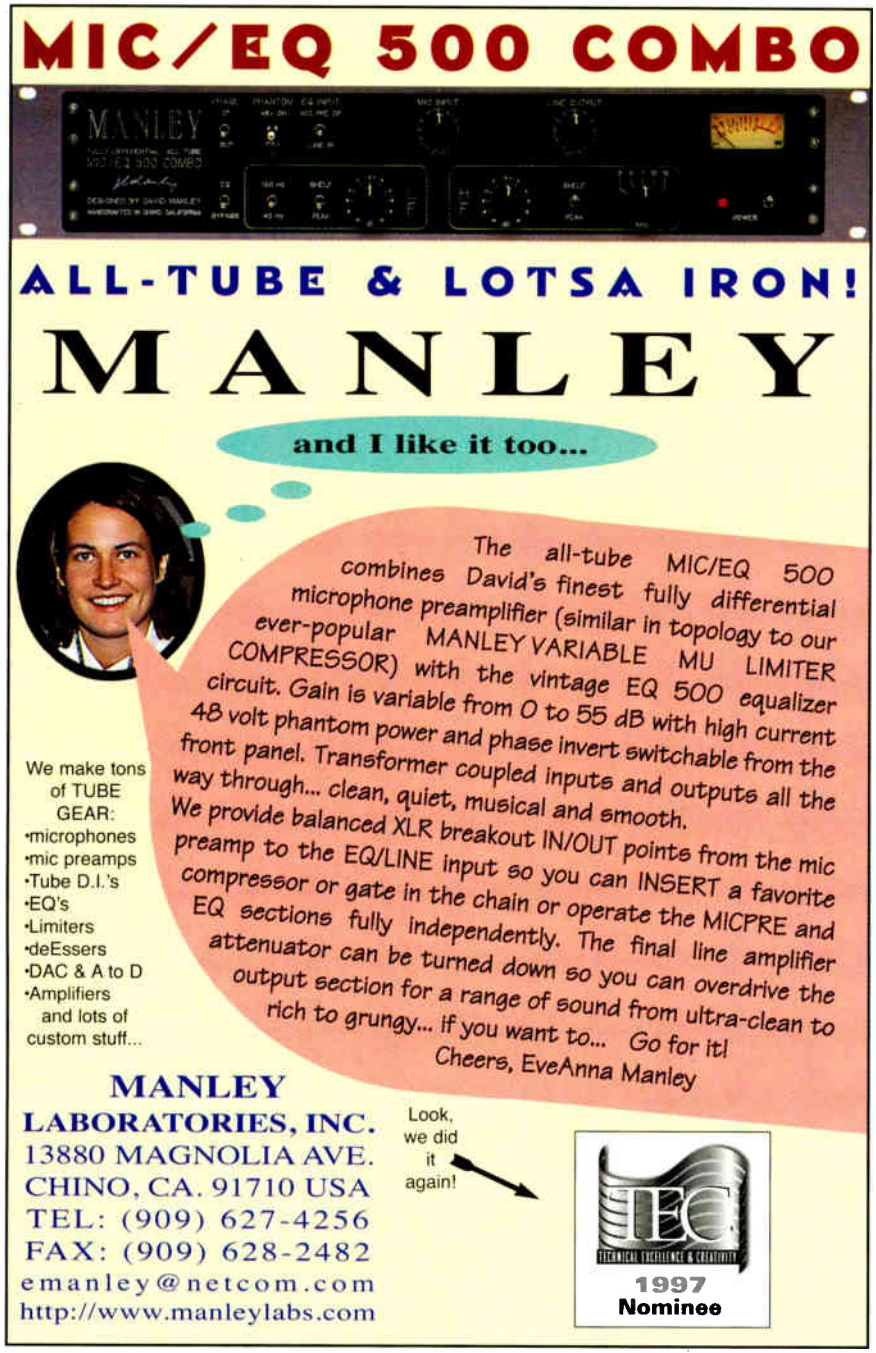
The DA-98's front-panel 4-line-by-20-character LCD screen simplifies use of the advanced digital track-bouncing/copying/routing feature, and it provides easy access to other function menus while offering operational status at a glance. One notable difference between the DA-88 and the DA-98 is that the new machine offers analog interfacing only via D-25 sub connectors (this time, thankfully, they've screened the pinout diagram on the rear panel), and the unbalanced -10dB RCA analog I/O jacks are gone. But like the DA-88, up to 16 decks (any combination of DA-98s, DA-88s or DA-38s) can be interlocked for up to 128 tracks of recording. The four-rackspace unit has a projected retail of $5,999. Optional for either the DA-98 or DA-88 is the RC-848 multimachine (6-transport) autolocator at $1,599. Beyond the standard transport commands, the RC-848 provides programmable pre/post-roll, along with 9-pin RS-422 output for interfacing to video systems, 99-point autolocation, shuttle wheel, LCD status screen and two time displays.

The **Tascam DA-88** ($4,799) records 108 minutes on a standard Hi-8mm videotape (slightly longer with extended-length formulations). Besides the usual transport functions, the DA-88's four-rackspace front panel includes controls for tape shuttle, sample-rate select, two locator points, rehearse and auto-punch modes, and clock source select. The optional SY-88 synchronization board ($849) is a plug-in SMPTE card for MIDI Machine Control, chase-lock to timecode sources and RS-422 video editor control.

Tascam's DA-38 is a scaled-down version of the TEC Award- and Emmy Award-winning DA-88 digital 8-track. Now shipping, the DA-38 does not support video sync or 9-pin protocol (as do the DA-98 or DA-88/SY-88 combo), but MIDI sync and MMC can be added via an optional MMC-38 adapter. However, the DA-38 adds a few advanced features of its own, such as track-to-track copying within the machine, dither on/off switching, A-440 digital tone generator and bar graph error rate display. The DA-38 retails at $3,499.

The only non-Tascam DTRS recorder is the **Sony PCM-800** ($5,995), which is compatible with the DA-88, offering eight tracks on Hi-8mm cassettes. Standard features include two 25-pin D-sub connectors, which carry eight channels of AES/EBU digital information (on stereo pairs), and break-out cables with XLR connectors for interfacing with other digital devices. The RM-D800 ($1,500) autolocator/remote unit can control up to eight PCM-800s. Another option, the DABK-801 sync board ($800), is similar to Tascam's SY-88 card, in that it adds SMPTE timecode chase, 9-pin RS-422 control, MIDI Machine Control, timecode generation and MIDI sync capabilities. ■

Mix editor and digital pioneer George Petersen started digital multitracking 15 years ago on two interlocked PCM-F1 encoders and a pair of U-matic decks. Things are much easier these days.



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PREVIEW

EARTHWORKS LAB1 PRECISION PREAMP

The LAB1 Precision Preamp from Earthworks Inc. (Wilton, NH) is configured specifically for engineering field test and production measurement applications. A calibrated stepped gain control provides for 2,000 discrete, repeatable gain settings over a 66dB range, and a separate variable output control offers 20dB vernier gain reduction. Frequency response is 2-100k Hz ±0.05 dB. Included are switches for polarity reverse, 48V phantom power on/off and Standby (output muting). The rear panel includes an XLR balanced transformerless input and five outputs: stepped gain BNC and RCA outputs; variable gain BNC and RCA outputs, plus a buffered BNC output.

Circle 327 on Product Info Card

TANNOY SYSTEM 1000 AND 1200

Tannoy (distributed by TGI North America, Kitchener, Ontario) announces two Dual Concentric studio monitors, the System 1000 ($1,795/pair) and System 1200 ($2,395/pair). Both feature phase coherent Dual Concentric drive units in landscape-oriented cabinets, provide high sensitivity (94 dB and 96 dB at 1 m, respectively) and are capable of handling more than 250 watts. Frequency response is 45-25k Hz (System 1000) and 40-25k Hz (System 1200), ±3 dB. Features include newly designed crossovers with steeper filter slopes and improved high-end components. Magnetic shielding is optional.

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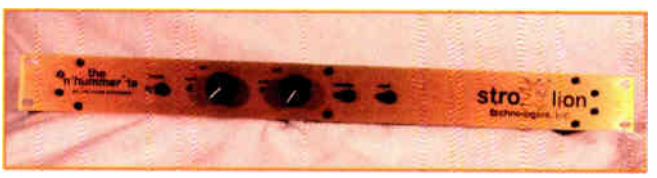
STROLION N'HUMMER

StroLion Technologies (Litchfield, CT) introduces the N'Hummer™ 1A, a 2-channel, single-rackspace unit designed to eliminate AC line noise on audio signal lines by digitally recording a sample of the noise and combining the sampled noise out-of-phase with the noisy signal. The unit is capable of up to 48 dB of hum reduction per channel. Front panel controls include input level pots for each channel, a record/play switch to initiate noise sampling and a Reset button. LEDs indicate status and overload conditions. Retail: $249.95.



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SONY DAT WALKMAN

Sony Electronics (Park Ridge, NJ) introduces the TCD-D100 DAT Walkman personal stereo, a lightweight full-function digital player/recorder with extended battery life capability. Weighing only 13.3 ounces with its two nickel-metal hydride AA batteries, the unit offers up to four hours of recording and playback time in standard operation; a lithium-ion battery enables up to 21 hours of continuous operation without monitoring. Features include a digital automatic gain control (AGC) that operates in two modes (music or speech) and three adjustable recording levels. A built-in LCD indicates current operational mode and remaining battery life. Price: $999.95, with headphones, remote control, AC adapter and battery charger.

E-MU AUDIO PCMCIA CARD

E-mu Systems Inc. (Scotts Valley, CA) offers the EMU8710 Audio PCMCIA card for laptop digital audio production and delivery. The PCMCIA Type II card for Windows 95 supports audio and MIDI production software such as Sound Forge, Cakewalk, MasterTracks Pro and Creative Labs Vienna V2.0, enabling users to create CD-quality digital audio and wavetable music on a standard Windows 95 Pentium-based computer. Featuring 16-bit/44kHz stereo audio capabilities and 32-voice, 2MB General MIDI wavetable synthesizer, the EMU8710 comes standard with control panel software, Windows 95

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PREVIEW

drivers, reverb and chorus effects, several SoundFont banks, example files and a stereo playback cable. An optional Media Access Breakout Box (MABOX) includes connectors for line in, analog and S/PDIF digital line out and MIDI in/out. Retail: $395, including MABOX.

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SYMETRIX WINDOWING EXPANDER/GATE

The 562E Windowing Expander/Gate from Symetrix (Lynnwood, WA), is a 2-channel, single-rackspace unit using newly developed technology to enhance gating and expander control. The AutoWindowing feature uses a dynamic smoothing process to reduce pops and other nonlinearities, and users can monitor the gated signal in both direct and side chains. A Window Advance feature moves the statistical energy center of the gated signal toward the center of the gated envelope, eliminating clicks typically associated with fast attack times. High and Low Key Filters narrow sidechain frequency response, and the unit offers an external key input. I/Os include balanced and unbalanced XLR and ¼-inch connectors. Retail: $499.

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FOLDED SPACE VOX BOX

The Vox Box from Folded Space Technologies (Acworth, GA) offers a flexible solution to the problem of recording voice or instruments in untreated or unflattering acoustic environments. With eight 24x48-inch Cloaking Device acoustic panels arranged on four double-height swivel stands, the Vox Box allows for quick, easy assembly of temporary vocal booths and instrument enclosures. Vox Box offers a total of 128 square feet of adjustable surface area (each panel has both absorptive and reflective sides) and stands a maximum of 7 feet 6 inches. The modular system may be combined with other Cloaking Device systems. Retail: $699.

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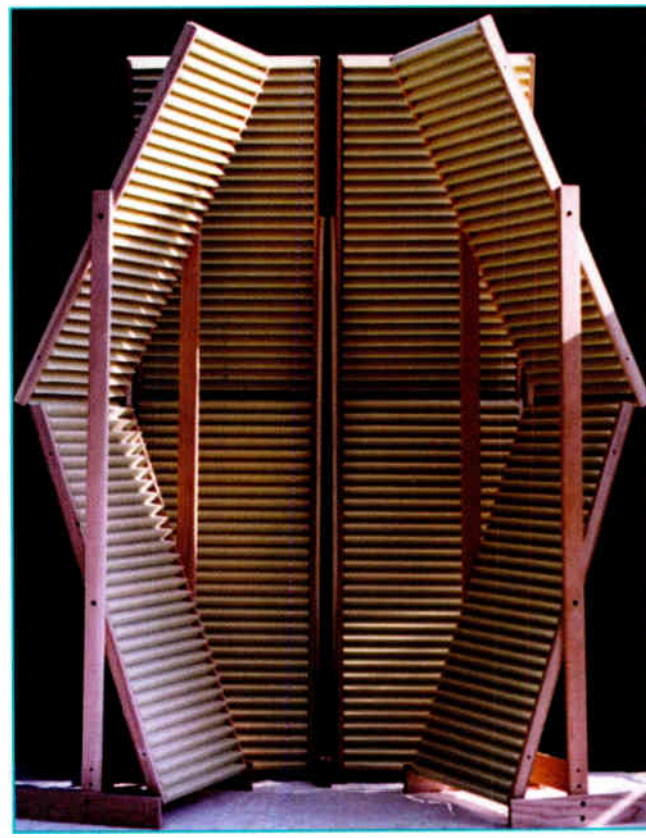

TELOS AUDIOACTIVE INTERNET AUDIO

The Audioactive Internet Audio Suite from Telos Systems (Cleveland, OH) promises to deliver CD-quality audio over the Internet. The system includes a dedicated hardware encoder that uses enhanced MPEG Layer 3 encoding technology to reduce audio information to a tenth of its original size. The complete signal chain includes a "transmitter" or audio server, and client software applications that may be downloaded over the Internet to enable PC sound card- and Power Macintosh-equipped Web surfers to listen to real-time (live Webcasts) and stored audio streams. Audioactive supports NetShow 2.0 and is compatible with Macromedia's Shockwave plug-in.

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CAKEWALK PRO AUDIO 6.0

Cakewalk Music Software (Watertown, MA) is shipping Cakewalk Pro Audio™ 6.0, the first MIDI/digital audio workstation software to support Microsoft's DirectX™ audio plug-in architecture. New features include a variety of DirectX-based processing effects, such as pitch shifting, time expansion/compression, reverb, flange, chorus and delay. Cakewalk is also now the exclusive distributor of QSound's QTools/AX line of DirectX-compatible audio processing products. Version 6.0 also includes Cakewalk StudioWare™, allowing users to create their own on-screen emulations of front panels for favorite studio gear, including the Roland VS-880, the Mackie 1604 and the Yamaha ProMix 01.

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HHB CD RECORDER

Priced at $2,095, the CDR-800 CD recorder from HHB

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PREVIEW

(Santa Monica, CA) is said by the manufacturer to be the lowest-cost professional CD recorder available. An onboard sample rate converter instantly recognizes sample rates between 32 and 48 kHz with up to ±3% speed variance and converts them to the CD standard of 44.1 kHz. A built-in indexer converts DAT IDs to CD tracks, and a synchronous dubbing mode allows digital transfer from CD. Connections include balanced XLR analog inputs, unbalanced phono analog inputs and outputs, an AES/EBU digital input, and optical and coaxial digital I/Os.

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MIDIMAN DIGIPATCH

MIDIMAN (Arcadia, CA) is shipping its DigiPatch 12x6 automated digital audio patchbay, which routes digital audio signals among audio gear equipped with S/PDIF and ADAT LightPipe connectors. Offering six coax and six optical inputs for 12 independent sources, DigiPatch 12x6 can route signals to six target devices via co-ax or optical outs. The single-rackspace unit may be programmed from the front panel or may be remotely controlled from a PC or Macintosh (software included) and offers 50 non-volatile memory addresses for storing internal patch configurations. Additional features include compatibility with all digital audio format converters, co-ax-to-optical translation for S/PDIF signals (and vice versa) and MIDI Thru connection. Multiple units may be cascaded. Retail, $699.95.

Circle 336 on Product Info Card

HOT OFF THE SHELF

Quantegy intros two analog audio cassette products, the IRC Instant Recording Cassette (a magnetic leader allows recording at the head of the tape) and the AVX Professional Audio Cassette. Both products are available in 10, 20, 30, 46, 60, 90 and 120 minute lengths. At your dealer or call 770/486-2800 …**NetWell Noise Control's acoustic Pyramid foam absorbing panel system is** available in 2-foot squares and a variety of colors/thicknesses. The standard 3-inch thickness offers an NRC absorption value of 90%. For free product catalogs, samples and acoustical advice call 800/638-9355… **Miles Technology has been awarded a U.S. patent for its TriSonic™ Imaging Technology**, which creates full-bandwidth left, center, right and two surround signals from any stereo source. The process is incorporated in the Miles Technology MTI-3 TriSonic Imager. Call 616/683-4400…**Otari announces 48-track recording on the RADAR system**. Version 1.4 software enables two RADAR units to be linked with a single cable to allow sample-accurate 48-track recording and editing from a single RE-8 controller. Call 415/341-5900 or visit www.otari.com…**True Audio WinSpeakerz V2.0**. "The Speaker Design Toolbox" for Windows 95, is a 32-bit application that can model a speaker's response in an auto cabin environment and print shop drawings for each completed design. Free upgrades are available for WinSpeakerz 1.0 users. Call 760/480-8961 or visit www.trueaudio.com …**Hannay Reels' new catalog of Audio/Video Reels** has durable and lightweight nonreflective black reels, with removable side panels for customization of connector configurations. For a free copy call 518/797-3791 or visit www.hannay.com… **Hafler has gained CE (Community Europe) approval for** the P1000 Trans•ana, P1500 Trans•nova and the P3000 Trans•nova amplifiers. Call 602/967-3565 or e-mail gentryri@rockfordcorp.com …**DIGIFON introduces a new bridging service for ISDN audio codec users**, enabling otherwise incompatible systems to "talk" to each other. Call 203/254-0869 or visit www.digifon.com …**Analog Devices offers edition 30-4 of Analog Dialogue, a 24-page newsletter** examining topics such as: electromagnetic compatibility and CE mark requirements; advanced digital encoders and voltage regulators; and modulation schemes for digital communications. Call 617/937-1428 or visit www.analog.com …**Sound Dogs Inc. introduces the first global sound effects library on the World Wide Web**. Users can now access the exclusive library of 35,000 SFX at www.sounddogs.com. For more information call Rob Nokes at 310/280-7966 or e-mail robnokes@sounddogs.com …**AMS Neve announces software enhancements** for Logic and Capricorn consoles and has also announced the release of Flying Faders software Version 3.10. Call 44/1282/457011 or visit www.ams-neve.com …**SoperSound Music Library introduces four new production music CDs**. The new titles include Classical & Americana; Guitars (i-lek'trek); Tension, Danger & Mystery; and Action, Heroic & Patriotic. SoperSound's new TeleDemo System allows customers to listen to music tracks over the phone by dialing 800/227-9980. For more information call 415/321-4022. ■

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DIGIDESIGN AUDIOMEDIA III

DIGITAL RECORDING CARD WITH SESSION SOFTWARE

Digidesign's Audiomedia III (AM III) card with Session software is a recent entry in the computer hard disk recording market. Used together, the card and the software make a good team, but they can be purchased separately. Because Wave Driver software is also provided with the AM III card, it can be used with any digital audio sequencer that uses standard Microsoft Wave drivers. Programs that work with AM III include Cakewalk Pro Audio, Cool Edit, Cubase Audio, Logic Audio, Microsoft Media Player, Microsoft Sound Recorder, SAW, SEKD Samplitude Master, Sound Forge and WaveLab. It is compatible with both Windows and Mac. For this review, I tested Session software for Windows. Bought separately, the AM III card is $795, and the Session software is $199.

Session's Edit and Mix windows

THE BASICS

The hardware requirements for the Session system are a Pentium computer with a clock speed of 75 MHz or greater, one free PCI slot, Plug and Play BIOS, SVGA monitor and video card, 8 MB RAM minimum/16 MB RAM recommended, DOS 6.0 or greater with either Windows 3.1 or Windows 95, and SCSI or EIDE hard drive.

The Session system consists of the AM III card, Session software, an installation guide, a user's guide and a laminated quick-reference card. The card, which uses a Motorola 5600X Series DSP chip, plugs into a PCI slot in your computer as a plug-and-play device, so you don't have to deal with IRQ settings or port addresses. The Session software comes on three floppies; the installation program copies the device driver and Session program, and optionally a demo session, to your hard drive. The hardware and software can be installed in about 15 to 20 minutes.

The six RCA jacks on the back of the AM III card furnish left/right analog inputs, L/R analog outs and S/PDIF co-axial (RCA) stereo in and out. By using the two analog inputs and the stereo digital input, it is possible to record up to four tracks of digital audio at a time with the Session system. Eight tracks can be played back at a time, but they must be mixed to stereo within the Session software, as only one pair of outputs—either analog or digital—can be designated as main outputs. The audio on each track is always recorded as a 16-bit mono, .WAV file, and 48, 44.1, 22.050 and 11.025kHz sample rates can be selected. The 32kHz sample rate is not supported when recording. However, the system can import mono and stereo 8-bit and 16-bit .WAV and PCM files. Imported stereo files will appear as two separate files within Session. PCM files are the common sound format for AVI format movie files. Imported files can be at any sample rate; Session will convert the files to the sample rate being used in your current session.

THE HARDWARE

Digidesign offers a little bit of everything with Session, and the feature set is impressive—this power and sound quality at such a low price was unthinkable two years ago.

Session software lets you select whether you want the analog or digital inputs to be linked to inputs 1-2 in the software. If you select analog for inputs 1-2, then the digital input will be selected as inputs 3-4, and vice versa. Being that any input can be routed to any of the eight tracks in the Session software for recording, it actually doesn't matter what input a signal is received on.

The output situation is similar. The main stereo output is user-selectable, and this output is normally used to send a stereo mix of the eight digital tracks within the Session software to the mixdown deck. The remaining pair of outputs become two aux send outputs. Again, outputs are available on L/R analog and a co-axial S/PDIF digital.

In general, this is a very good setup that works well in most applications. However, if you're mixing down to an analog deck, then you have to select the analog outs as your main outs, which means the digital outs will have to be used as the aux sends. If your effects de-

BY DOMINICK J. FONTANA

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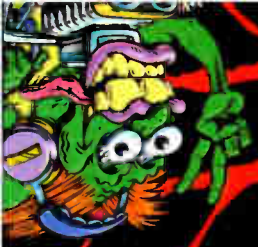

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vices only have analog inputs, than you obviously can't use Session's digital aux sends unless you convert the signal to analog first.

For the low cost of the Session system, some compromises in the hardware had to be made. The hardware is not expandable in any way. You can't add more inputs, outputs or horsepower at a later date. At this price point, limitations are understandable; however, I wish there had been provision for future expansion on the card, even if it cost a bit more.

THE SOFTWARE

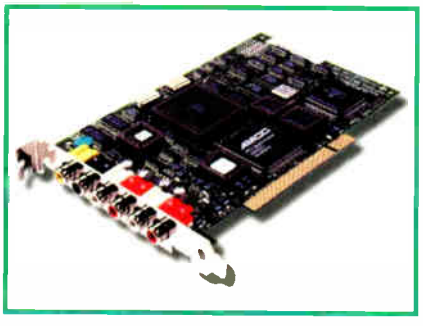
The Session software provides the following main features: nonlinear, nondestructive, random-access editing; separate audio regions; volume and pan mix automation; use of an external MIDI controller for mix automation; eight bands of real-time digital parametric EQ; two aux sends and four returns during mixdown for use with external effects processors (or the returns can be used for additional live inputs during mixdown); loop playback; 100 locators; nudging audio by specified time intervals; custom crossfades with definable fade shape and length; use of external synchronized MIDI sequencer playback; frame-accurate synchronization to AVI format movie files; unlimited track bouncing; and automated punch-in and punch-out recording.

Session has seven menus: File, Edit, Display, Grid, Options, Window and Movie. There are six main windows: I/O Setup, Transport, Movie, Input/Return, Mix and Edit.

The I/O Setup window allows you to select the sample rate, clock source, inputs, outputs and analog input gain. The Transport bar contains the usual transport controls, as well as Return to zero, Loop playback, a Time indicator, 100 Locators, and three buttons to open the Mix, Edit and I/O Setup windows. However, when using a 640x480 resolution display, the three buttons won't fit on the right of the Transport Bar, where they should be, and are wrapped around to the left of the next line underneath the transport controls, making the Transport bar twice as high as it's supposed to be. The Transport bar can be placed anywhere on the screen, but it can't be resized. As is the case with most of these kinds of programs, the detached Transport bar always seems to get in the way.

The Movie window allows importing .AVI format movie files for the purpose of creating or editing soundtracks for them.

The Input/Return window has four inputs/returns and can be used as effects returns or additional inputs when mixing. Keep in mind that the Input/Return window gets its signals from AM III's two analog inputs and two digital inputs. Signals sent to this window are routed to AM III's main mix outputs and combined with the Session digital audio tracks. Therefore, if you have eight Session tracks that you are mixing down to DAT, you can also add live inputs or a submixer feed (perhaps from MIDI tracks) to the Input/Return window, and mix them to DAT as well. If you are using the aux sends within Session to send some of the Session tracks to external effects processors, then you can patch the effects returns to the Input/Return window and record the wet signal to the DAT deck along with the dry Session tracks.



The Audiomedia III card features analog and S/PDIF I/Os and plugs into a PCI slot.

The Mix window resembles a digital mixer, allowing users to record and bounce tracks, and to adjust all monitor and mixdown levels, equalization and effects sends. It consists of eight channels, each representing a track of digital audio. Each channel has an EQ slot, two effects send knobs, a horizontal fader for panning, a vertical main level fader, a track meter and clip LED, a Playlist/Input selector, and Solo, Mute, Audio/Automation Record-Enable, and Automation-Enable buttons and LEDs. There is also a master section with two master effects sends, two master level faders and two master level meters with clip LEDs. At the top of the mixer are buttons for assigning the faders and pans to four different groups, buttons for bouncing, buttons for selecting EQ and a button for MIDI mapping.

You can record tracks from either the Mix or Edit windows. Session uses the concept of Playlists. You can record, save and name a take into a Playlist. Thereafter, you can unload or load any Playlist into any of the eight tracks for playback or editing. Recording is straightforward. When in Record-Enable mode, the Playlist selector becomes the input selector. Select an input for the track and adjust fader levels and panning. (These levels are for monitoring purposes only.)

All takes are temporary, unless they are saved. So if you record on a track again without saving the previous take, the previous take is lost. However, a Retain Unsaved Takes option allows you to record on a track, disable that track's Record-Enable button and try different takes on other tracks, without losing the original track. The original track will remain available until you record on that track again. If you fill up all eight tracks and still need more, you can unload a Playlist from any of the eight tracks, add a new Playlist and record a new take on that track. So, though you are limited to playing back eight tracks at a time, you can select from an unlimited number of previously recorded Playlists and assign one to each of the eight tracks.

Session also allows you to record, edit and play back mix automation for the playback levels and panning of all eight audio tracks. This feature works well. You can also record your Session moves into a MIDI sequencer and have the sequencer "play back" the automation.

Session allows automated punch in/out recording but does not allow punching on-the-fly. There is also no Rehearse mode when using automated punching. The manual describes a procedure for simulating Rehearse mode by using loop playback while doing an automated punch, but it's not the same thing.

Session provides eight single-band digital equalizer modules and up to four EQ modules can be assigned to a track. But if you use three bands on one track, for instance, you're left with only five EQ modules for the remaining seven tracks. Each module includes an EQ in/out bypass button, a graphic display of the EQ curve, cut/boost knob, frequency knob and a choice of four types of EQ (narrow-band parametric; wide-band parametric; high and low shelving). The EQ is not a true parametric, as Q is not continuously variable, but it's a high-quality EQ nonetheless.

Session also allows unlimited digital track bouncing and allows you to use an external MIDI fader box or any MIDI continuous controller device to control Session's onscreen controls. It also pro-

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ALESIS

vides four groups for grouping fader and pan controls, so they move together when you move any member of the group.

The Edit window contains all of Session's digital editing functions and is based on the concept of audio regions. Every take that you save is created as an audio region. Thereafter, you edit your audio by creating, deleting, cutting, copying, pasting, moving and otherwise manipulating these regions.

The Edit window displays the eight audio tracks as horizontal waveforms, along with buttons for selecting Playlist/Input and Solo, Mute, Record-Enable and Automation-Enable buttons. Audio regions appear in the Regions bin and can be selected and manipulated from there, as well as from the waveform itself.

All editing is nondestructive, and there is one level of Undo and Redo. In general, you select a tool to perform an action on the waveforms (remember that each waveform can be comprised of one or more audio regions). A Zoomer tool, four zoom arrows and four zoom presets assist viewing the waveform displays. The Selector tool allows selection of playback point as well as portions of the waveform, for purposes of creating or editing an audio region. Numeric editing fields allow fine tuning of the selection points. A Grabber tool moves or rearranges audio regions within a track. You can freely move regions or move them to a grid point, such as a SMPTE timecode location. Shuffle mode makes the beginning of one region automatically snap to the end of the previous region, so there are no spaces between regions. You can also trim the beginning or end of a region. An Automation tool edits stored gain and pan automation data. The Scrubber tool allows listening to small portions of your audio at varying speeds to locate an exact spot, similar to rocking the tape reels back and forth on an open-reel analog recorder.

The Edit window also allows eliminating silent portions of your audio by placing silence regions in a waveform or by using the Strip Silence command. You can also create crossfades between regions, and crossfade duration, position, and shape can all be selected. And it's a simple matter to create fade-ins and fade-outs.

The editing features provide a powerful means of creating and manipulating audio regions from the recorded waveforms. But Session does not allow you to actually edit the contents of your recorded waveforms and provides no DSP functions. For more detailed editing of your waveforms, you will need a dedicated digital audio editor, such as WaveLab or Sound Forge. In its defense, it must be said that Session is not alone in this regard; most of the software programs provided with digital audio cards for the PC neither offer DSP functions nor allow actual editing of the waveforms.

Session has extensive MIDI and synchronization capabilities. You can use Session as the master and slave a MIDI sequencer to it using SMPTE/MIDI Time Code sync. This permits combining virtual MIDI tracks with digital audio tracks, and you can play back, refine, and automate your mix, and then mix everything to a DAT deck, for example. I tried this using Steinberg's Cubase Audio XT, and it worked fine. However, Session must be the master and cannot slave to a MIDI sequencer. But you can slave Session to an external tape deck

—CONTINUED ON PAGE 236

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SPENDOR SA300

POWERED NEAR-FIELD SPEAKERS

Although their products are not common in the United States, Spendor has been designing and manufacturing loudspeakers for nearly 30 years. The company was founded in 1969 by Spencer and Dorothy Hughes (Spen+Dor) after Spencer decided to manufacture and market speakers that he had helped design while working in the BBC's research department. The SA Series studio monitors are the company's latest offering, and they are now being distributed in the States.

At $3,595 a pair, the SA300s are the mid-priced models in the SA Series, which ranges from the SA200s at $2,395 to the three-way SA500s at $6,995. The SA300s are powered two-way monitors with 8-inch woofers and 3-inch soft-dome tweeters. The woofers have filled homopolymer cones, coupled with long-throw coil assemblies, and are powered by 130-watt amplifiers. The tweeters have silk diaphragms, are ferrofluid-cooled and damped, and are powered by 60-watt amps; components are matched to within 0.75dB tolerance. The SA300s measure 18.5x10x11.5 inches, weigh 37 pounds and sport sculptured, high-grade MDF cabinets finished in lightly textured gray. Their sides and top are chamfered to reduce diffraction at high frequencies, giving them an attractive and unique appearance.

On the back are four controls, one for gain and three for equalization. The gain control ranges from 0 to +20 dB, or the full output of the speakers. The LF Cut control varies the cutoff frequency of the LF filter and can be set to 50, 70 or 90 Hz. The LF Tilt shelving control operates from 500 Hz downward and can be adjusted to give ±3dB boost/cut in 1dB steps. The HF Tilt control gives up to 3dB boost or cut from 4 kHz upward, also in 1dB steps. There is also a large heat sink, XLR input connector and an IEC mains inlet with a voltage selector.

I found the high and low EQ controls to be quite useful for adjusting the speakers to different listening environments. The fact that they are notched in 1dB increments makes it easy to set them as a pair, and to find your way back to the flat setting. I did experience a bit of trouble with one of the AC inlets, though; the cable did not fit very snugly and became loose on two occasions, causing the amplifier to shut off and then come back on suddenly. This was not as big a problem as it might have been, though, as the unit features a protection circuit that delays connecting the input to the amplifier for five seconds on power-up and mutes the input within 100 ms on power-down. Another protection circuit compensates for the different thermal time constants of the bass and treble units and mutes the input when there is a signal overload.

BY BARRY CLEVELAND

PERFORMANCE

For my listening tests, I used a Yamaha 03D digital mixer, with a Sony DAT deck connected to its

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co-axial digital input and a Panasonic CD player connected to its analog stereo inputs. Although I listened to a wide variety of recordings to hear how the SA300s handled diverse program sources, I did my most critical listening using five particularly dynamic and/or complex CDs, and five DATs of my own mixes. The CDs were Oliver Messiaen's *Couleurs de la Cite Celeste* (a work for piano, clarinets, xylophones, brass orchestra and metal percussion instruments); Joe Zawinul's *My People*; King Crimson's *Thrak*; *Gongs and Vocal Music from Sumatra* (Smithsonian Folkways); and my own *Voluntary Dreaming* (mixes of an ensemble of multiple percussionists, bass, electric guitar and woodwinds, and another ensemble of electric guitar, bass, cello and cymbalom).

I chose the recording of *Couleurs de la Cite Celeste* because it has an unusual variety of timbral colors and an extremely wide dynamic range. The SA300s reproduced the xylophones and metal percussion instruments with great clarity and definition, while handling the intense surges of the brass orchestra with ease. The overall sound was rich and full, yet it maintained the subtle "airy" quality of the concert hall during the quiet passages. The Zawinul CD was chosen because it combines the full range of synthesizer sounds with vocals and myriad instruments from around the world, all presented with exceptional production values. The mixes are layered with subtle sounds that are easily lost on most other speakers and even studio monitors. Once again, the SA300s reproduced them all with astonishing clarity and definition. The big bass synth pedal notes came across tight and full, even at the lowest frequencies, and cymbals, bells and other high-frequency sounds were crystal-clear. Mid-frequency sounds, such as talking drums, vocals and guitars were also crisp and clean.

On *Thrak* there are really two sets of musicians performing in a "double trio" formation. There are two drummers, two guitarists and two bass/Chapman Stick players, so the mixes tend to be very dense and complex, often employing unorthodox imaging and panning effects. In addition, all of the musicians use multiple layers of effects processing, often in stereo, which further complicates things. The strengths *and* weaknesses of this approach were revealed by the Spendors. They faithfully reproduced the full range of sounds and maintained a high degree of stereo definition, while clearly highlighting those sections where there was simply too much going on within a particular frequency range. Also, their reproduction of certain, often quite subtle, stereo effects was nothing short of amazing. The gong and vocal music from Sumatra tested the SA300's ability to handle very complex high-frequency sounds with lots of overtones and the nuances of multiple voices. They met the challenge quite well in both regards.

Finally, I chose my own *Voluntary Dreaming* CD because I am familiar with how the original 2-inch masters sounded in a control room environment, and I wanted to see just how close the Spendors could come to it. My recordings, like the Zawinul recording mentioned above, tend to have layers of extra sounds mixed in at relatively low levels. These sounds are the first things to go when you listen back on less than optimal speakers, and they are inaudible on many. The Spendors reproduced them all in their pristine purity. And, I had essentially the same experience while listening to my DAT mixes of newer material, though in some cases it was the problems and inconsistencies in those mixes that were revealed.

SUMMARY

Overall I found these speakers to be exceptional. I could listen to them for long periods of time without feeling fatigued, which is fortunate because I got so much pleasure from them that I returned often and usually listened very intently. The Spendor SA300s are absolutely ruthless when it comes to reproducing a recording without coloration. Highs are crisp and clear, mids tight and well-defined, and the low end rich and even. I detected no dead spots or other funny business in the critical 3kHz range, and the imaging was simply breathtaking. You may have to do a little searching to find a pair to check out, but I wholeheartedly recommend that you do so.

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Barry Cleveland is a San Francisco-based composer, recording artist, engineer and producer. He also plays guitar in the improvisational quintet Cloud Chamber.

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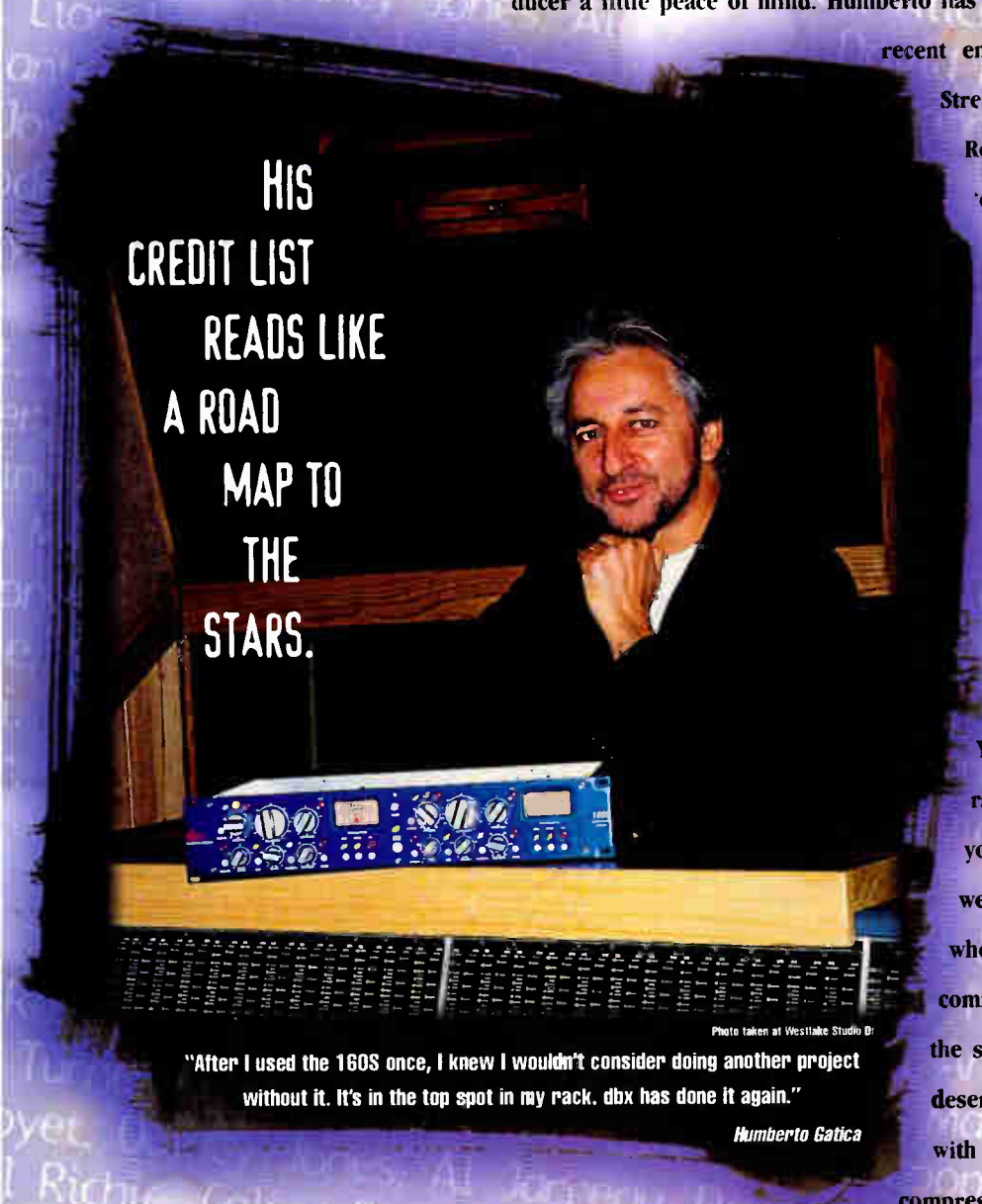

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RPG DIFFUSOR SYSTEMS B.A.S.S. TRAP

TRAPEZOIDAL BASS ABSORBING SOFFIT SYSTEM

I was called in to look at a mastering studio owned by a major label. The request came from a speaker manufacturer who had just sold a new set of monitors to the studio. No one thought that the speakers sounded right in the room, and the manufacturer was concerned. This speaker system comprised high-quality direct radiators with active two-way crossovers. The speakers were mounted on very large (and very heavy) stands that stood out from the front and side walls at an appropriate distance. The room had been designed by a well-known studio designer from the Los Angeles area. Most everyone agreed that some problem existed in the low end, but, because this was a mastering room, it had to be accurate. And so the hunt began.

There were many layers of problems to be sorted out. I found that one of the active crossovers had internal wiring problems that needed to be fixed before we could proceed. We also replaced the ⅓-octave graphic equalizers with high-quality parametric equalizers, which would allow for more accurate tuning and a better-sounding signal path. First-order reflections coming off of the ceiling and the side walls needed treatment, because they created bad coherence in the listening area. Most alarming was a 29dB hole centered at around 70 Hz (Fig. 1).

How could a room designed by one of L.A.'s top studio designers have a hole that size? Well, for whatever reasons, this room was built with all parallel surfaces; a few diffusive and absorptive treatments had been added. The result was a huge hole in the frequency response.

The studio needed a solution that did not have a great deal of impact on the room physically. This meant that large bass traps in the front or back of the room were out of the question. Trapping the corners would be an ideal solution, but the traps needed to be compact. I had read about the RPG B.A.S.S. Trap™ and decided to try it out.

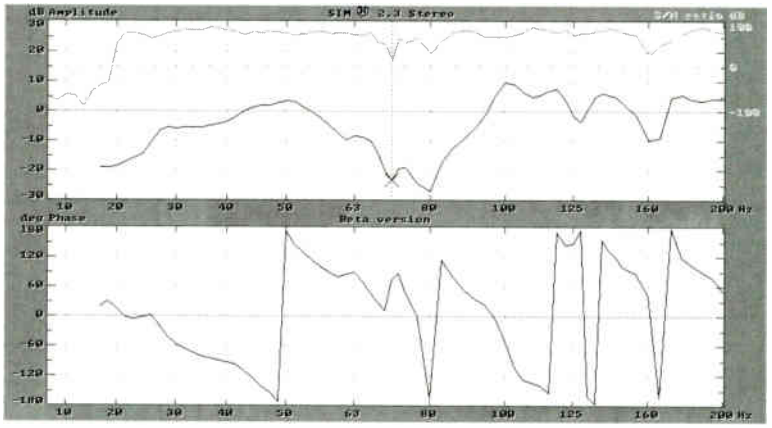

Figure 1: Initial low-frequency hole in the system response caused by side wall dimensions. Note that the frequency scale is ±30 dB. Phase response is quite rough.

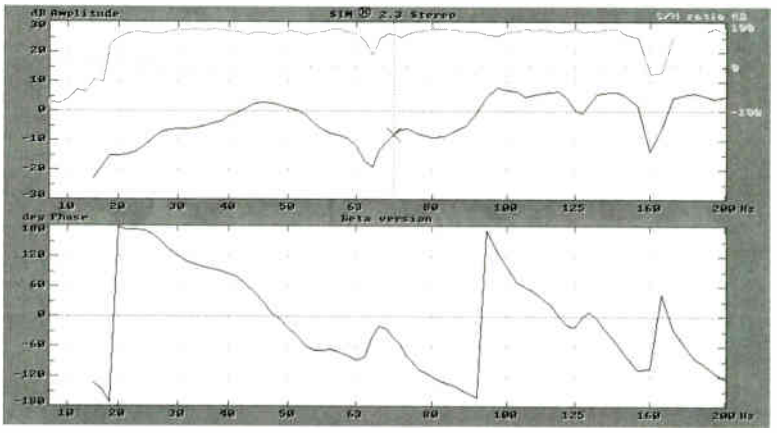

Figure 2: Significant response improvement with the final trap configuration in place. Phase response has smoothed out considerably as well.

B.A.S.S. Trap stands for Trapezoidal Bass Absorbing Soffit System. It is a membrane absorber that is tuned to 71 Hz. A membrane absorber operates by resonating at a specific frequency that is tuned by design. The trap absorbs the tuned frequency (sound turns into heat through vibration of the membrane) and solves the problem. RPG states that its newly designed fire-retardant membrane is three to four times more efficient than conventional membranes, and the B.A.S.S. Trap provides 80% efficiency at 71 Hz. It also behaves like a low-frequency shelf attenuator, as opposed to conventional bandpass absorbers.

The B.A.S.S. Trap is designed to fit into corners—a sound design philosophy for space-challenged project studios—and at 24x24x11 inches (HxWxD), it is quite unobtrusive in a room. The unit is covered with a gray fabric, or it can be ordered with custom fabrics. The trap is also available as a panel that

BY BOB HODAS

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fits between wall studs, for installation during room construction.

So how would absorbing 71 Hz help a 29dB hole? The hole, in this case, was caused by excessive out-of-phase information arriving at the mix position. So if we could remove that information, the hole will fill in. The big question was where to place the traps for the most efficient and effective results. Because the wavelength of the frequency being canceled corresponded to the room width, the first idea for placement was on the side walls centered at the mix position. This yielded absolutely no results. We then tried the traps in the front corners of the room, behind the speakers. This proved to be quite effective when we placed them as high in the corners as possible, but not so effective down by the floor. We tried the front wall/ceiling juncture with very little results. We had good results in the rear corners, once again placing the units high instead of low. But the wall/ceiling juncture we tried was fruitless and, in fact, non-corner placement generally yielded poor results. We could see that the trap placement needed to be very specific in order to be effective. The corner placement was optimum for the studio visually; in that position, you barely realize that they are there. We ended up with five B.A.S.S. Traps in each front corner and three in the rear corners and found significant response improvement (Fig. 2).

Once we had done as much as possible acoustically, we applied some equalization (Fig. 3). Why not just fill in the hole with equalization? Pure equalization is not the answer to a problem such as this, for several reasons. With a hole this size you would have to use massive quantities of equalization. This would put an excessive amount of strain on the system, and, although the hole would be filled in at the mix position, the room problem would still exist and you would lose a tremendous amount of system headroom. This amount of equalization can also induce an extreme amount of phase shift into the system. Additionally, equalization would only correct the problem for one

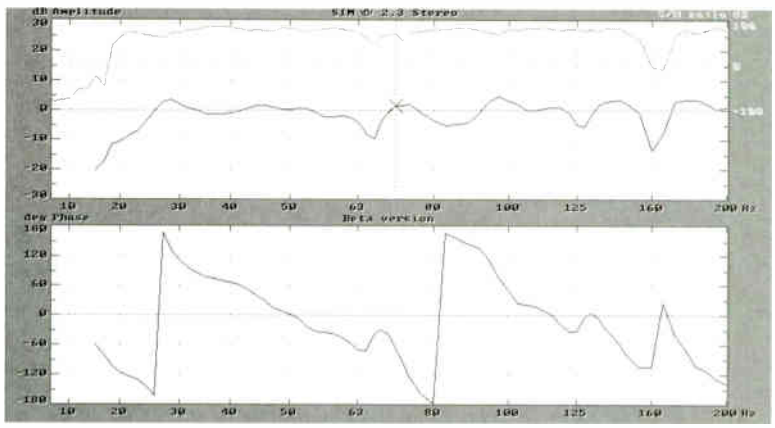

Figure 3: Final room response with traps and equalization.

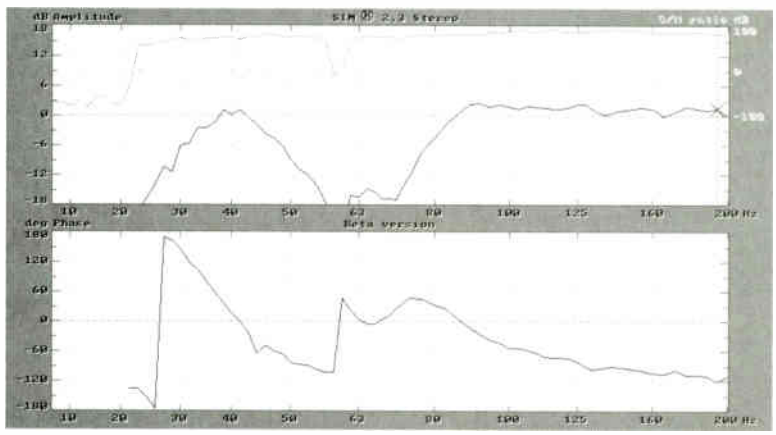

Figure 4: Composer's room prior to traps. Note that the frequency scale is only ±18 dB.

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small spot in the room. Because this problem exists side to side, as you moved off-center, the equalized hole would become a gigantic bump: Try explaining that to your clients.

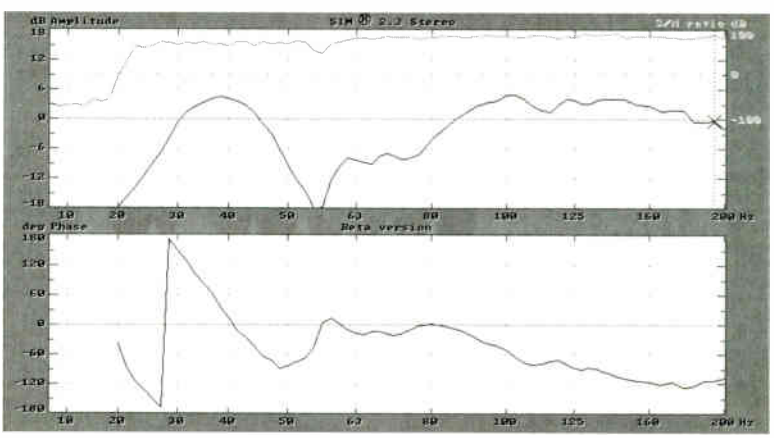
I was encouraged by the results in the label's room and decided to try the B.A.S.S. Traps in a small studio owned by a composer. Major television scoring is done in this tiny room, but the bass problems were horrific (Fig. 4). The most we could hope for was to expand the sweet spot by a couple of feet. There was very little space for any acoustic treatment, because all of the walls were covered with equipment, books, DATs, etc. Because of the location of the windows and doors, we could only fit the traps in the front corners. This proved effective, although not nearly as much as in the mastering room (Fig. 5). We would have been able to do more if we'd had access to the rear corners. However, the client felt that the results warranted the cost, and the composer is now more comfortable and trusting of his space.

I can't say that this trap will always be the perfect solution. I measured another room that had a large hole at 70 Hz and an 8-foot ceiling, which indicated an ideal application for the B.A.S.S. Traps. But I found little or no change in this room when the traps were used. The reason for this was that one wall was sucking out the problem frequency. The wall needed to be reinforced in order to fix the problem. It is important that you test each individual situation and make decisions about placement and effectiveness based on science, not rules of thumb. Of course, this is a good philosophy no matter what type of treatment you plan on installing.

Overall, I found the RPG B.A.S.S. Trap to be very effective. I will continue to use it as an acoustic solution when needed. If your room has a problem around 70/80 Hz, an 8-foot ceiling (as most home studios do) or a room dimension that is a multiple of eight feet, then it would be worthwhile to check out this product.

RPG Diffusor Systems, 651-C Commerce Drive, Upper Marlboro, MD 20774; 301/249-0044; fax 301/249-3912. E-mail info@rpginc.com. ■

Bob Hodas is a Mix *contributing editor.*



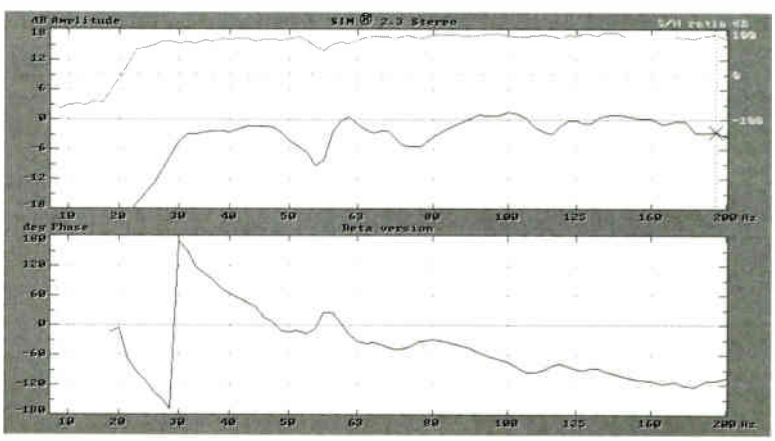


Figure 5: Composer's room after traps demonstrates significant frequency and phase improvements. Below, composer's final room response with traps and equalization.

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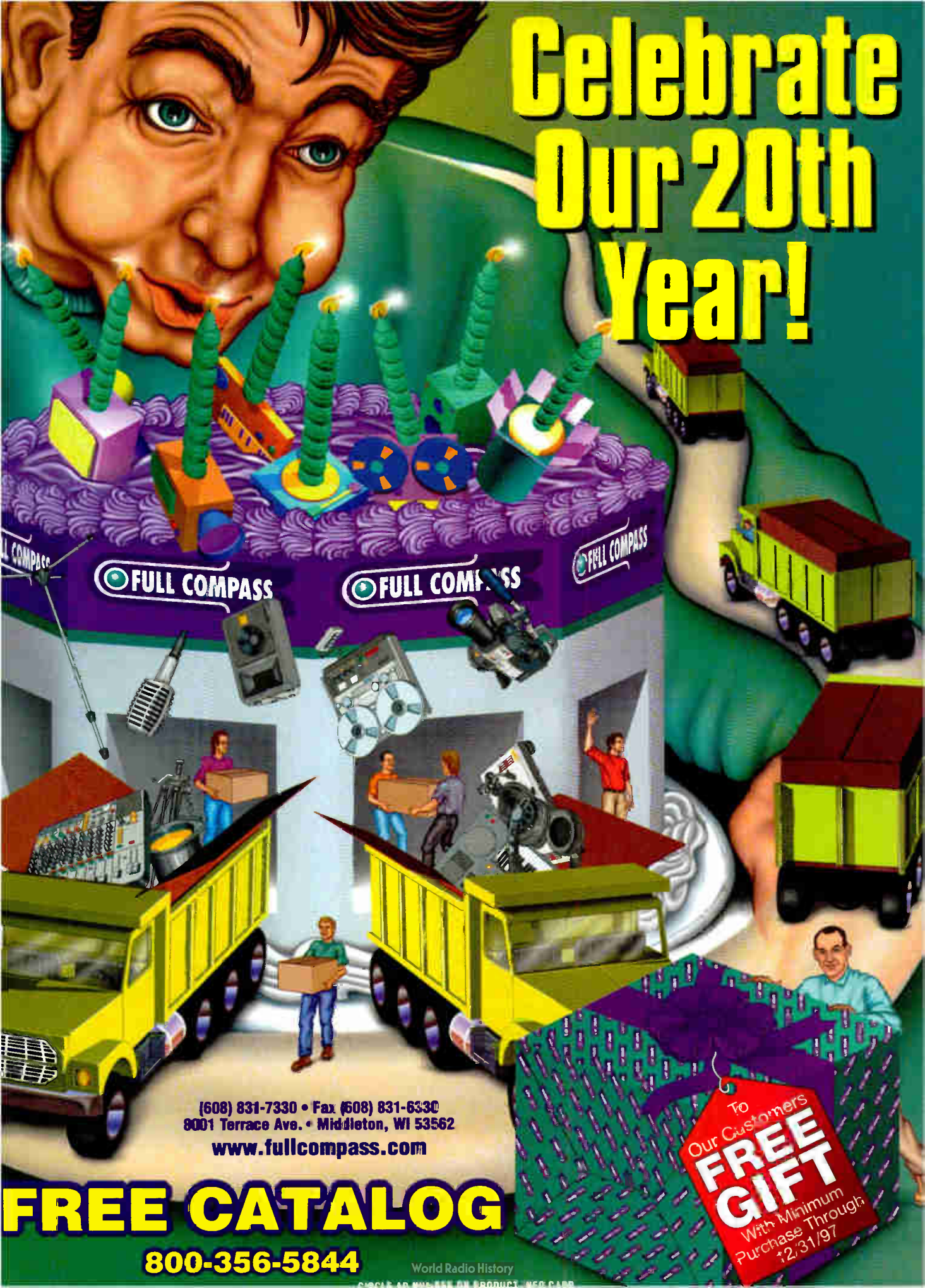

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SOUND CHECK 2

TEST CD/AUDIO ANALYZER

There are plenty of reference CDs on the market, but Sound Check 2 from Sound Check Productions is unique in that it comes with its own built-in analyzer. The package is the result of a collaboration between producer/engineer/performer Alan Parsons and Stephen Court, founder of Court Acoustics. Sound Check 2—an extension of the first Court/Parsons Sound Check, which contained fewer tracks and no analyzer—is designed to provide a portable, cost-effective analysis system. The CD includes a fairly comprehensive collection of material, featuring a wide variety of both musical and technical information. It was edited and mastered at Abbey Road Studios—incidentally, the place where Parsons and Court met, while Parsons was working on Pink Floyd's *Dark Side of the Moon*.

The $100 system is packaged in a dual-CD-sized jewel case, with one half housing the reference disc and the other containing a 10-segment audio level meter complete with built-in microphone. Sound Check's analyzer is mounted on the inside of the jewel case and integrates a sound pressure meter, calibrated in ten 3dB increments (from -15 dB to +12 dB, represented by LEDs built into the case), with an omnidirectional electret mic calibrated to provide a stated response of 20 to 20k Hz ±2 dB. The standalone CD retails for around $40.

Inside, the instructions and liner notes information are straightforward, clearly explaining how to use test tracks and interpret the results. A blank Spectrum Analyzer chart for plotting your system's frequency response is included.

The disc has 99 tracks, arranged in 11 sections according to application. The first section is a set of ⅓-octave pink noise bands for analyzing speaker frequency response. Following a 30-second, 1kHz reference tone, 32 bands, each on consecutive tracks, make up the 20 to 20k Hz spectrum. As the spectrum is broken up into ten-second bands, it is possible to pinpoint within a third of an octave where problems lie. The next set of tracks features wideband pink noise tones with phase check. Sweep tones follow, sectioned into octaves for easier identification of resonances. Square wave spot frequencies are included, for analysis as well as equipment alignment.

The rear panel of the Sound Check 2 case shows the LED meter readout on the left and the track list on the right.

I checked out the disc on a pair of Meyer HD-1s. I began by adjusting loudspeaker volume so that the first track, the 1kHz reference tone, read 0 dB on the Sound Check meter. I then went through the various pink noise bands, spot tones and sweeps. Plotting the meter response on the included Spectrum Analyzer graph, I came up with a curve that was roughly similar to the results I found when using a Gold Line DSP-30 real time analyzer—although it took me considerably longer to graph the response on paper.

Many other tracks are useful for a range of applications: The disc has a group of dry, close-miked instrumental tracks taken from original studio recordings, and a few vocal tracks (including an uncompressed track of Luciano Pavarotti), and some sound effects such as jet fly-overs and a stereo thunderstorm. These dry tracks are ideal for experimenting with signal processors. A few musical selections are included to allow for an assessment of overall system performance. The tracks comprise various pop and classical selections with wide dynamic range and even frequency response—they're also great for demoing a killer system. A variety of utility tracks, such as an A-440 tuning reference, SMPTE drop and non drop timecode and digital black, are useful tools.

I found the Sound Check disc to be a comprehensive reference aid, and useful in a variety of situations. I wish some of the tracks, especially the pink noise references, were longer; my CD player's loop function solved that problem.

Although Sound Check 2 is no substitute for—nor was it designed to replace—advanced test equipment and highly calibrated systems, for the price (and size!) it's certainly a convenient device for simple measurement and equalization of room response, troubleshooting systems and evaluating gear.

Sound Check Productions, 134 Cricklewood Lane, London NW2 2DP; phone 44/181/450-0363; fax 44/181/208-1979. Available in the U.S. from Royal Publications (Sun Praire, WI), Professional Sound Services (NYC) and Cliff Electronics (Benicia, CA). ■

BY SARAH JONES

Sarah Jones is Mix's assistant editor.

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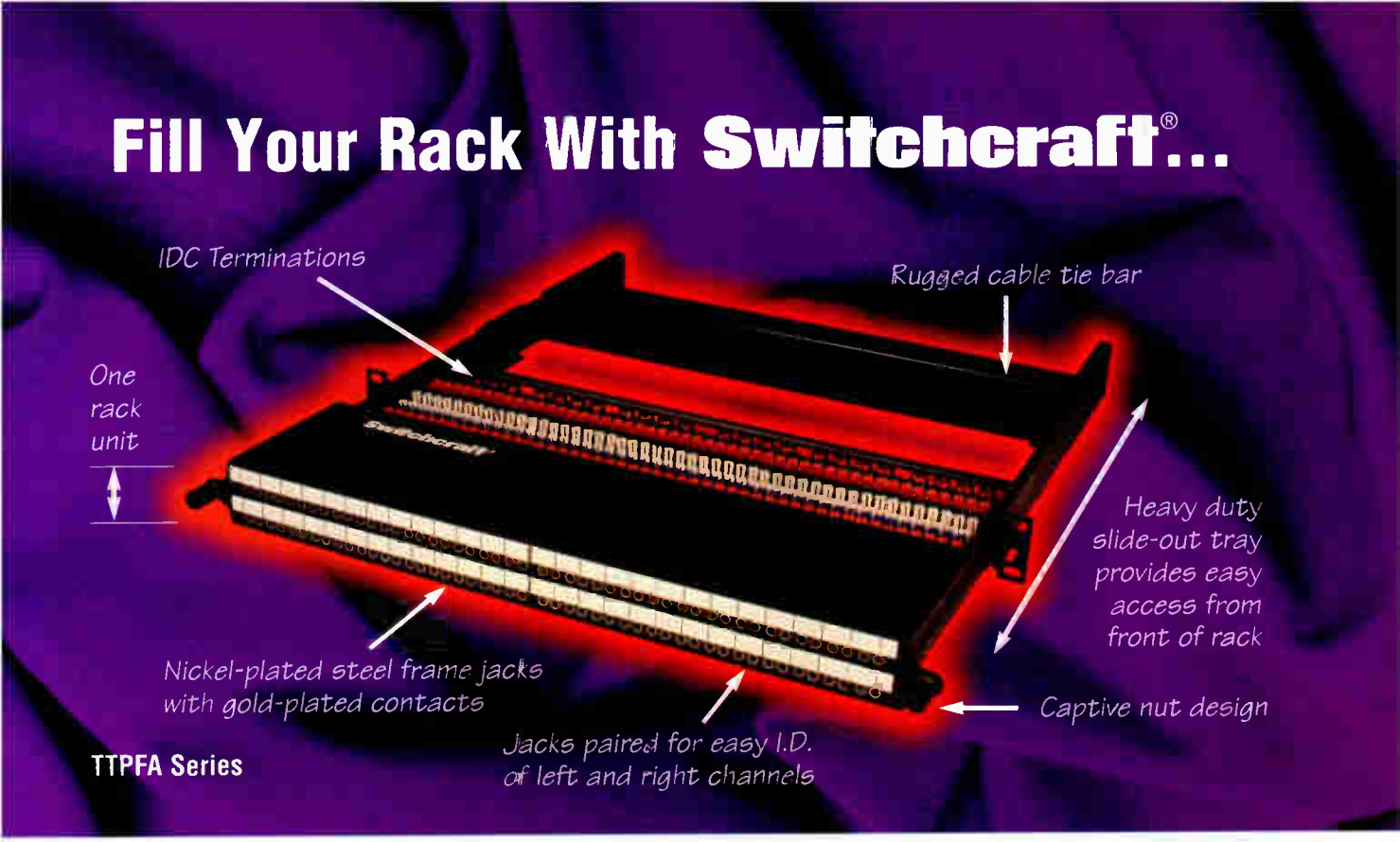

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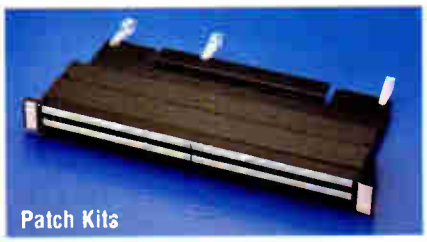

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LEXICON PITCH FX

EFFECTS CARD FOR THE PCM 80

Lexicon's line of FX cards for its PCM 80 and PCM 90 effects and reverb processors expand the functionality of these already powerful units. The Pitch FX Card ($249 list) adds flexible pitch shifting effects, in combination with one of four reverb algorithms (including Inverse), to the Lexicon PCM 80 digital effects processor. Not reviewed here are the Dual FX card for the PCM 80, the Dual Reverb card for the PCM 90, and several preset cards from notable sound engineers and effects designers.

Lexicon's FX cards are Read-Only PCMCIA cards, and each only works with its intended PCM machine because their architectures are different. The Pitch FX card works with the PCM 80 Version 1.10 or higher; early PCM 80 buyers may have to upgrade in order to use the card. The Pitch FX card adds two banks of 50 presets to the PCM 80, labeled X0 and X1, and numbered 0.0 through 4.9, similar to the naming convention for the machine's internal register and program banks. As with the Dual FX and Dual Reverb cards, the Pitch FX card is actually a "dual effects" system. Each of the six different algorithms combines pitch shifting and stereo reverb, though in many of the presets the reverb has been turned down or off.

The Quad Hall algorithm is a 4-voice pitch shifter in series with the PCM 80's Concert Hall reverb. The other five algorithms combine a pitch shift with a reverb, but the routing of the two effects blocks can be varied from parallel to series, offering a range of creative choices. A two-voice shifter is combined with either a Chamber, a Plate or an Inverse reverb for three algorithms. The latter two use the colorless Chamber reverb block. Using the VSO preset allows shifting to be set as a percentage to match the pitch change of a varispeed playback source in order to achieve time compression or expansion while maintaining pitch. These last two algorithms are handy for post work and corrective surgery and have parameters for optimizing the splicing that is inherent in pitch shifting. Combined with the stereo-linked shifter, the card can also be used to shift an entire mix up or down in pitch.

There are several Pitch FX presets that can make a single voice or instrument sound like an ensemble in unison or in harmony, playing chords or intervals, and MIDI keyboard control of shifting can make a Mellotron out of a looped sample, although excessive shifting can result in audible artifacts. Pitch-shifting algorithms splice the signal, adding to or subtracting from the original to make up for the difference in time. Splicing artifacts are inaudible on small amounts of shift, on higher frequencies and on purer tones like a solo voice or a monophonic instrument. Large shifts, low frequencies and transient material all can exhibit audible splicing artifacts. Following pitch shifts with reverb covers some of this splicing.

BY MARK FRINK

Many engineers already use a PCM 80 and have discovered that, while it makes a great reverb, it's not as sweet as a PCM 90 and is really more of a utility effect. If you are using your machine as a mono input device, you can get a second effect by using FX cards. Both effects can be returned in stereo by sharing the machine's outputs. This works well with complementary effects that are used together and can be returned to the same fader, such as an inverse snare reverb with a percussion plate, fattening and ambience used on close-miked instruments, or dual vocal effects.

Left and right inputs can be sent mono to both algorithm blocks, shared by both in stereo, or split between the two. A Returns control allows the PCM 80's outputs to share the stereo output of both, split them each to their own output or sum them mono. Other parameters in the Sub Mixer row control the levels and stereo width of the reverb or pitch shifter's inputs and outputs, as well as their high and low cut parameters. This extra tailoring of the two effects allows the user to blend them together. Care-

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ful adjustment of high and low cuts on the submixer, as well as in the reverb design, can reduce unwanted artifacts from close miking and leakage from other stage sounds that are found in live performance. Many presets are designed in, and for, the studio, and it takes a little patience to get good performance effects tweaked, because of the audio compromises and hectic pace of a live event. A little pre-production goes a long way.

Do you simply want to fatten up vocals? No problem. One very attractive use of the Pitch FX card for live sound is to detune a vocal slightly, thickening it. Though there are several stock presets for detuning on the Pitch FX card that add up to four voices, my favorite setting became a split preset I wrote from one of the "clean slate" versions at the end of the card's preset list. My Amb/Harmon program routes the Dual Shift-Chamber algorithm as two parallel machines, with left feeding a miniature chamber as an ambience setting and the right feeding the dual pitch shifter with ten cents of detuning up and down, panned hard. Both effects share the stereo outputs. This provides two kinds of vocal fattening on the same stereo return with independent sends from two aux buses. A variation on this is using the Dual Shift-Plate the same way with the smallest possible Plate setting, providing a brighter ambience on the reverb side of the split. Adding echo delay or pre-delay to the reverb can give the vocal more dimension. Then the reverb can be opened up. The possibilities are endless.

The Pitch FX card has some great guitar presets: The snare and tom "tools" are cool and there's some wacky stuff, like PullThePlug that's a lot of fun, plus of course, The Chipmunks and Darth Vader effects.

Though many presets on the card can be used just as they are, the key to mastering the PCM 80 for live work is to take the time to program your own sounds. Sit down for a half-hour session with a mic and headphones and just work on one preset for a specific application. As you tweak a program, imagine how it will be operated live. Pick up to ten parameters for which quick access is desirable and patch them into the soft row so that just the Select and Adjust knobs can run the PCM 80. Patching the most significant parameter to the Adjust knob lets the user quickly grab it without even going into Edit mode. Store your new presets with meaningful names. As you fine-tune presets, they will become trusted tools in your bag of tricks.

Lexicon's FX cards are what in software would be called "dongles" or keys. Programs created from them and stored in the PCM 80's registers must have the software extension loaded from the FX card in order to run. I suppose if you had several machines and you never turned them off, one card could serve all. In practice, the card needs to be married to the machine, though after it's loaded, other FX or memory cards can be swapped. After the machine is powered down it needs to see the FX card again to run its algorithms. As the cards are conveniently pocket-sized, it is easy for someone to walk off with a card or simply misplace it. The best place to store the card is in the machine's PCMCIA slot.

Though effect units have been sold with PCMCIA slots for some time now, the cost of blank memory storage cards has been dropping, and a 1-Meg card, which holds up to 47 banks of 50 presets for a PCM 80, can be bought for under $100. The time it takes to create and archive presets is a worthwhile investment, as it tends to familiarize you with the power and potential of the machine, while providing a safe, easily transportable medium for saving your work. If there is any chance that other users will change or erase a machine's user registers, this added investment is worthwhile, and Lexicon recommends several vendors of blank storage cards. This makes even more sense with the PCM 80 as there is only one internal user bank of 50, while the PCM 90 has two.

Owners of a PCM 80 or 90 will find FX cards are the next best investment they can make for the outboard rack. The cost is low, they require no rackspace, and they extend the creative possibilities of machines that already sound great. Top mix engineers once had personal effects racks that they faithfully carted to gigs. Now it's as likely they will carry a pouch of PCMCIA cards. Engineers who don't own either Lexicon machine but know that they will find one or both at their next gig can benefit even more by purchasing one or two FX cards and a couple of memory cards for backing up entire machines. Who knows, maybe you'll write Lexicon's next Live Music FX card.

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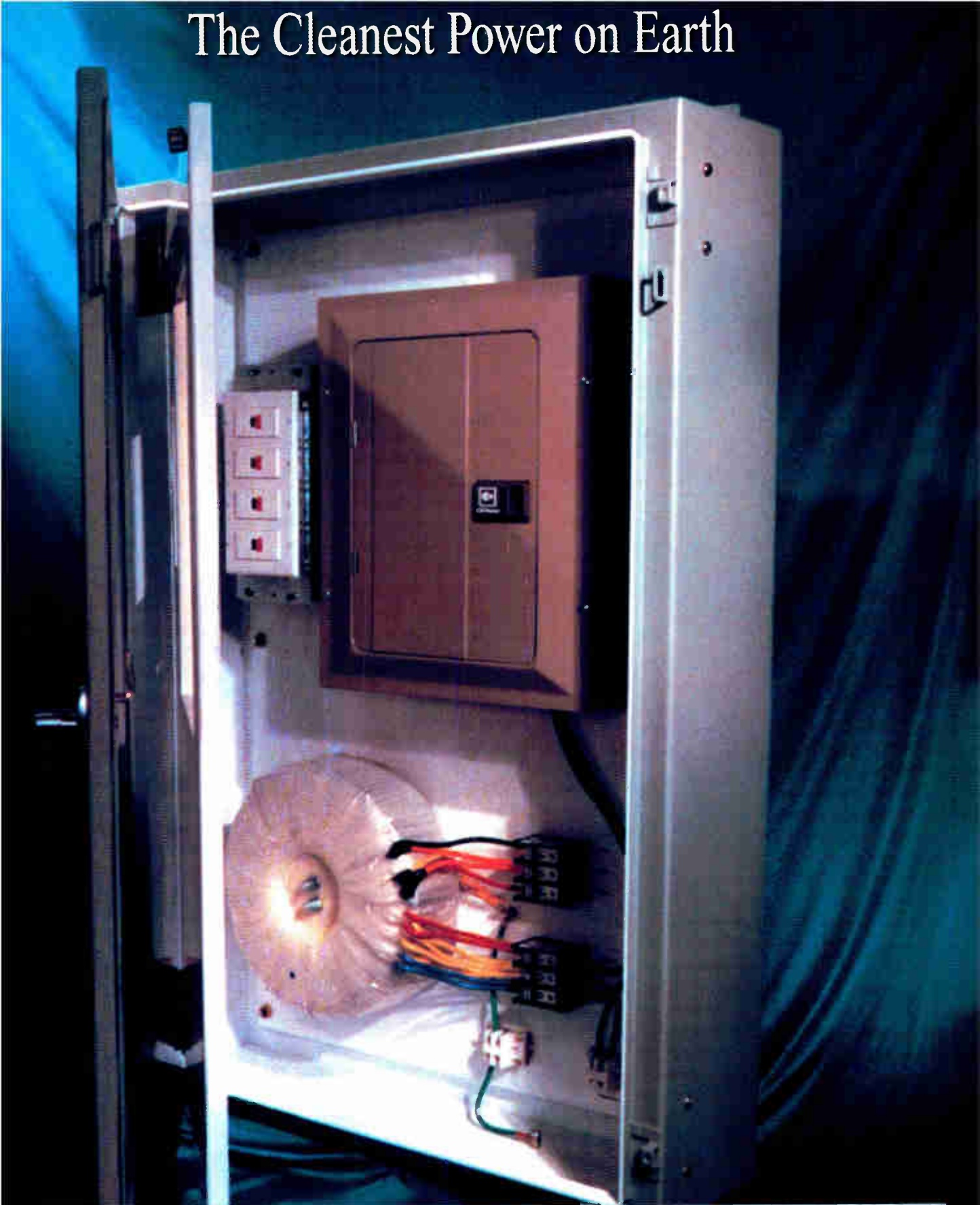

First, *Equi=Tech* introduced the revolutionary rack-mount balanced power system for recording and sound reinforcement applications. Now we have gone one step further, a system with the capacity to balance everything.

Wall cabinet systems provide all the punch you need to hardwire a whole studio with simplicity and ease. Just feed it with 208 or 240 volts, then run circuits to your outlets anywhere in the studio– it's that easy. We can even show you how to retrofit a pre-existing AC wiring system.

Of course, every system we build has spike and GFCI protection built in along with the best quality components your money can buy. And only *Equi=Tech* backs all of its systems with a lifetime transformer replacement warranty.

So, when you think of balanced power, think of *Equi=Tech* – **It's the real thing.**

CIRCLE AD NUMBER ON PRODUCT INFO CARD

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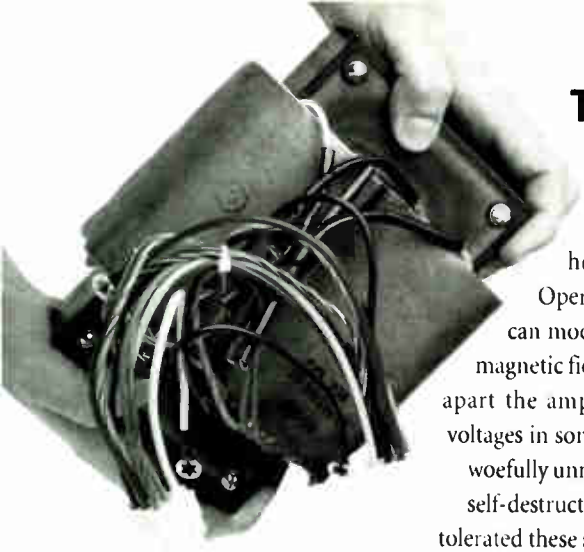


THE PAST...

High power amplifiers with old fashioned iron core transformers are dinosaurs. While effective at delivering raw power, these big, heavy, and slow devices have weaknesses. Operating at AC line frequency, the supply voltage can modulate the audio signal under clipping. Strong magnetic fields induce AC hum. Big transformers can tear apart the amp and racks on the road. Poorly regulated voltages in some popular high end brands cause them to be woefully unreliable and inclined to self-destruct. Audio engineers have tolerated these shortcomings because there was no other alternative. Until now...

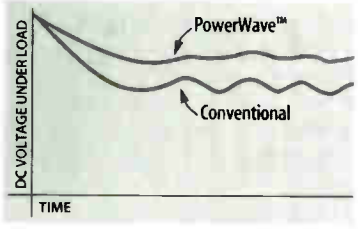
> *"...excellent bass response... performance can exceed that of traditional amps, with the weight and energy savings as an added bonus."*
>
> **Mix** *Magazine*

> *"...the pure, high-quality, rich sound this amp provides is unmistakable."*
>
> **Pro Audio Review** *Magazine*

The new PL 2.0^{HV} was designed for maximum power at 4ohms in a 2RU chassis, while the new PL 3.4 provides maximum power from a standard 120V, 15A line cord

...AND THE FUTURE

PowerLight™ amplifiers use patented PowerWave™ power supplies, the most efficient power supply available in audio. Operating at 114kHz, a one pound PowerWave™ transformer has more current capacity than a 50 pound conventional 60Hz transformer. Primary capacitors operating at a higher voltages more than double their energy storage. The result—a stiffer supply with more power and more energy storage for gut-wrenching bass. AC magnetic fields never enter amplifier circuitry—reducing hum to inaudible levels and increasing dynamic range. Reliability is increased because light weight prevents transit damage while the robust design and Intelligent Amplifier Protection™ keep the things working under conditions that would kill a conventional amp.



PowerWave sags less under load and has less AC ripple

Output Power in Watts per Channel			
MODEL	8Ω*	4Ω*	2Ω**
PowerLight 1.0	200	325	500
PowerLight 1.4	300	500	700
PowerLight 1.8	400	650	900
PowerLight 2.0^{HV}	650	1000	N/A
PowerLight 3.4	725	1150	1700
PowerLight 4.0	900	1400	2000

ALL POWERLIGHT AMPS FEATURE:

- PowerWave™ Switching Technology
- Clip Limiter *(user defeatable)*
- Remote AC Power Control
- Data Port for Computer Control
- Variable Speed Fan(s)
- DC, Sub Audio, & Thermal Overload Protection
- Advanced Thermal Protection
- Patented Output Averaging™ Short Circuit Protection

1997 Nominee

IN THE END, IT'S THE PEOPLE

No matter how good the gear, it's people that make the difference. We know your performance depends upon our peformance. When you buy a product from QSC you buy more than just a piece of equipment, you get our support and involvement. New PowerLight models and features have come from working directly with people like you. If our standard models don't meet your needs, our Technical Services Group can provide you with custom modifications. Need a question answered or got a problem? Get on the phone or the Web. It's like having your own engineering consulting group.

Contact QSC for more infomation...better yet, come by for a visit!

QSC's PowerLight Project Team *(clockwise from left):* ***Darrell Austin,*** *Technical Services Manager;* ***Pat Quilter,*** *Chief Technical Officer,* ***Robert Becker,*** *Design Engineer;* ***Greg McLagan,*** *Market Manager (Live Sound);* ***Doug Teulie,*** *Industrial Designer*

> *"Zero defects, 450 shows"*
>
> **Mike Southard**
> *Southard Audio (Mt. Crawford, VA)*

> *"I bought one ton of PowerLights and replaced 3 tons of conventional amps...you do the trucking math!"*
>
> **Dave Cousins**
> *Sound Arts (Winnepeg, Canada)*

> *"...we feel that the best of all worlds has been created...light weight, sonic excellence."*
>
> **Tom Smith**
> *LD Systems (Houston, TX)*

> *"Best sounding, most reliable amps on the road...hands down"*
>
> **Dave Snadoan**
> *Sound Image (Escondido, CA)*

> *"...my choice for a long, long time..."*
>
> **Jeff Lilly**
> *Jason Sound (Vancouver, Canada)*

CIRCLE AD NUMBER ON PRODUCT INFO CARD

QSC AUDIO PRODUCTS, INC.
1675 MacArthur Blvd., Costa Mesa, California, 92626 USA
Ph 714/754-6175 ***Fax*** 714/754-6174
Email info@qscaudio.com ***Web*** www.qscaudio.com

"Output Averaging," "Intelligent Amplifier Protection" and "Hear the Power of Technology" are trademarks of QSC Audio Products, Inc. "QSC" and the QSC logo are registered with the U.S. Patent and Trademark Office. PowerLight Patents Pending

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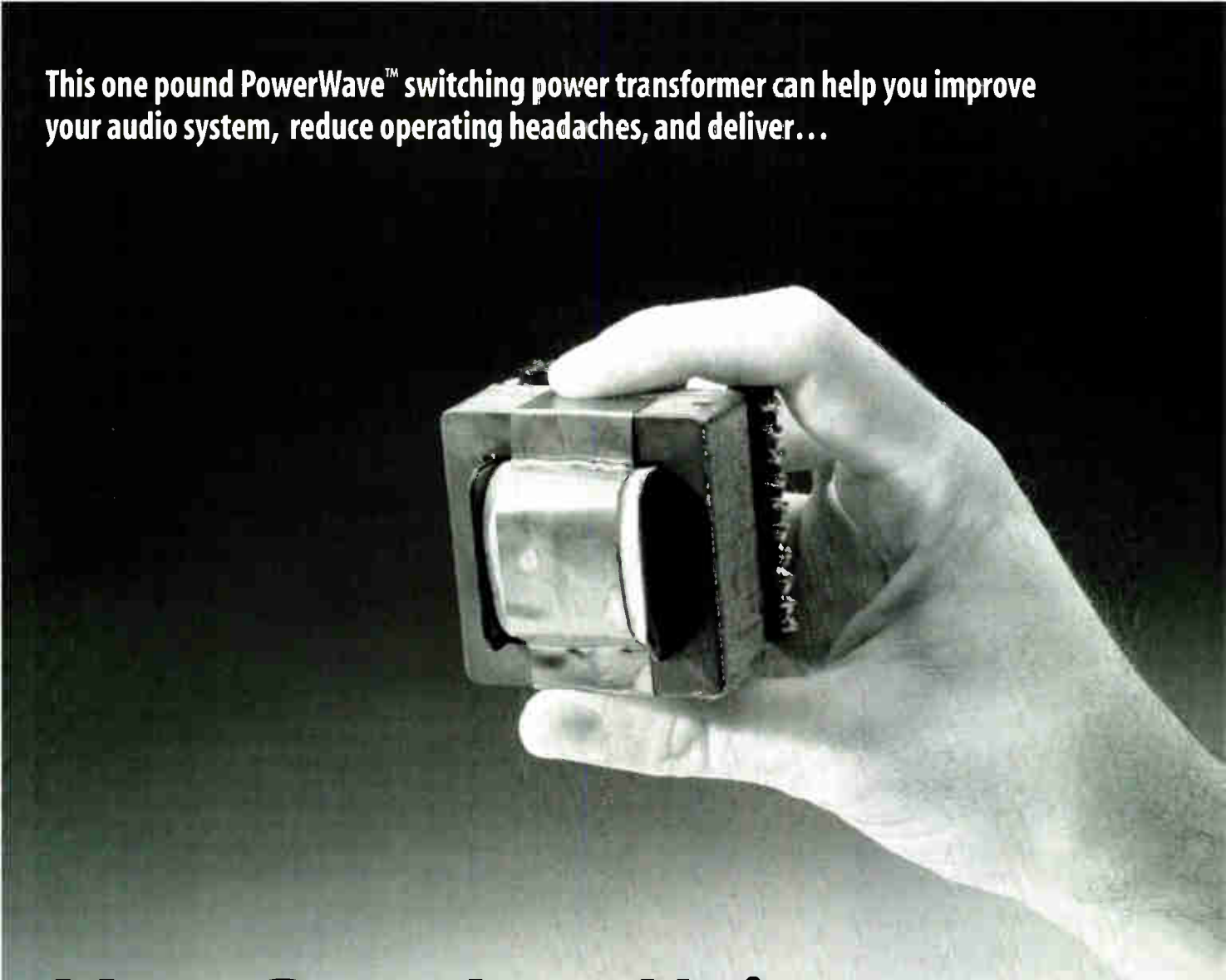
This one pound PowerWave™ switching power transformer can help you improve your audio system, reduce operating headaches, and deliver...



More Bass, Less Noise and Fewer Problems

PowerLight amplifiers are the first lightweight amps to surpass conventional technology in both audio performance and reliability. Advanced PowerWave™ technology eliminates the bulky, heavy power transformers and their problems while improving audio. Large sound systems powered by PowerLight amplifiers are better sounding, more compact, lighter and more reliable than systems using the traditional solutions.

POWERLIGHT 8.0 COMING SOON

With thousands of shows logged all over the world, the PowerLight Series has built a tremendous following among demanding professionals. Now PowerLight amplifiers have been improved—with new models and increased 2 ohm power, the addition of defeatable Clip Limiters and a HD15 Dataport connector for QSControl compatibility. Check out PowerLights for yourself. Contact us for complete information—better yet, talk to someone who owns them. References gladly provided.

QSC™ AUDIO

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Hear the Power of Technology™

Rigs . Sound Reinforcement . Mobile . . . ring Sound . Studio Monitoring . Gui

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TECHNICAL EXCELLENCE & CREATIVITY AWARDS

Saturday, September 27, 1997

Broadway Ballroom
New York Marriott Marquis

Reception 6:00 p.m.
Dinner 7:00 p.m.
Awards Ceremony 8:15 p.m.

For information about TEC Awards tickets, contact Karen Dunn, TEC Awards Executive Director, at (510) 939-6149.

[Beginning on page 146 are seven pages of nominee descriptions and biographies. Please take the time to read the information before voting. (Ballots are in subscribers' issues only.) Entries must be postmarked by ***Saturday, August 30, 1997****.]*

THE TECHNICAL EXCELLENCE & CREATIVITY AWARDS was created in 1985 by the publishers of *Mix* magazine to recognize and promote outstanding achievement in recording and sound production and technology. Proceeds of the TEC Awards benefit organizations dedicated to the prevention and cure of deafness and hearing impairment, audio education, and nonprofit groups serving the professional audio industry.

In its 13-year history, the TEC Awards has raised more than $330,000 for these worthy causes, while offering attendees the opportunity to mingle with audio and music industry luminaries at what has become one of the most important annual events for audio professionals.

The TEC Awards is divided into three major categories—Technical, Creative and Institutional Achievement—and 26 sub-categories. Voting for the TEC Awards winners is a two-step process. A Nominating Panel, comprising approximately 130 prominent members of the professional audio industry, makes initial selections in March. Their nominations appear on the Voting Ballot in this issue of *Mix*. The winners of the 1997 TEC Awards will be announced at a ceremony on Saturday, September 27, at the Marriott Marquis in New York City.

FIFTY-FIVE PERCENT of the proceeds from the 1997 TEC Awards will be donated to hearing conservation programs—to Hearing Is Priceless (HIP), co-founded by *Mix* magazine and the House Ear Institute of Los Angeles, and Hearing Education and Awareness for Rockers (H.E.A.R.). The HIP campaign seeks to educate music listeners, especially young people, about the dangers of noise-induced hearing loss. The House Ear Institute is a nonprofit organization supported entirely by private donations, and has been a recipient of TEC Awards funds since 1986. H.E.A.R, a San Francisco-based nonprofit organization, works to educate the public, especially musicians, about the dangers of noise-induced hearing loss.

FORTY-FIVE PERCENT of the proceeds will be distributed to past winners and nominees of the TEC Award for Recording School/Program that have previously established scholarship or grant programs with TEC Awards funds, and to scholarships and other educational programs of the Audio Engineering Society Educational Foundation and the Society of Professional Audio Recording Services (SPARS). A portion of the proceeds will also go to the TEC Awards Scholarship Fund to assist deserving individuals currently enrolled in audio programs.

HALL OF FAME

The TEC Awards Hall of Fame was created to recognize those individuals, living or deceased, whose careers have best exemplified the spirit of creative and technical excellence in professional audio. This year, the TEC Awards will honor **Al Schmitt**. With seven Grammy® Awards for engineering, Schmitt epitomizes artistic recording through decades of technological change

LES PAUL AWARD

The Les Paul Award was created in 1991 to honor those individuals or institutions that have set the highest standards in the creative application of technology. This year the Les Paul Award is being presented to **Stevie Wonder**. Wonder has elevated pop, explored soul, reinvented R&B, mixed in jazz, reggae and blues, played it with his own synthesizing sense, and along the way pioneered the concept of the one-man-band artist's studio.

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1997 TEC AWARDS SPONSORS

PLATINUM SPONSORS

JBL Professional • JBL Professional is proud to serve as a Platinum sponsor of the TEC Awards. JBL is the world's preeminent manufacturer of state-of-the-art professional loudspeakers and speaker components for music, contracting, tour sound, cinema and recording/broadcast applications. JBL Professional is part of the Harman International network of professional and consumer audio and video companies.

Mix Magazine • Founded in 1977, *Mix* celebrates its 20th anniversary this year. *Mix* is the world's leading publication for professional recording and sound production, with subscribers in more than 90 countries. *Mix* covers a wide range of topics, including studio and location recording, audio for film and video, live sound production, facility design and acoustics and other subjects of relevance to audio professionals. *Mix* also publishes the *Mix Master Directory* and *Mix Spanish Edition*, and maintains a Web site, *Mix Online*. *Mix* is the founding sponsor of the TEC Awards.

Quantegy Inc. • Quantegy is headquartered in Peachtree City, Ga., with manufacturing facilities in Opelika, Ala. Quantegy is a leader in the manufacture of professional recording media. It markets Ampex and Quantegy brand professional audio, video and instrumentation media products. The company serves professionals involved in entertainment, education, communications, aerospace and government.

GOLD SPONSORS

Alesis Corporation • Founded in 1984, Alesis Corporation is a leading manufacturer of professional audio equipment and musical instruments. Best known for its creation of popular, value-packed recording equipment, Alesis has received numerous TEC Awards for its ADAT digital multitrack recording system, as well as its signal processors, synthesizers, monitors and drum machines.

AMS Neve • Based in the UK, AMS Neve plc supplies facilities worldwide with mixing and editing systems for film and video post-production, broadcast, music recording and live/theater applications. Sales and service in North America are handled by regional offices in the United States and Canada. AMS Neve's product range includes the Capricorn, Logic Series and Libra digital mixing consoles; the AudioFile hard disk editor; the VX and VXS analog consoles; the 55 Series analog broadcast console; and the Libra Live Digital Broadcast Production Console.

Harman Music Group • The Harman Music Group manufactures dbx, DigiTech and DOD products in Sandy, Utah, and distributes the British-manufactured Allen & Heath product. The group has evolved a state-of-the-art factory utilizing the latest in computer-aided manufacturing and testing equipment. HMG is an integrated leading manufacturer of signal processing equipment, digital effects processors, equalizers, limiters, crossovers, mixers, pedals, and other audio electronic components. Allen & Heath, dbx, DigiTech and DOD are trademarks of the Harman International family.

Meyer Sound Laboratories Inc. • Since 1979, Meyer Sound has earned a reputation for excellence in designing and manufacturing superior-quality loudspeakers, equalizers and sound measurement tools. Meyer has played a leading role in the evolution of audio technology with such patented innovations as the trapezoidal cabinet, the SIM® System II acoustical measurement system, and the best-selling Self-Powered Series. Meyer was the manufacturer of choice for Carnegie Hall, the Orange Bowl, the Three Tenors and the Montreux Jazz Festival.

QSC Audio Products • QSC Audio Products Inc., is a leading manufacturer of audio products, developing innovative technologies for the professional audio industry, including the revolutionary PowerLight Series power amplifiers. The company's scope has recently expanded to include signal processing, audio routing and distribution, and Ethernet-based network audio system control. QSC products are distributed in more than 80 countries. The company has served the professional sound, touring, cinema and installation markets since 1968.

Solid State Logic • Solid State Logic is one of the world's foremost manufacturers of leading-edge analog and digital equipment for the creative manipulation of sound. SSL is recognized by the international audio community for its long-standing record of innovation and quality. The Music & Film division and Broadcast & Post-Production division of SSL address the particular audio requirements of their respective markets. SSL is based in Oxford, England, with offices in Los Angeles, New York, Japan, France, Italy, Canada and Asia.

Sony Professional Audio • Sony Professional Audio is both an inventor and manufacturer of audio hardware technologies, with diverse offerings that include digital multitrack recorders, DAT recorders, CD/MD mastering systems, mixers and consoles, and professional microphones. Sony Recording Media and Energy Group is a leading media supplier with diverse offerings that include professional audio/video tape, data media, consumer audio/video tape and batteries.

SILVER SPONSORS

Aphex Systems
Audio-Technica
Clair Brothers Audio
Digidesign
Lexicon Inc.
Roland Corporation U.S.
Tannoy/TGI North America
TC Electronic
Yamaha Corporation of America

BRONZE SPONSORS

Apogee Electronics
Eastern Accoustic Works
Otari Corporation
Lisa Roy's Studio A
Howard Schwartz Recording
Shure Brothers, Inc.
Skywalker Sound

The 1997 TEC Awards Voter's Guide

1997

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OUTSTANDING INSTITUTIONAL ACHIEVEMENT

Awarded to those companies, facilities or institutions that have contributed most significantly to excellence and innovation in audio during the eligibility year.

A. ACOUSTICS/FACILITY DESIGN COMPANY

Harris, Grant Associates Ltd., *London:* Eligibility year projects included Starstruck, Nashville, Reba McEntire's recording complex; Grand Central Studios, SoHo, London, offering audio post-production; Liverpool Institute for Performing Arts, a performing arts education facility; Digimax Production Center, Taipei, the first-ever digital post-production facility in Taipei; and Syn Production Company, Tokyo, a music scoring and production facility.

Pelonis Sound & Acoustics, Inc., *Santa Barbara, CA:* During the eligibility year, projects completed by Pelonis Sound included Voice of the Arts multimedia production facility, Los Angeles; Big Bang Productions music production facility, Humboldt County; Another Large Production, a multimedia production facility, Hollywood, CA; Christopher Cross, award-winning recording artist; Kenny Loggins, award-winning recording artist, Brad Feidel, film composer, Ben Margulies, songwriter/producer, and David Kirshenbaum, producer Santa Barbara.

Russ Berger Design Group, *Dallas, TX:* RBDG provided design for Ion Storm; Texas Instruments DLP Facilities; KUHT-KUHF; Whittier College Radio; Universal Studios; Discovery Channel; Media Resource Group; KUVN-TV; Tom's Easy Way; NPR-Los Angeles; Harwood Studios/ Don Henley; Court-TV; KTCK/93.3; Immortal Productions; Lexicon; KUNR; WPLN; Lyrick Studios *Barney & Friends* and *Wishbone*, GPTV; Michael Bolton's "Safe Space"; 615 Productions; Sweetwater Sound; Washington State University recording studios; and Mastermix Mastering Facility.

studio bau:ton, *Los Angeles:* Projects completed during the eligibility period included Brandon's Way Studios, Hollywood, a three-room facility for Kenneth "Babyface" Edmonds; Ocean Way, Nashville, a three-room facility for Allen Sides and Gary Belz; James Newton Howard Studio, Santa Monica; Musicians Institute, Hollywood, CA; Yello, Project Studio, Los Feliz, CA; Brian Austin Green Project Studio, Hollywood, CA; Counterpoint Studios, Salt Lake City, a three-room facility; Swell Pictures, Chicago; Tate and Partners, Santa Monica, CA; Hamilton Project Studio, Pacific Palisades, CA; Tremens Film Studio, Vienna, Austria; and Fatima Studios, Bangkok, Thailand.

Walters-Storyk Design Group, *Highland, NY:* During the eligibility period, Walters-Storyk Design Group completed numerous media facilities, including Crescendo!, San Francisco; First Edition (Aural Fixation), New York City; AR Studios, Rio de Janeiro; Sound Design, Sao Paulo, Brazil; Superdupe Studios, New York City; Georgia State University, Atlanta; Full Sail, Orlando; Producer's Video, Baltimore; and Steve Shafer Music, Chicago.

B. SOUND REINFORCEMENT COMPANY

Clair Brothers Audio has won the last three years and is ineligible for 1997.

A-1 Audio, *Hollywood, CA:* Eligibility year credits for A-1 Audio included: (touring) Aerosmith, Counting Crows, Sex Pistols, Chicago/Beach Boys, k.d. lang, Bryan White, DIO, Barry Manilow, Motorhead, Motley Crue, Engelbert Humperdinck, Julio Iglesias, Luis Miguel, Johnny Mathis; (premieres) *Dante's Peak, Nutty Professor, Liar Liar*; (installations) Billboard Live! and the Viper Room; (events) Frank Sinatra Celebrity Invitational Gala, Starfest '96, Legends of Country Music, New Year's Eve in Las Vegas; (theater/showroom) *Joseph and the Amazing Technicolor Dreamcoat, Grease* and *Danny Gans at the Rio.*

Audio Analysts, *Colorado Springs, CO:* During the eligibility year Audio Analysts continued the development of its touring sound system, the AALTO®, including a new generation of loudspeaker components, in a cooperative effort with JBL Professional. The company provided sound for: (world tours) Bruce Springsteen, Wynonna, Styx, Ringo Starr, Dwight Yoakam, Status Quo and Natalie Merchant; (corporate events) Nissan Dealer Show, Infiniti Dealer Show, Jeep/ Chrysler Camp Jeep, and Herbalife in Las Vegas, Rio, Vienna and Tokyo; and (installation division) Light of the World Catholic Parish and Fort Lewis College Community Concert Hall.

Electrotec Productions, *Westlake Village, CA:* Eligibility year credits included Rush, Rod Stewart, Tom Petty, Elvis Costello, Garbage, Def Leppard, The Orb, Marilyn Manson, Bob Dylan, Alabama, Tibetan Freedom Concert '96, Tool, Danzig, REO Speedwagon/ Foreigner, Ted Nugent/Bad Company, Kula Shaker, Orbital, Lenny Kravitz, Bruce Hornsby and June Jam '96.

Maryland Sound Industries, *Baltimore, MD:* Eligibility year credits included Toni Braxton, Kenny G, Whitney Houston, Neil Young, Mariah Carey and Neil Diamond.

Showco, *Dallas, TX:* Eligibility year credits included Reba McEntire, Vince Gill, Alan Jackson, Live, James Taylor, Kiss, Phil Collins, Smashing Pumpkins, Stone Temple Pilots, Boston, Gin Blossoms, Bob Seger, Alanis Morissette, Moody Blues w/Symphony Orchestras, Santana, Soundgarden, Linda Ronstadt, the Beach Boys, Pantera/White Zombie, the Cranberries, Butthole Surfers, Ministry, Kirk Franklin, Willie Nelson, Korn, Joe Satriani, G3, Luther Vandross, Farm Aid and Arizona State Fair.

C. MASTERING FACILITY

Bob Ludwig's Gateway Mastering has won the past three years and is ineligible for 1997.

Future Disc Systems, *Hollywood, CA:* Founded in 1981, Future Disc Systems offers six premier mastering suites featuring state-of-the-art digital and analog equipment including the latest high definition compatible digital (HDCD) encoding system. Some of the work mastered at Future Disc this past year included projects for Kirk Franklin, Marilyn Manson, Keiko Matsui, Chris Isaak, Jim Brickman and Peter White.

Bernie Grundman Mastering, *Hollywood, CA:* During the eligibility period Bernie Grundman Mastering mastered projects for Stevie Wonder, Keiko Matsui, Boz Scaggs, Dr. Dre, Van Halen, Neil Young, Snoop Doggy Dog, New Edition, 2 Pac, George Duke, George Clinton, Westside Connection, Kenny G, Chick Corea, Shogo Hamada, Luis Miguel, Al Jarreau, Liz Story, Ani DiFranco, Tony, Toni, Tone, and the soundtrack albums for *First Wives Club, Tin Cup, Jerry Maguire, Jungle 2 Jungle, Selena, The Associate,* and *That Thing You Do.*

Masterdisk, Corp., *NYC:* During the eligibility year, Masterdisk mastered Grammy®-winner The Chieftains *Santiago*, U2 *Pop*, The Smashing Pumpkins *Melloncollie & The Infinite Sadness*, Garbage *Garbage*, Tony Bennett *On Holiday*, Whitney Houston *The Preacher's Wife* soundtrack, Patti Smith *Gone Again*, Herbie Hancock *The New Standard*, Alfonzo Hunter *Blacka Da Berry*, PJ Harvey *To Bring You My Love*, Busta Rhyme *Woo Ha Got You All In Check*, Aaliyah *One in A Million* and Rancid... *And Out Come the Wolves.*

Masterfonics, *Nashville, TN:* In the past year, Masterfonics' three mastering engineers, owner Glenn Meadows, Benny Quinn and Tommy Dorsey, have added the final touches to projects as diverse as LeAnn Rimes' *Blue*, Diamond Rio *IV*, Adrian Belew's *Op Zop Too Wah*, John Berry's *Faces*, Trace Adkins' *Dreaming Out Loud* and Christopher Eschenbach and the Houston Symphony Orchestra performing *Music of Johannes Brahms.* Compilations and restoration work included releases from Clint Black, Alabama and "The Outlaws" 20th anniversary retrospective.

Sterling Sound, *NYC:* In operation for nearly 30 years, Sterling Sound offers five fully equipped mastering studios. Led by engineers George Marino, Ted Jensen, Tom Coyne, Joseph Palmaccio and Eugene "UE" Nastasi, eligibility year projects included work for Metallica, Dave Matthews Band, Live, The Verve Pipe, The Cranberries, Kiss, Wu-Tang Clan, Hanson, Maxwell, Fiona Apple, Pat Metheny, Luther Vandross, David Bryne, Me'Shell Ndegeocello, Jon Bon Jovi, Nas, Erykah Badu, James Taylor and Jimi Hendrix.

D. AUDIO POST-PRODUCTION FACILITY

EFX Systems, *Burbank, CA:* Eligibility year credits included *Babylon 5, Set It Off, The Island of Dr. Moreau, Mother Night* and *Feeling Minnesota.*

Skywalker Sound, *San Rafael, CA:* During the eligibility year, Skywalker Sound completed 17 films (including *Mission: Impossible, Sleepers, Volcano, Mars Attacks!, One Fine Day, Romeo and Juliet, James & the Giant Peach, The Arrival, Beverly Hills Ninja, Follow Me Home* and the *Star Wars Trilogy Special Edition*); sound design for three features (*Con Air, Eraser, The Rock*), five special venue/ large format projects (*Among Whales, Enchanted Castle, Ellen's Energy Crisis, Special Effects, To Be An Astronaut*); more than two dozen commercials for such clients as Chevy, Energizer, Honda, Levi's, Nissan, Pacific Bell, Pepsi, Sony and Toyota; and music recording for film scores, musical groups, choirs and symphonies.

Sync Sound, Inc., *NYC:* Sync Sound's award-winning staff provides complete audio post-production services for numerous features, television series and specials, documentaries, Omni-Max, HDTV, home videos

World Radio History

and DVD. Eligibility year credits included Stephen King's feature *Night Flier, Beavis and Butt-head Do America*, Three Tenors in Concert 1994 at Dodger Stadium—DVD remix, *Homicide* (NBC series), *Beavis and Butt-head/Daria* (MTV series'), *Turning Point* (ABC series), *Chicago* (Broadway cast album), and *Remember WENN* (AMC series).

Todd-AO Studios, *Hollywood, CA:* During the eligibility year, Todd-AO projects included *Dante's Peak, Star Trek: First Contact, Shadow Conspiracy, Private Parts, Evita, Fled* and *Kansas City.*

Saul Zaentz Film Center, *Berkeley, CA:* Eligibility year credits included *The English Patient, Fly Away Home* (mixed in 8-channel SDDS), the remix of *The Godfather, Apocalypse Now, Capricorn One* and the other two *Godfathers*, and mixing on *Blood and Wine, Masterminds, Commandments, Female Perversions* and *The Long Way Home.*

E. REMOTE RECORDING FACILITY

Design FX Remote Recording, *Burbank, CA:* Design FX Remote recorded Sting and the Soul Train Music Awards Show for television, plus Def Leppard, The Brian Setzer Orchestra and the Playboy Jazz Festival for radio. Additional recordings included Alexis Gershwin singing Gershwin classics, Tracy Chapman, the Four Tops, and *The Colors of Christmas*, featuring Roberta Flack, Peabo Bryson and Aaron Neville. Other work included Elton John, Babyface, Vanessa Williams, Seal, David Foster, Tim McGraw and Faith Hill for the Andre Agassi Foundation.

Effanel Music, *NYC:* During the eligibility year, Effanel's new 24-bit, all-digital Capricorn mobile recording studio "L7" captured or mixed the following artists or projects: The Grammys® telecast, Oasis-MTV Unplugged, Aretha Franklin, Wynton Marsalis' *Blood on the Fields*, Storytellers featuring James Taylor, Elvis Costello, Ray Davies, Garth Brooks, Lyle Lovett and Sting, Itzhak Perlman's *In the Fiddler's House*, David Letterman Across America, the MTV Video Music Awards, Lincoln Center Jazz and Riverdance—Live From Radio City Music Hall.

Le Mobile, *Vista, CA:* During the eligibility period, Le Mobile recorded: (film scoring) *Warriors of Virtue, Jungle Book II, Going West, The Associate* and *The Arrival*; (music recordings) The 3 Sopranos, Smashing Pumpkins, John Tesh *Avalon*, Counting Crows, Lee Ritenour, Melissa Etheridge, Suzanne Vega, John Mellencamp; and (live broadcast performances) Chris Isaak, Ozzy Osbourne, Shawn Colvin, 311, The Neurotic Outsiders, The Black Crowes, Los Lobos, and such clients as Album Network, Global Network, Warner Bros. Network and Columbia Radio Network.

David Hewitt's Remote Recording Services, *Lahaska, PA:* Eligibility year credits included Gloria Estefan "Live From Miami"—HBO special, Super Bowl—stadium orchestra theme, *Bring in Da Noise, Bring in Da Funk* —broadway cast album, Live From the Metropolitan Opera—a season of live TV shows, 1996 Academy Awards—live TV broadcast (orchestra), Summer Olympics—orchestra for opening and closing ceremonies, the concert for the Rock 'n' Roll Hall of Fame—a live CD, and a tribute to Oscar Peterson—Live at Town Hall, a live CD.

Record Plant Remote, *NYC:* A partial list of Record Plant Remote's eligibility year credits included Oasis, Sting, The Who, *The Preacher's Wife* (movie), Tragically Hip, Betty Buckley, Further Festival, Mary Chapin Carpenter, Farm Aid, Wynton Marsalis, Eric Johnson, Steve Vai, Joe Satriani, MTV Video Music Awards, Harry Belafonte, Bette Midler HBO Special, Just Heads, the Broadway musical *Rent*, Mingus Big Band and Ozzy Osbourne.

F. RECORDING STUDIO

Chung King Studios, *NYC:* During the eligibility year, Chung King worked with four-time Grammy® Award-winner Billy Corgan, lead writer and performer of Smashing Pumpkins who tracked and mixed *The Aeroplane Flies High* and his single "Eye" from *The Lost Highway* soundtrack, Ric Ocasek, Patricia Kaas, an adaption of *West Side Story* arranged by Dave Grusin, The Fugees *The Carnival*, two songs for Michael Jackson's new release, Vanessa Williams, En Vogue, Brandy, Shudder To Think *50,000 B.C.*, *First Love Last Rights* soundtrack, *Bring in Da Noise Bring in Da Funk* original cast recording, *When We Were Kings* soundtrack and Tricky.

Electric Lady Studio, *NYC:* During the eligibility period, Electric Lady Studios worked with Alice in Chains *Unplugged*, Depeche Mode *Ultra*, Zhane "Request Line," Corrosion of Conformity *Wiseblood*, Blues Traveler's upcoming release and Everclear's upcoming release.

Ocean Way, *Los Angeles:* During the eligibility period, the studios of Ocean Way hosted projects by Don Was, The Black Crowes, Toni Braxton, Travis Tritt, Red Hot Chili Peppers, Green Day, Natalie Cole, Michael Jackson, Babyface, Nusrat Fateh Ali Khan, Rod Stewart, Soul Asylum, Eric Clapton, Me'shell Ndegéocello, Enrique Iglesias, Luis Miguel, Ry Cooder, Rolling Stones, k.d. lang, B.B. King, Hole, and the soundtracks of *The Crow II, Last Man Standing, The Mirror Has Two Faces, The Preacher's Wife, Private Parts* and *Speed II.*

Right Track Recording, *NYC:* During the eligibility year Right Track worked with Metallica *Load*, Alice in Chains *Unplugged*, David Bowie *Earthling* and *50th Birthday Pay Per View Special*, *Rent* cast LP, Pat Metheny Group *Quartet*, Pavarotti & Friends *Warchild*, James Taylor *Hour Glass*, Jon Bon Jovi *Destination Anywhere*, Bee Gees *Still Waters*, C. Hayden/Pat Metheny *Missouri Skys*, Toni Braxton "Today," Donna Lewis "Without Love," The Fugees "Ready or Not," Allure *Allure*, Vanessa Williams *X-Mas*, Jimmy Buffett, *X-mas Island*, and Elvis Costello "God Give Me Strength."

Sony Music Studios, *NYC:* During the eligibility period, Sony Music Studios was involved in projects for such artists as Emmanuel Ax (*Bartok Piano Concertos*), Celine Dion, INXS, Ginuwine, Wynton Marsalis, Paula Cole, k.d. lang, Yo Yo Ma, Shawn Colvin, Jamiroquai, Kathleen Battle, Faith Evans, Blues Traveler, Indigio Girls, Maxwell, Michael Bolton, Jewel, Marry Me Jane, Jeff Buckley, Aerosmith, Aliyah, Ben Folds Five, Meshelle N'Degeocello and Bruce Springsteen.

II OUTSTANDING CREATIVE ACHIEVEMENT

Awarded to those individuals or teams who have achieved the highest levels of excellence in professional audio during the eligibility year.

A. AUDIO POST-PRODUCTION ENGINEER

Ben Burtt: During the eligibility period Ben Burtt was sound designer for *Star Wars Trilogy Special Edition* and *Special Effects: Anything Can Happen* (Imax).

Tom Fleischman: During the eligibility period Tom Fleischman mixed *The Bus, Some Mother's Son, Michael Collins, Looking for Richard, Grace of My Heart* and *Girl 6.*

Ted Hall: Eligibility year credits for Ted Hall included Eric Clapton's *Unplugged*, Madonna's *Girlie Show*, Sting's *Let Your Soul Be Your Pilot* and Sheryl Crow's *If It Makes You Happy*—(multichannel music mixing for DVD); *The Fifth Element*—music editing; and *Singing In The Rain*—audio restoration.

Walter Murch: During the eligibility year Walter Murch worked on *The English Patient.*

David West/Thierry Couturier: During the eligibility period, the creative team of West/Couturier worked on *The X-Files* and the pilot for the series *Millennium.*

B. REMOTE/BROADCAST RECORDING ENGINEER

Guy Charbonneau: During the eligibility period Guy Charbonneau recorded the 1996 Ozz Festival (Ozzy Osbourne); *Mystere* CD (Cirque du Soleil, Las Vegas); 311; Shawn Colvin; Tracy Chapman; Los Lobos; Toadies; The Neurotic Outsiders; and Hezekiak Walker (live in London).

Biff Dawes: Eligibility year credits for Biff Dawes included: (live national radio broadcasts) The Who Quadrophenia live broadcast from Madison Square Garden, Tom Petty live national broadcast from The Fillmore, Sting live from the Woodlands in Houston; (television) VH-1 Honors, Academy of Country Music Awards; (albums) Frank Sinatra, *80th Live*, Nirvana *Live From the Muddy Banks of the Wishkah*; and (live recordings for radio) Beck, Rage Against the Machine and Pete Townshend.

Randy Ezratty: Randy Ezratty is the owner of Manhattan-based Effanel Music. Mixing credits for the eligibility period included the 1996 Grammy® Awards telecast; Aretha Franklin "Live From Detroit's New Bethel Church"; and VH-1 "Storytellers" featuring James Taylor, Lyle Lovett, Garth Brooks and Elvis Costello.

John Harris: Eligibility year credits for John Harris included various projects with David Bowie, Sting, Aerosmith, Eric Clapton, Stone Temple Pilots, Metallica, Bush, The Black Crowes, Patti Smith, Lou Reed, The Doobie Brothers, Collective Soul, Alanis Morissette, The Smashing Pumpkins, the 1996 MTV Video Music Awards, the 1996 Grammy® Awards, The Kennedy Center Honors 25th Anniversary, the 1996 Horde Festival, VH-1's Hard Rock Live, the 1996 Rock & Roll Hall of Fame Inductions, Tony Bennett Live By Request, and MTV Unplugged with Hootie & the Blowfish, Oasis, Seal, Tori Amos and Alice in Chains.

David Hewitt: David Hewitt is president and chief engineer of Remote Recording Services. Eligibility year credits included The Three Tenors at Giants Stadium—a live television PPV; Super Bowl—stadium orchestra theme; The Three Sopranos in L.A.—a live video and CD; Patrick Cassidy "A Famine Remembrance" —orchestra recordings; and Live from the Met 1996/1997 season—live television recordings.

C. SOUND REINFORCEMENT ENGINEER

Robert "Cubby" Colby: During the eligibility period, Robert Colby was FOH engineer for Bob Seger's "It's A Mystery" tour, recording 30 of the 65 North American shows. He was also involved in the promotional tour for Phil Collins and mixed FOH for Collins' North America tour. Colby also mixed the 1996 Billboard Music Awards.

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John Kerns: During the eligibility period John Kerns was FOH engineer/system engineer for Bruce Springsteen's world tour and FOH engineer for Indigo Girls, Dave Pirner, Billy Bragg, Bruce Springsteen and others at the Woody Guthrie Tribute at the Rock & Roll Hall of Fame.

Dave Kob: During the eligibility period Dave Kob mixed The Who's Quadrophenia, MTV Video Music Awards and the Grammy® Awards.

David Morgan: During the eligibility period David Morgan mixed the live performances for Steely Dan's "The Art Crimes" tour and Bette Midler's "Diva Las Vegas" tour, and with Mike Wolf of Clair Brothers designed and installed the Clair System at the Universal Amphitheatre in Universal City.

Robert Scovill: During the eligibility period Robert Scovill was FOH mixer for Foreigner's "Can't Stop Rockin'" tour, mixing live concert sound as well as live uplinks to the Internet; teamed up with Rush for the first leg of their "Test For Echo" tour, where Scovill's duties included 72-track digital recordings of the shows to be used on an upcoming release; and worked with Tom Petty and the Heartbreakers for a 20-show run at The Fillmore in San Francisco.

D. MASTERING ENGINEER

Bob Ludwig has won the last three years and is ineligible for 1997.

Greg Calbi: During the eligibility period, Greg Calbi mastered The Chieftains' *Santiago*, Patti Smith's *Gone Again*, Tony Bennett's *On Holiday*, Whitney Houston's *The Preacher's Wife* soundtrack, Luscious Jackson's *Fever In, Fever Out*, Joshua Redman's *Freedom in the Groove*, Morphine's *Like Swimming*, Vic Chestnutt's *About to Choke* and John Scofield's *Quiet*.

Bernie Grundman: During the eligibility period, Grundman mastered projects for Boz Scaggs, Stevie Wonder, Kenny G, Liza Minnelli, Yumi Matsutoya, Tool, Andre Crouch, Keiko Matsui, George Winston, Steve Vai, Robert Cray, Harvey Mandel, Chick Corea, Eric Johnson, Mighty Clouds of Joy, Sneaker Pimps, Sergio Mendes, David Benoit, Gilberto Gil, Richard Carpenter, Ferron, Simply Red, Puff Johnson, Donnie McClurkin and the soundtrack albums for *That Thing You Do, Selena, Last Man Standing, Mandela* and *Jungle 2 Jungle*.

Ted Jensen: A few projects Ted Jensen worked on during the eligibility period included Live's *Secret Samadhi*, The Verve Pipe's *Villains*, Pat Metheny's *Quartet*, Big Head Todd & the Monsters' *Beautiful World*, Helmet's *Aftertaste*, Neurotic Outsiders' *Neurotic Outsiders*, James Taylor's *Hourglass*, Dave Matthews Band's *Crash*, Third Eye Blind's *Semi-Charmed Life* and Hanson's *Middle of Nowhere*.

Denny Purcell: During the eligibilty period Denny Purcell mastered Mark Knopfler's *Golden Heart* and remastered Knopfler's soundtracks for *The Princess Bride, Last Exit to Brooklyn, Cal* and *Local Hero*. Other projects included Vince Gill's *High Lonesome Sound*, George Strait's *Carrying Your Love With Me*, Mark O'Connor, Edgar Meyer and Yo Yo Ma's *Appalachian Waltz* and Barry Manilow's *Summer of '78*, and work by Wynonna, Chet Atkins, Cibo Matto, LeAnn Rimes, Deana Carter, Tanya Tucker, Steve Wariner, Carl Perkins, Paul McCartney, George Harrison, Tom Petty, Bono, John Fogerty, J.J. Cale, John Prine, Pam Tillis, Trisha Yearwood, Garth Brooks, Asleep at the Wheel and Randy Travis.

Howie Weinberg: In the eligibility year, Howie Weinberg mastered U2's *Pop*, The Smashing Pumpkins' *Mellooncollie & the Infinite Sadness*, Garbage's *Garbage*, Blues Traveler's double live CD, PJ Harvey's *To Bring You My Love*, Squirrel Nut Zippers' *Hot*, Gravity Kills' *Gravity Kills*, Rancid's *And Out Come The Wolves*, Cracker's *The Golden Age* and The Jon Spencer Blues Explosion's *No I Got Worry*.

E. RECORD PRODUCER

Kenny "Babyface" Edmonds: No credits were available at presstime.

Tony Brown: Eligibility year credits for Tony Brown included: co-produced George Strait *Blue Clear Sky*, Todd Snider *Step Right Up*, Marty Stuart *Honky Tonkin's What I Do Best*; produced David Lee Murphy *Getting Out the Good Stuff*, Vince Gill *High Lonesome Sound*, Tracy Byrd *Big Love*, Mark Chesnutt *Chesnutt's Greatest Hits* (2 sides) "It's A Little Too Late" and "Let It Rain"; and executive produced *One Voice*.

T-Bone Burnett: Eligibility year credits for T-Bone Burnett included Wallflowers *Bringing Down The Horse*; Gillian Welch *Revival*; Sam Phillips *Omnipop: It's Only A Flesh Wound, Lambchop*; Daniel Tashian *Sweetie*; and Jimmie Dale Gilmore *Braver, New World*.

David Foster: Eligibility year credits for David Foster included Az Yet *Hard to Say I'm Sorry*, Toni Braxton "Unbreak My Heart," Natalie Cole "When I Fall In Love," Whitney Houston "I Believe in You and Me" from *The Preacher's Wife* soundtrack, "For You I Will" from the *Space Jam* soundtrack, "I Finally Found Someone" from *The Mirror Has Two Faces* soundtrack, "Where Do We Go From Here" from the *Eraser* soundtrack, Celine Dion "All By Myself," "Whenever There Is Love" from the *Daylight* soundtrack, Michael Jackson "Earthsong," Celine Dion "Natural Woman," and Jordan Hill *For The Love of You* and *How Many Times*.

Don Gehman: Eligibility year credits for Don Gehman are Hootie & the Blowfish *Fairweather Johnson*, Better Than Ezra *Friction Baby*, Nanci Griffin *Blue Rose*, and Uma's latest album.

F. RECORDING ENGINEER

Tchad Blake: Albums released during the eligibility period included Suzanne Vega *Nine Objects of Desire* (engineer); Los Lobos *Colossal Head*, Richard Thompson *You? Me? Us?*, Cibo Matto *Viva La Woman*, Finn Brothers *Finn Brothers* , Kent (France) *Nouba* (co-producer/engineer); Sheryl Crow *Sheryl Crow*, Soul Coughing *Irresistibie Bliss* (mix engineer); and Crowded House *Recurring Dream—The Best of Crowded House* (engineer/co-producer of new songs).

Ed Cherney: Eligibility year credits for Ed Cherney included Jann Arden's *Living Under June*, Anne Murray *Anne Murray*, The Calfianes and Johnny D. Lang "Lie to Me."

Mick Guzauski: Eligibility year credits included Az Yet *Hard to Say I'm Sorry*, Michael Bolton's *Go The Distance*, Uncle Sam *I Don't Ever Want To*, Warren Hill *Shelter*, Toni Braxton *Secrets* and Eric Clapton "Change The World" from the *Phenomenon* soundtrack.

Tom Lord-Alge: Eligibility year credits included Live's *Secret Samadhi*, Dave Matthews Band's *Crash*, The Wallflowers' *Bringing Down the Horse*, and The Verve Pipe's *Villains*.

Rail Jon Rogut: During the eligibility period, Rail Jon Rogut recorded Meshell Ndegeocello's second album *Peace Beyond Passion*, and also recorded her remake of "Time Has Come Today" for the motion picture *White Man's Burden*, new material on Chaka Khan's *Epiphany* album and material on Ry Cooder's score of *Last Man Standing* and *In From The Storm*, a tribute to Jimi Hendrix, produced by Eddie Kramer.

III OUTSTANDING TECHNICAL ACHIEVEMENT

Awarded to those products or innovations that have made the most significant contributions to the advancement of audio technology during the eligibility year. Note: The following product descriptions were supplied by the companies nominated and have been edited for length and style.

A. ANCILLARY EQUIPMENT

Aardvark AardSync II: This keeps all digital audio devices running together perfectly while keeping everything in sync to video. AardSync II eliminates unwanted clicks and pops and guarantees that the equipment will not only work well, but it will work flawlessly with everything else. Proprietary Digital AardLock Technology provides quick, stable lock while generating extremely low jitter, which eliminates cloudy audio. Comaptible with Digidesign, Sonic Solutions, Yamaha 02R/03D, Tascam DA-88, etc. Full NTSC/PAL compatibility.

Apogee Electronics FC-8 Format Converter: The Apogee FC-8 allows the cost-effective, bi-directional transfer of eight channels of digital audio between Alesis ADAT and Tascam TDIF (DA-88 and compatibles) MDMs. It also permits ADAT-compatible digital converters—such as the Apogee AD-1000—to operate with TDIF-based MDMs. The FC-8 is particularly useful for studios and post-production facilities needing to make transfers between the two formats, where it offers a cost-effective, compact, stand-alone solution to a common problem.

Benchmark AD2004 Analog-to-Digital 20-Bit Converter: The AD2004 is a 4-channel, 20-bit A-to-D converter in a one-rackspace chassis. The AFD2004 sets new benchmarks in price and performance by providing the absolute highest performance at a cost of only $550 per channel. THD+N is -108 dBFS, intrinsic jitter is <11 pS, and idle tones are <137 dB, even when phase-locked to AES sync. Digital meters and sample rates of 44.1 and 48 kHz are standard.

Equi=Tech Balanced Power AC Wall System: The revolutionary breakthrough of balanced AC power technology is now available as a turnkey system for hard-wiring an entire studio or production facility. Three sizes, which have 50-, 75- and 100-amp capabilities, include built-in surge and GFCI protection. Housed in a rugged NEMA-12 cabinet, quality components ensure many years of dependable operation and immaculately clean audio system performance.

Furman Sound IT-1220 Balanced Power Isolation Transformer: This shielded, rackmount, toroidal isolation transformer provides balanced 60/120 VAC single-phase power (NEC-recognized for low-noise technical applications), significantly reducing sytemwide hum and buzz—a 16dB background noise reduction. Installs in minutes without an electrician. A microprocessor-controlled AC voltmeter indicates for marginal or excessive voltage conditions. Extreme Voltage Shutdown protection circuits power

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down if accidentally connected to 220V, and Soft Start prevents large surge currents on power-up.

JBL Professional SMAART™: JBL Professional SMAART is affordable acoustical measurement and analysis software that allows consultants, contractors and audio system designers to easily optimize sound sytems, analyze acoustical conditions and obtain maximum performance from their sound systems.

B. AMPLIFIER TECHNOLOGY

Crown K2: The K2 amplifier utilizes Crown's proprietary, patent-pending Balanced Current Amplifier (BCA™) circuitry to deliver exceptionally high power (1,250 watts per channel into 2 ohms) while generating virtually no component-degrading heat. The K2 has more than double the energy efficiency of conventional switching amps, allowing sound professionals to plug more amplifiers into a single AC circuit, while greatly reducing overall operating costs. No fan, no noise, $2,000.

Hot House High Resolution Control Room Amplifiers: Studio amps that reproduce music in a no-compromise fashion, the High Resolution Series is a direct descendant of the original S400 (the first dedicated control room amp, introduced a decade ago) and is the result of a great deal of R&D and listening time aimed at refining that initial design. No global feedback, extremely fast recovery time, superb square-wave performance and exceptionally stable wide-bandwidth response into reactive loads from all-discrete MOSFET circuitry and over-built power supplies.

Mackie FR Series M-1200: The FR Series M-1200 features low negative feedback; T-design constant gradient cooling for thermal stability; sustained ultra-low-impedance capability (1,200 watts, 4 ohms bridged; 600 + 600 watts into 2 ohms); built-in sweepable CD horn compensation, built-in variable HP filter, built-in limiter and switchable LP subwoofer crossover; defeatable clip eliminator; and ultra-LF subsonic stabilizer. Detented Input gain controls calibrated in volts and dB, 5-segment level LEDs, and six status LEDs.

Peavey CS800S: The CS800S benefits from 20 years of continuous improvement. A smart HF power supply combines with metal output power transistors to continue the tradition of reliability and ruggedness that makes the CS800S world famous. A patent-pending output circuit delivers damping factors in excess of 1,000:1 for rock-solid bass. Industry-standard power and performance in a remarkable two rackspaces (only 23.5 pounds), at a price only Peavey can deliver.

QSC Powerlight 2.0 HV: Optimized for maximum power at 8 and 4 ohms, this amp delivers 650 watts/channel at 8 ohms and 1,000 W/ch at 4 ohms in a two-rackspace chassis weighing only 18 pounds. The power supply, using QSC's PowerWare™ switching technology, provides higher regulation than most "conventional" supplies to deliver superior dynamics and LF response. Other features: remote AC power control, remote signal processing, amplifier monitoring, and control with QSC's new QSControl2 network audio system.

Stewart World Series: The World Series consists of five amps—the World 250, 600 1.2, 1.6 and 2.1—ranging from 250 to 2,100 watts, weighing 7 to 17 pounds. Features include detented front-panel level controls and XLR and 1/4-inch connections that accept balanced or unbalanced inputs. Prices range from $439 to $1,399; all include a five-year warranty.

C. MIC PREAMPLIFIER TECHNOLOGY

ATI 8MX2: The ideal companion to digital recording in one rackspace, the 8MX2 contains eight of ATI's signature high-voltage (±48V) mic preamps, each with its own output, adjustable limiter, ground lift, phantom and phase reverse. The 8MX2 is simultaneously a full-featured 8x2 mixer with monitoring of either the mic inputs or the eight balanced line returns. Multiple 8MX2s can be slave-linked together for multiple-unit connection of the cue and mix buses.

Focusrite Green 1 Mic Preamp: The Green 1 Mic Preamplifier follows proudly in the footsteps of the illustrious Red Range, providing two channels of exceptionally high-quality mic preamplification for live stereo recording, studio tracking, ADR or voice-over. This all-new design uses the latest audiophile-grade electronic components combined with original and striking industrial design. Features include 48V phantom power, phase reverse, 75Hz HP filter and mute switch with external trigger input.

Grace Design Model 201: The Model 201 2-channel microphone preamplifier is based on the critically acclaimed circuitry of the flagship Model 801 8-channel. The 201 is designed to deliver a high level of clarity, subtlety and detail to tape/hard disk without coloration. Each channel is equipped with phantom power, phase reversal and a 20dB attenuator. Gain controls are 24-position gold-contact rotary switches accompanied by 10dB output trim controls. Retail: $1,895.

Joemeek Tube Channel: This multifunctional mono processor for tracking combines four separate pieces of quality equipment in a single 2U unit. Onboard are a state-of-the-art mic preamplifier, using a transformer at the input and two separate amplifier stages for the lowest possible noise and distortion. A full mono Joemeek Photo-Optical Compressor for added punch, a mono Joemeek enhancer to add sparkle and a "Tube" gain makeup amplifier to add warmth are standard.

Manley Mic EQ500: Following on the heels of the Variable MU Limiter Compressor, this shares similar fully differential tube circuits, but this time used for a mic preamplifier/equalizer. The minimalist passive-design equalizer has stepped rotary switches for frequencies and cut or boost. It is a combination of the best in vintage and the best in modern electronics. The Mic EQ500 is perfectly suited for direct-to-tape recording and situations where performance is important.

Summit Audio MPC-100A: The MPC-100A mic preamp/comp-limiter features two tube-driven stages. The input stage accommodates mic (using Jensen transformer), line or Hi-Z signals. The compressor-limiter section offers attack, release, AC threshold and slope controls. A VU meter displays output or gain reduction levels. The unit has an input pad, 48V phantom and tube drive indicators. Input is XLR balanced or unbalanced; output is +4 balanced XLR and -10 unbalanced.

D. COMPUTER SOFTWARE & PERIPHERALS

Cakewalk Pro Audio 5.0: This complete audio/music sequencing workstation for musicians, producers and multimedia developers lets users record, edit and play back as many tracks of digital audio as the computer can handle. Digital audio hardware support includes Digidesign Session 8/Audiomedia III, Soundscape SSHDR1 and Windows-compatible sound cards. Pro MIDI editing includes 256-bank SysEx librarian; interpolate; fit-to-time; fit-improvisation; velocity scale; and event filter. Incorporates audio and MIDI sync to SMPTE formats, MTC and MMC.

Digital Audio Labs V8: The V8 modular, multichannel workstation platform for the PC includes a 16-track disk recorder, up to 32 channels of automated mixing, a modular DSP architecture, and full synchronization capabilities. The V8 system offers a wide variety of I/O peripherals, including multichannel rackmount A/D-D/A and ADAT/DA88 interfaces with transport control. Application and DSP plug-in software is available entirely from third-party developers.

Liquid Audio Liquifier Pro™: The Liquifier Pro professional audio mastering software for the Internet contains everything needed to prepare and publish true CD-quality, copy-protected music for secure distribution over the Internet. Simply point and click to create a single file that contains descriptive text, graphics and superior-quality audio. The Liquifier Pro contains all the tools necessary to record, edit, encode and publish. Once mastered, audio can be previewed and purchased using the free Liquid MusicPlayer.

Mark of the Unicorn Performer 5.5: Performer is MOTU's award-winning Macintosh sequencer, well-known for its intuitive graphic interface, real-time editing, powerful MIDI output processing, notation editing and printing, automated mixing, graphic sequence chaining, unlimited tracks and comprehensive MIDI system management. Performer is a complete front end for today's studio with advanced synchronization and MIDI Machine Control. Ten years of hit records, film scores and concert tours are reflected in the features and design of Performer.

Sonic Foundry Sound Forge 4.0: Sound Forge 4.0 sets the standard in sound editing for Windows. Record and edit professional-quality audio with numerous effects, processes and tools. Set custom parameters to a selection and preview changes before execution. Sound Forge supports Video for Windows files, which can be output as RealMedia and Active Streaming Format for the Internet. Sound Forge's expandable architecture supports plug-ins such as CD Architect, Noise Reduction, Batch Converter and DirectX Audio plug-ins.

Spatializer Audio Labs Spatializer® PT3D TDM: This Pro Tools TDM plug-in provides real-time 3-D audio processing for Pro Tools systems equipped with TDM. Users can position any number of sounds in space in real time, using the Pro Tools panning sliders and a minimum of system resources. The PT3D also provides level meters, sum/difference meters and a Spatial Impression Meter™ for an intuitive and ergonomic display.

E. MICROPHONE TECHNOLOGY

Brüel & Kjaer DPA4060: The DPA4060/4061/4062—one of the world's smallest omnidirectional microphones at only 7/32-inch in size—is designed to handle humidity, sweat, wind and pops with optimum audio performance. They're perfect for invisible miking applications, including body placement, and are compatible with all pro wireless systems. Designed by Ole Brosted Sorenson of Danish Pro Audio, designer of the Brüel & Kjaer microphones, the 4060 Series is changing the industry's benchmark for miniuature microphones.

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Earthworks TC40K: The TC40K is accurate to a degree that few microphones can approach. Accurate in the time domain and optimized to deliver clean impulse response, the TC40K has extremely accurate frequency performance from 9 Hz to 40 kHz (typically within ±0.5 dB from 20 Hz to 20 kHz). By keeping time relationships coherent and transducing waveforms exactly, the TC40K captures the experience of being there. They sound real!

Neumann M149 Tube Microphone: The first new tube microphone from Neumann in 30 years, the M149 Tube combines the K49 capsule—from the U47 and M49 microphones—with a transformerless tube circuit, resulting in a tube microphone with the lowest self-noise of any in the world. Like its ancestors, the M149 Tube is a superb vocal mic and has gained rapid acceptance with a wide variety of engineers and artists, ranging from cartoon voice-overs to opera recordings.

RØDE Classic Valve Microphone: Priced at $1,999 the Classic was developed using the sonic quality and spirit of the great vintage models as a baseline. It features the rare 6072 tube used in the most famous vintage microphones, a dual-pressure gradient transducer with large gold-sputtered diaphragm, a custom Jensen™ output transformer and a hand-polished casing milled from solid brass. The remote power supply provides nine selectable polar patterns, two bass rolloffs and -10/-20dB pads.

Schoeps M222 Tube Microphone: The Schoeps M222 updates its 35-year-old predecessor, the classic M221B, in several important respects. The M222 has a balanced, transformerless output and accepts any of the capsules and active accessories of the current Schoeps Colette line. It includes a cable, stand mount, pop screen, power supply and carrying case. An optional line-level solid-state preamplifier is available. Powering is from external DC, using either a battery or the AC-DC converter provided.

Soundelux U95: Following in the tradition of the classic tube mics of the 1950s, the Soundelux U95 features a 1-inch diameter capsule with dual 6-mil gold-on-mylar diaphragms, as well as vacuum tube electronics. The amplifier uses a powerful, two-stage, low-distortion, direct-coupled topology. Offering switchable omni, cardioid and figure-8 polar patterns with six intermediate steps, pattern selection is accomplished remotely from the power supply unit.

F. SOUND REINFORCEMENT LOUDSPEAKER TECHNOLOGY

Apogee Sound C-3: The C-3 Concert Loudspeaker is a three-way, tri-amped system, offering wide range at very high sound pressure levels in a small-format enclosure. It utilizes a horn-loaded 15-inch (380 mm) bass driver, a constant-directivity horn-loaded 2-inch (50 cm) compression driver and a 1-inch (25 mm) high-frequency horn/driver combination. The enclosure is a 15-degree trapezoid, constructed of Finland birch ply, and fitted with a steel grille.

Electro-Voice DeltaMax™ DMS 1122/85: This two-way, full-range, electronically controlled loudspeaker is designed for high-level touring or fixed installation applications. The DMS 1122/85 employs a custom 12-inch woofer and a high-output/low-distortion titanium compression driver coupled to a 80°x55° constant-directivity horn providing wide-range music reproduction and accurate vocal intelligibility. The new DeltaMax line also includes a 15-inch two-way, an 18-inch subwoofer and a dual 18-inch subwoofer.

Eastern Acoustic Works KF855 Downfill Speaker: This concert loudspeaker provides front-fill coverage while still flying seamlessly within a typical KF850 array. Housed in the same size and shape cabinet as the KF850, it features a dual high-frequency section. Two individual horns are loaded with 2-inch compression drivers: One horn fires downward at a gentle angle, the other fires downward at a steeper angle. The KF855's 10-inch horn-loaded midrange section is also angled slightly downward.

JBL Professional HLA Series: The HLA™ (Horn Loaded Array) Series is the next generation in large tour sound systems, representing a breakthrough combination of new driver technology, ergonomic design and highly integrated components. The HLA Series features revolutionary technologies such as DCD™ driver technology, SpaceFrame™ technology and Aimable, Multi-band Waveguide™ tilting system. This combination of new mechanical innovations provides advantages in positioning, flying, loading and aiming the array.

Meyer Sound Labs CQ-1/CQ-2: The CQ-1 (80°x40° coverage) and CQ-2 (50°x40°) self-powered loudspeakers offer precise pattern control. Developed from extensive research in Meyer's anechoic chamber, both speakers feature Constant Q horns (for uniform frequency response over the entire coverage area), with a lightweight electronics/amp module on the cabinet back for quick setups. Currently on shows such as *Smoky Joe's Cafe* and *The Lion King*, CQ speakers are used in theaters and clubs worldwide.

Turbosound HiLight: The Turbosound THL-2 is a member of the HiLight family of products that combine Turbosounds's proprietary cone midrange transducer technology with all-new, wide-dispersion horn techniques derived from the company's highly successful long-throw Flashlight technology. The THL-2's 90°x40° dispersion pattern is ideal for permanent installations in clubs, houses of worship, conference centers and a wide variety of portable applications, including A/V corporate presentations, touring productions and regional band performances.

G. STUDIO MONITOR TECHNOLOGY

Audix Nile V: Designed for mastering and critical applications where linear frequency response and accurate reproduction are essential, this two-way system combines a 1-inch cloth-dome tweeter and a 7-inch Kevlar cone woofer. Noted for its exceptional imaging, accurate reproduction and the ability to reproduce bass frequencies down to 40 Hz without phase distortion, the Nile V's vented enclosure is solidly constructed of 1-inch wood composite internally lined with natural wool.

Dynaudio C4A: The C4A is a free-standing 3- or 4-way high-resolution monitoring system designed to work without the need for special flush-mounting or acoustic redesign. Driver complement: modified Dynaudio Esotar units, with specially formulated ferro-fluid damping/cooling, plus extra low-mass aluminum voice coils. Cabinets: hand-built, acoustically optimized, heavily damped asymmetric enclosures offering the best possible transient response. ABES LF units for greater power, room matching and discrete 5.1 systems.

Event 20/20bas Biamplified System: Designed for professional audio environments where accurate and detailed frequency response and imaging are required, the 20/20bas direct field monitor system features custom-designed, mag-shielded 8-inch polypropylene cone woofers and 25mm ferrofluid-cooled natural silk-dome tweeters. Each cabinet offers 200 watts of continuous power (130W to the woofer; 70W to the tweeter), an active fourth-order asymmetrical crossover, and continuously variable input gain and high- and low-frequency trim controls. Retail: $999/pair.

Genelec 1029A/1091A: The 1029A/1091A Active Monitor System achieves high performance through the use of expert design and new manufacturing technologies. The system has applications for both home studio and professional installations. The 1029A's aluminum-injected enclosure contains multiple mounting options as well as Genelec's DCW technology, active crossovers and direct-coupled bi-amplified 40-watt output stages. The optional 70-watt, matching 1091A Active subwoofer extends the system response down to 38 Hz.

Quested VS2205: The latest addition to Quested's range of near-field, self-powered monitors, the VS2205 offers extremely accurate and natural reproduction, a wide listening area, high power handling and low user fatigue. Designed by Roger Quested, whose designs are found in studios owned by prominent musical artists around the world, the VS range has won the respect of studio designers, recording engineers and post-production professionals for its honest ability to present recorded material in an uncolored fashion.

Tannoy System 800: This high-sensitivity (92 dB), high-power-handling (180W) studio monitor is designed in the fundamental 50-year Tannoy Dual Concentric tradition. The phase-coherent, point source 8-inch Dual Concentric drive unit and innovative landscape cabinet design provide a natural sound field, detailed midrange, a superior overall tonal balance and deep bass extension. The System 800 provides the professional engineer with a useful tool to create well-defined, well-balanced mixes.

H. MUSICAL INSTRUMENT TECHNOLOGY

Akai MPC-2000: The MPC-2000 from Akai is an integrated sequencer/sampling drum machine that's the perfect solution for electronic music production or live performance applications. Priced at $1,495, the MPC-2000 combines a 64-track/100,000-note sequencer, 16-bit sampling engine (32-voice), and Akai's renowned pressure/velocity-sensitive finger pads for fast, creative production.

Alesis QS8™ Expandable Master Synthesizer: Combining an 88-note weighted keyboard controller with a powerful synthesis engine, this has 16MB (32MB expandable) of sounds: 640 programs, 500 multitimbral mixes and Alesis' acclaimed piano sounds. Load sounds via PCMCIA cards or import sample files with the (included) Sound Bridge™ software. Four effects buses, four audio outputs, serial port for direct connection to Mac or PC computers and an ADAT® Optical Digital output allow easy integration into the digital studio.

E-mu E4XT: E-mu's premier sampler/synthesizer represents four generations of Emulator technology. With 128-voice polyphony, 128MB sample RAM capacity, 1GB hard drive, and professional features like built-in FX, balanced outputs and AES-EBU digital

World Radio History

I/O, the E4XT can tackle anything from sound design to 32-part multitimbral MIDI sequencing. Thanks to EOS software, new features are added regularly, such as a 48-track workstation sequencer and support for sound ROMs.

Ensoniq MR-61/MR-76: These (61- or 76-key) weighted-action keyboards feature more than 1,200 sounds and include a built-in drum machine, full-featured sequencer and effects processor. Both products also have Ensoniq's SoundFinder interface, which makes sound selection a breeze, as well as the new Idea Pad™, which is always recording anything that is played on the keys. The Wave ROM can be expanded up to 86 MB using three Wave expansion board slots.

Line 6 AxSys 212 Digital Guitar System: The AxSys 212 offers a new approach to guitar amplification that physically models the sounds of the most popular classic amplifiers. Using powerful Dual DSP architecture, the AxSys 212 software preamp re-creates the audio characteristics of real tubes along with a comprehensive set of professional "rackmount" digital effects. The AxSys 212 combo features a 100-watt stereo (50W RMS/channel) amplifier with dual 12-inch custom-designed Eminence speakers.

Roland JV-2080 Synth Module: The 64-voice JV-2080 expands upon the worldwide success of Roland's JV-1080e—a standard among profesional musicians and composers—by offering eight expansion board slots, three independent EFX sets and dramatically enhanced ease-of-use. These features, combined with a large new backlit LCD and innovative Patch Finder and Phase Preview functions, makes the JV-2080 one of the most powerful sonic tools in existence for the professional synth market.

I. SIGNAL PROCESSING TECHNOLOGY

Amek 9098 Compressor-Limiter: Designed by Grammy Award-winning Rupert Neve and manufactured by Amek to his exacting specifications, the 9098's circuitry is firmly based on the principles established by Neve in his revered 2254 device, originally manufactured in the late 1960s. The compressor-limiter has two transformer-balanced channels with separate compression and limiting circuits. An innovative Ambience control enables the unit to be used to eliminate or minimize backgrounds and reverbant fields in stereo or mono signals.

BSS Audio Omnidrive FDS388 v1.22: The Omnidrive FDS388 Version 1.22 is a programmable, all digital, DSP-based loudspeaker management device that combines the functions of a stereo four-way crossover with parametric EQ, delay and protection limiting. Other features include a meteorology probe to sense changes in temperature and humidity and change delay and EQ parameters to produce a more consistent sound during changing atmospheric conditions.

dbx Blue Series 160S: Combining new designs with classic technologies, dbx compressors are the standard of the industry. The flagship of the premier Blue Series, the 160S uses a 32 matched-pair transistor implementation of the classic David Blackmer decilinear VCA, which has the performance characteristics one expects from the company that brought the audio community the VCA over 25 years ago. Distinctive styling and classic "dbx sound" made the 160S an instant success with audio professionals everywhere.

Lexicon MPX 1: The MPX 1 uses Lexicon's Multiple Processor FX Technology featuring two independent microprocessors—the proprietary Lexichip for the world's best reverb and a separate DSP chip for additional effects. Unlike other multi-effects, there's never a sonic compromise in reverb programs with the MXP 1. The MXP 1 features an interactive front panel interface, library sort/search function, balanced XLRs, 1/4-inch analog and digital S/PDIF connectors and full MIDI functionality.

Nightpro EQ$^{3\text{-}D}$ Dimensional Equalizer: One of the most exciting products in the audio industry in years, the EQ$^{3\text{-}D}$'s unique patented circuitry adds the presence and warmth of a performance back into the sound without distorting or introducing the negative effects normally associated with equalization. The EQ$^{3\text{-}D}$'s AirBand opens up the high-end, adding shine or polish to the sound, setting it apart from all others, with broad applications in film, broadcast, vocals, sound reinforcement and live performances.

TC Electronic Finalizer: This complete mastering toolbox in a single rackspace provides the finishing touch to mixes that you usually get from a professional mastering house. Finalizer optimizes DAT or CD-R masters, turning this often difficult task into a straightforward process. It combines 20-bit A/D and D/A converters, 5-band parametric equalizer, de-essing, digital radiance generator, gain maximizer, multiband expander/compressor/ limiter, auto-fade tool and dithering. Digital I/O is standard.

J. RECORDING DEVICES/ STORAGE TECHNOLOGY

Genex GX 8000: The Genex GX 8000 MO Disk Recorder sets new standards in digital 8-track recording. Only the GX 8000 can record at up to 24-bit resolution and 96kHz sampling rate, to deliver a dynamic range and frequency response that outperforms any other tape- or disk-based digital multitrack. No other recorder is better equipped to meet the needs of new formats such as DVD. The GX 8000 provides the ultimate solution in digital audio recording.

Marantz CDR620 CD Recorder: The next generation in stand-alone, write-once CD recorders, the CDR620 features built-in sample rate conversion, CD/DAT/MD/DCC subcode converter, level sensor for automatically incrementing from the analog input, 9-pin parallel (GPI) port for customized control and SCSI-II for connecting to most digital audio workstations or computers. Other features include 2x speed recording, AES/EBU digital I/O, digital cascading, index recording and a wired remote.

Nagra-D Series 2000: This professional, transportable, autonomous, 4-channel digital audio recorder is designed to high-quality standards for reliability, robustness and exceptional sonic performance, synonymous with the Nagra brand name. Capable of 24 bits-per-sample recording at sample rates from 32 kHz through 96 kHz, the Nagra-D has found its home on the sets of award-winning feature films, in concert halls preserving performances of the world's great orchestras, and in the equipment collections of demanding audiophiles.

Sony PCM-7040: Sony has added the PCM-7040 to its PCM-7000 series of time-code-capable recorders. Featuring four heads to allow confidence monitoring, the PCM-7040's newly designed transport offers improved tape handling. In addition to time-code-capability with SMPTE/EBU and film formats, a built-in chase synchronizer and a 9-pin RS-422 control port, the PCM-7040 has many standard features that were options on previous PCM-7000 recorders.

Studer D827-MCH MK II: Studer's fourth-generation 24/48-track DASH multitrack features a new autolocator, 20-bit A/D-D/A converters, tape cleaning stabilization guide system, improved tape transport, 24-bit Extended Digital Resolution capability, 180-second onboard sampler with edit track slip and track-bounce features, and MADI and AES/EBU interfaces. Field-upgradeable from 24 to 48 tracks, the D827-MCH MK II offers total DASH compability. Its NST™ Noise Shaping Technology provides the best sound quality.

Tascam DA38: Optimized for the musician and songwriter, Tascam's DA-38 modular digital multitrack utilizes the Hi 8mm tape format. The recorder features an electronic patchbay, digital track copy capability, track advance and delay plus a test tone generator. The DA-38 is compatible with all DTRS® recorders and can be expanded up to 16 machines (128 tracks). With the optional MMC-38, the DA-38 can be controlled via MMC commands and output MTC without sacrificing an audio track.

K. WORKSTATION TECHNOLOGY

CreamWare TripleDAT Version 2.3: Priced at $1,798, TripleDAT is a completely professional, fully featured DAW system for Pentium PCs. Features include multitrack recording, editing, mixing, DSP (80-bit real time), master, CD-writing and archiving. A smooth, slick interface is the result of five years of experience and 10,000 installations. Other features include free updates, optional plug-ins (FireWalkers™ expanded Signal Processing, Osiris™ real-time noise reduction and audio restoration/enhancement), upgrade path: 16 I/O (ADAT/analog).

Fairlight MFX3^{plus}: The Fairlight MFX3^{plus} is among the world's fastest digital audio workstations and is the first proprietary-based CPU to feature a PCI interface, allowing for high-speed networking between workstations. The MFX3^{plus} can be configured in a wide variety of ways to meet a broad range of budget requirements. It also offers individual function-specific software modules that allow users to invest in a fully configured workstation over time.

Roland VS-880 V-Xpanded: In 1996, the VS-880 sold 30,000 units in 10 months, becoming the best-selling hard disk-based DAW in history. By incorporating new and advanced functions, the V-Xpanded VS-880 Digital Studio Workstation offers more versatility than ever. Highlights include powerful mix automation, ten new effects algorithms (including a modeling program simulating the sound of vintage German condenser mics), new EQ and effects insert capabilities, and expanded editing functions for faster edits.

SADiE3: SADiE3 is the new software from digital audio editing specialists Studio Audio & Video Ltd. A free upgrade for all SADiE users, SADiE3 is designed to work across a wide variety of digital audio platforms manufactured by SAVL. SADiE offers a host of new features, including 96kHz sampling, streamlined editing tools and enhanced CD premastering functionality. SADiE systems are found in CD premastering, radio and film/TV post-production. SADiE users enjoy exceptional customer support.

Sonic Solutions SonicStudio Post: This PCI-based digital workstation provides audio post facilities with master-quality recording

World Radio History

and editing for music, dialog, sound effects and multitrack mixing/production. It includes 24-bit resolution, up to 96 channels of I/O, real-time crossfades and automated mixing. SonicStudio Post is designed to work in nonlinear, digital video and film production environments for both online and offline applications. File format support is included for QuickTime, AIFF and CMX.

360 Systems Shortcut: Designed to replace reel-to-reel tape machines for fast and accurate editing, Shortcut is a competely self-contained system including internal hard disk and digital/analog I/Os. Shortcut offers cut/copy/insert-style editing, with realistic scrub and 10 Hot Keys for quick access to finished spots. Features include stereo waveform display and traditional transport controls—in a 12-pound, portable package with mic preamp, built-in stereo speakers and headphone jack.

L. SOUND REINFORCEMENT CONSOLE TECHNOLOGY

Allen & Heath GL4000: Featuring 4-band, full sweep EQ with selectable Q midbands, all the "goesintas" and "goesoutas" that you would ever want in a great-sounding package, and a price that redefines "affordability" has made the GL4000 a hit with professionals around the world. All GL Series consoles provide the aux reverse routing and monitor wedge mix capabilities necessary for using the console as a full-function house, monitor or combination of the two.

Cadac F-Type Live: The Cadac F-Type Live production console combines operational flexibility with traditional Cadac quality. The compact, modular package (just 32.25 inches, front-to-back) can be extended and developed as required. Module options range from totally manual operation through Cadac's motor fader system, with comprehensive internal and external control facilities. The use of multiple configurable frames offers a versatile approach, permitting each desk to be tallored to the specification and budget of each new job.

Crest Century LMx: The first monitor console designed from the ground up to provide 100% multimode operation, the LMx can configure any or all of its 22 output buses for mono or stereo pair operation. The LMx has been developed with extremely low noise and distortion, extended headroom and automatic blending of room ambience for performers who prefer in-ear systems. The LMx features breakthroughs in routing and control, accurate and visible metering and a clean, logical layout.

Mackie SR 40•8: The SR 40•8 is a large-format, center-master section-style mixing console. The master control section includes a sophisticated group muting system, along with four complete, full-length stereo line "aux strips." Other features: Ultra Mute Section with Store/Preview/Snapshot/Clear/Enable switches and status LEDs, Talkback Section with routing switches and an integral, ground-isolated Clear-Com™ interface, and 12x4 matrix mixer. External power supply.

Soundcraft K2: Soundcraft's most fully featured, cost-effective live 8-bus console, K2 includes many features usually seen only on much larger consoles (advanced solo system, true left-center-right busing, meter bridge, matrix section and full 4-band EQ), making it ideal for applications ranging from touring to fixed installations. The desk is available in a choice of three frame sizes, from 24 to 40 mono input channels, with an additional eight stereo input channels.

Spirit 8: This 8-bus front-of-house mixer features up to 40 mic inputs, four assignable mute groups, 10x2 matrix and meter bridge as standard, along with 4-band dual-mid swept EQ with HP filter, six auxes and direct outs on every mono channel. Its acclaimed UltraMic Plus™ mic preamp accommodates +28dB of headroom and 66dB of gain with a low -129dBu EIN noise figure. Individual PCB construction allows easy in-field professional maintenance.

M. SMALL FORMAT CONSOLE TECHNOLOGY

Korg Soundlink DRS 168RC: This fully digital 16x8x2 console features two ADAT optical inputs, eight analog inputs with 18-bit A/D converters, two effects processors and full console automation. Standard is an assignable digital routing matrix; level control and metering, panning, two aux and effects sends, muting, soloing and output bus; 3-band EQ; 32 onboard algorithms: reverb, delay, distortion, pitch shifting and speaker cabinet simulation; fully automated mixing; and 100 scene-type memory settings.

Millennia Media Mixing Suite: The Mixing Suite is a Massenburg-compatible, logic-controlled modular analog workstation. Five plug-in modules are currently available. The Mixing Suite employs fully balanced busing with advanced discrete summing amplifiers of exceptional sonic purity. Intended for use in remote recording, large MIDI arrays and critical studio submixing, the Mixing Suite can be configured up to 80 inputs and is ready for remote automated faders, logic controlled remote muting, remote stereo soloing and surround mixing applications.

Oram BEQ Series 4: Following the successful BEQ Series 8 and 24 consoles, John Oram, acclaimed "Father of British EQ," presents the BEQ Series 4. Perfect for location recording and surround-sound applications, this innovative "Oram Sonics" is at the heart of the mixer's ultra-low noise and sound quality. Designed to meet broadcast specifications and featuring individual channel modules and transformer coupling, BEQ 4 is available with 8, 10 or 12 inputs, with four subs, stereo and mono outputs.

Soundcraft Ghost: Fast becoming the industry-standard in the project studio market, Ghost is available in 24- and 32-input frames, with an optional 24-channel expander module available. Ghost offers groundbreaking features derived from the acclaimed DC2020 console, such as MMC transport control and MIDI Mute Automation, while the EQ is directly comparable to Soundcraft's live consoles such as Europa and 3200. Ghost "LE" is a version without Transport Controls and Mute Automation.

Spirit Folio SX: Folio SX is a compact 20-input/4-bus mixer with 100mm faders, 3-band swept-mid "British" EQ with HP filter, and three aux direct outs that can be used as tape sends for recording. Features include UltraMic™ preamps and a mono output with level control for subwoofers or alternate mix feeds. Its hybrid use of surface mount and conventional components offers a higher density of features, yet retains Spirit's historic high-end sound quality.

Tascam M-1600: Designed for the home or project studio, this 8-bus mixer is available in 16- or 24-channel configurations and incorporates +4dBm balanced/unbalanced I/O on D-Sub connectors. The mixer has one stereo and four mono aux sends with four stereo returns. Each channel includes 3-band EQ with mid-sweep, insert points and TRS-balanced inputs. Channels 1 through 8 feature balanced mic inputs. Options include more XLR mic inputs and a meter bridge.

N. LARGE FORMAT CONSOLE TECHNOLOGY

Amek Rembrandt: This console delivers the best combination of audio quality, facilities and automation on the market today. Each module features a discrete mic pre, two automated fader paths, two 4-band equalizers, and addresses 16 auxiliary and 245 mix buses. The 40-module chassis therefore provides 80 fully automated and equalized signal paths; the 56-module chassis, 112 signal paths. Rembrandt also features Amek's Supertrue or Supermove automation, Virtual Dynamics, Recall and Visual FX.

AMS Neve Libra: This fully automated digital music production console is optimized for maximum capability at an attractive price. Its intuitive surface was designed from feedback gathered over the past two years from more than 250 AMS Neve digital console sites worldwide. Libra incorporates all the features needed for seamless audio recording and mixing, including integrated machine control and a wide range of digital and analog interfaces. Libra is available in 12-, 24- and 48-fader versions.

Otari Elite: The Otari Elite is a culmination of more than 100 combined years of console design experience. It is available in three task-specific models: the Elite Music, the Elite Film and the Elite Post-Production. The design brief was to deliver a large-format, digitally controlled analog console that looked and felt like a traditional analog console. A console with sonic integritry and a learning curve that is almost immediate.

RSP Technologies Project X™: This all-digital, fully automated 24-bus console features 128 snapshots, dynamic automation of all mix parameters, HUSH® noise reduction/gating, compression, 48-bit parametric EQ, panning and delay, internal effect processors, joystick panning, 5.25™ Circle Surround® encoding and 5.1 outputs. I/O options include analog (20-bit converters), TDIF, ADAT and AES/EBU. Project X has 8 aux, send/returns, optional PC interface and 8 channel mic preamps.

Soundtracs Virtua: This digital mixing console offers 64 inputs to mixdown and 48 full inputs with 4-band parametric EQ, dynamics, 8 aux sends, group and master inputs. Sixteen return inputs can be configured as eight stereos with level, balance, mute and master output. Forty-eight full inputs comprise 32 analog mic/lines and 16 digital inputs. The 32 analog inputs are individually remotely switchable between mic (on XLR) and line (on 1/4-inch jack) connectors.

Solid State Logic SL 9000 J Series: Engineered in pursuit of unparalleled super-analog integrity, the 9000 J exhibits barely measurable distortion, with noise performance approaching theoretical limits. The J Series computer provides an unprecedented amount of automated features, including Ultimation-style and small fader switchable VCA automation, Match 'n' Play switch automation, EQ and Insert Switching and Total Recall. The 9000 J attracts international artists and producers around the globe.

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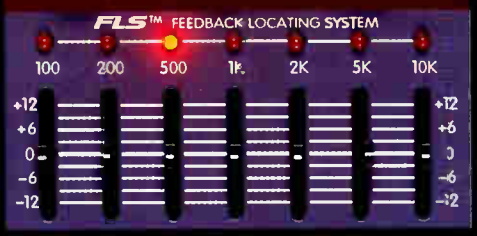

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BY TOM KENNY

POST·SCRIPT

SOUND FOR FILM

OPEN LETTER TO INDEPENDENT PRODUCERS/DIRECTORS

by Larry Blake

Dear Independent Producer/Director:

In March 1996 I wrote an open letter to film directors and producers on how they could get the most for their soundtrack dollars. While I was not intentionally focusing only on projects with large budgets, it occurred to me that I should write a companion column for those of you who must watch every penny.

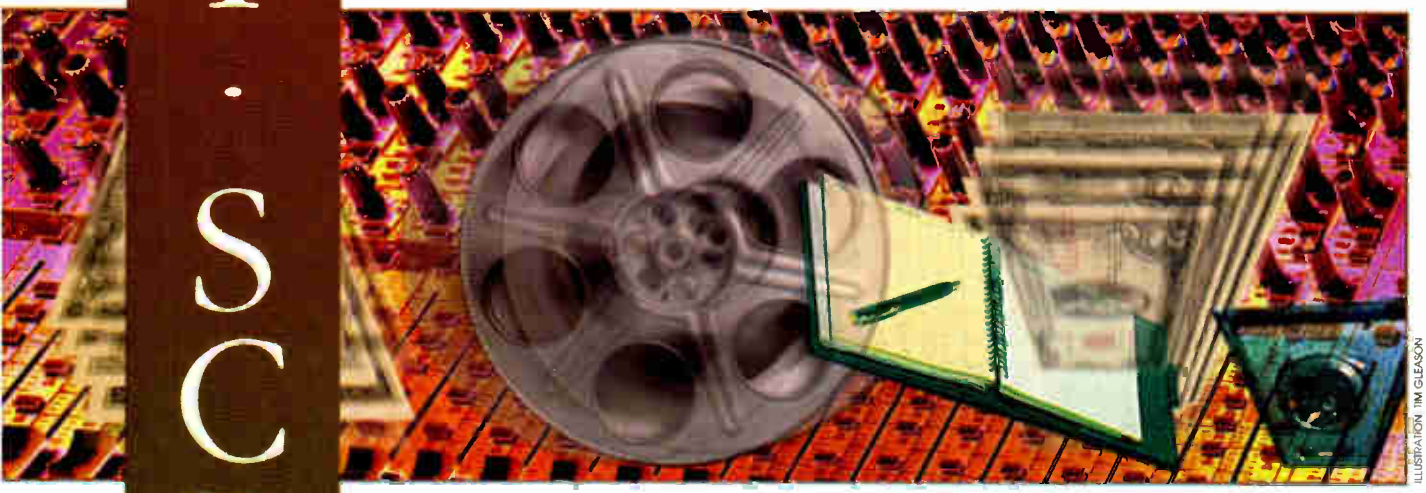

ILLUSTRATION: TIM GLEASON

Independent filmmaking has been around in some form since the '60s but has come into prominence only since the late '80s. Now, every October the Sundance Film Festival gets about 600 tapes from filmmakers hoping to get one of the precious few slots in the competition. And much has been said of how indie films dominated the Oscar nominations last year, even if *The English Patient* had a decidedly non-independent budget of over $30 million.

This column is aimed at those of you whose budget is south of $1 million—with a precious small lump sum allotted for all of post sound—and maybe, just maybe, it will help you finish your film without going back to investors one final time.

• **Start planning for post-production in pre-production.** Don't just put an arbitrary figure in your budget for post-production without first talking to the people who will be doing the work. You need to start a dialog with your production and post-production teams as soon as possible. You will save money by putting everyone—picture editorial, production sound and post-production sound—in touch with each other *before* mistakes are made. Picture editing departments can be somewhat cavalier about matters like the integrity of timecode on their EDLs and the signal path of the production tapes when transferring into the nonlinear edit system. These problems can be sidestepped with a little direct communication.

• **Let your audio post companies know what you *really* have to spend.** Budgeting post sound for big-ass Hollywood films is a snap because there is so much to go around. When budgeting for small films, it helps to know what money you really have to spend. I've had producers on medium-budget small films tell me that the overall budget was $4.5 million, when it was in fact $7 million. Similarly, when soliciting a bid, don't plead that you have "no money" and then go three months over schedule in picture editing before you lock.

Discuss the whole post sound process with your supervising sound editor even if he or she will not be mixing the show. I think it's a disservice to your film if you spend a relative fortune on mixing while holding the sound editorial budget at next to nothing. All things being equal, the preparation of the tracks is more important than the mix. As the saying goes, you can't polish a turd, and no mixer can make a cheesy effect sound good.

If you truly can't pay everything now, then you should expect to sign a deferral agreement taken from first dollar (i.e., before your investors get paid back).

• **Don't speak of the future when negotiating.** By this I mean don't say that after your film is a hit, you will return to the same facility with your next film and a bigger budget. You don't know—can't know—if any-

—CONTINUED ON PAGE 156

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DESIGNING EDIT BAYS

A STATE OF FLUX

by Loren Alldrin

To say that the audio post industry is in a season of transition would be a gross understatement. New technologies like DVD, 5.1/7.1-channel surround sound, high-definition video and digital TV are changing the rules of the game daily. Increased competition and dwindling profits have led smaller "traditional" music studios to gear up for audio/video post. Larger facilities, meanwhile, are embracing new technologies and standards with a cautious eye toward the future. The only thing that's certain in this game, it seems, is that nothing is certain.

Engineer Vinny Oliveri in Post Edge's Lexicon Opus suite, designed by George Augspurger of Perception Inc.

We spoke with three design professionals about the changing face of the modern edit bay. George Augspurger heads up Perception Inc., a Los Angeles-based firm specializing in acoustic consulting and design for film/video post and music production. Recent projects include Fotokem (Burbank, Calif.), Post Edge (Miami) and Doppler (Atlanta). Bret Thoeny is the principal of BOTO Design Architects, an acoustics and architecture firm headquartered in Venice, Calif. Notable BOTO projects include POP and Media Ventures (both in Santa Monica,

—CONTINUED ON PAGE 160

RICH OLIVER

DESIGNER ENGINEER

by Gary Eskow

His rooms are home to the creators of thousands of commercial scores, film dates and record sessions. Phil Ramone says his work is "great," and Keith Richards greets him with a hug and a "hello, mate." Still, triple-threat engineer, songwriter and audio architect Rich Oliver is something of a secret to those outside of the New York music scene.

Oliver's career path is easy to follow. Eschewing a chance to attend M.I.T., he followed a low road into the world of smoky nights and dirty panpots. An electronics buff since his early days, Oliver parlayed his math skills and engineering chops into a series of studio gigs that culminated with his work tracking the Stones on *Black and Blue* and *Emotional Rescue*.

In the early 1980s, Bob Blank asked Oliver to design what was to become Blank Tapes Studio A. Currently operating as Back Pocket Studios, this Oliver-designed room has been one of the area's most popular spot-scoring rooms for over a decade and has attracted more than its share of film and record dates, as well, with an emphasis on recording acoustic instruments. What made his first attempt at room design so successful? "I would say that my experience as an engineer and musician allowed me to come at room design from an angle that's a bit different from that of some of my colleagues."

Oliver's speech is inflected with bits of techno-speak and the kind of gutter talk that this writer, for one, is more comfortable with. Fortunately, he was able to reduce his design theory to a level that your run-of-the-mill cheesehead could deal with. "There are three major tricks that I've used in my work. First, although you have to have complete command of all the math involved in the business, you can't be a slave to it. Let's draw a parallel be-

—CONTINUED ON PAGE 168

A different look at Back Pocket Studios

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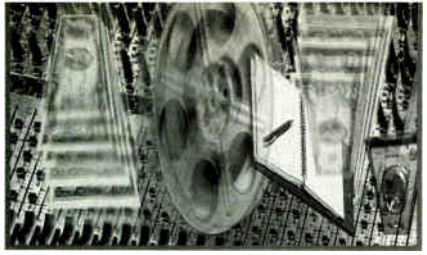

—FROM PAGE 154, SOUND FOR FILM

one is going to see this film, if you'll get a chance to make another or, even if you *do* make another, whether unpredictable forces will prevent you from working with them again.

Along the same lines, please don't tell a company that they should do your film for next to nothing because of the prestige of being associated with it when it becomes a hit. While we appreciate and understand your faith and hope for your film, which has probably consumed more than a year of your life, anyone who is worth using has a price tag on their time. Which leads me to...

• **Ask for advice from the best people, but don't expect to get their services personally.** If you have ended up in post-production with little money, you need to be realistic about wanting to work with the best in the field. You need to scale down your expectations for the same reason that you didn't include any large crowd scenes or extensive optical effects—you can't afford them. Vittorio Storaro probably wasn't behind your camera, either.

However, this shouldn't stop you from first calling the top sound editorial companies in the city where you'll be finishing; you never know who might be available, and very few companies want to pass up work. You might have the temptation to initially go to a low-budget post sound facility. Resist it and start with the best. A sound editorial company is a combination of talented editors and supervisors, plus a good library. More often than not you will end up with someone there who is looking for a break, which is something that you can turn to your advantage. The high-priced talent at those companies may not personally work on your film, but they will not let bad work pass through their doors and will keep an eye on the work of their protégés.

• **Beware of post-production packagers.** If you are unfamiliar with the world of post-production, you might be tempted to turn everything over to a company that will give you a package deal on all sound editing and mixing, in addition to picture negative cutting and answer printing. This is not the way to go. You should deal directly and separately with each individual company and not have someone else "sub" out the work. It helps to start your career by building direct relationships with vendors across the whole spectrum of filmmaking. You will be surprised by the amount of help and advice you will get.

You might be tempted to lean on someone to hold everything together, but let me assure you that you can do it. You don't need someone to package the post-production or hire a salaried post-production supervisor. My advice to all of you up-and-coming producers is to roll up your sleeves in post, just as you did in production. There are too few producers who do it all, and I know I can speak for the whole field of post-production in hoping that the next generation of independents includes producers and directors who deal with the process in a hands-on manner.

You are almost assured of a bad track if you don't spend the same care with hiring your production mixer as you do your director of photography or your picture editor.

• **Don't hire your brother-in-law to mix or boom your production dialog.** One of the most prominent and unmistakable hallmarks of low-budget films is bad sound. I'm not saying that you have to be worried if your track is not as loud or as big as that of your standard Hollywood Boy Movie of the late '90s; those tracks have their own set of problems and have nothing to brag about in the realm of dialog intelligibility and sonority. But you really tip your low-budget hand if the microphone is nowhere near the actors and the audience strains to follow what's going on.

You are almost assured of a bad track if you don't spend the same care with hiring your production mixer as you do your director of photography or your picture editor. There is the illusion that because the equipment is easy to use that anyone can do it—it just ain't so. You would never confuse knowing how to use a word processing program with writing ability; this would not even come up in hiring your writer.

You need to find the best production sound *team* that you can afford, and by that I mean don't think you're home and dry if you hire a mixer who knows what she's doing. The boom operator does more than 50% of the job; it is definitely not the place for your brother-in-law.

Once you hire a good sound team, support them. First and foremost, create an atmosphere on the set that will allow them to get you the best tracks possible. Don't allow the hideous phrase "we're waiting on sound" to be uttered by anyone on the crew, especially the DP, who has just spent two hours tweaking the lights.

Make sure that they get a chance to record production effects at every opportunity, especially difficult-to-re-create events such as crowd backgrounds. And don't let your first assistant director stop the recording of a wild crowd track after 30 seconds (half of which will probably be covered by crew movement). If it's an important sound, give them a minute or two, even more if variations (applause, murmurs, etc.) will be needed. It's *your* film, and these elements should not be pulled out of a sound library, which will never be as good as the real thing.

A whole 'nother level of trust in your sound crew will be revealed if you tell them that you do not want them to use any equalization on the original production recordings, other than a highpass filter to remove rumble. Let them know that you don't expect them to "save the film in dailies"; all you want is a good, clear recording.

To this end, make sure you listen with good headsets during shooting, an idea which might seem radical to you. Know what you are getting, and go away from each scene confident in what you have because...

• **You can't afford ADR.** Not to mention that everyone hates it, especially you and your actors. Outside of the substantial dramatic handicap of ADR, it costs time and money: to shoot, to

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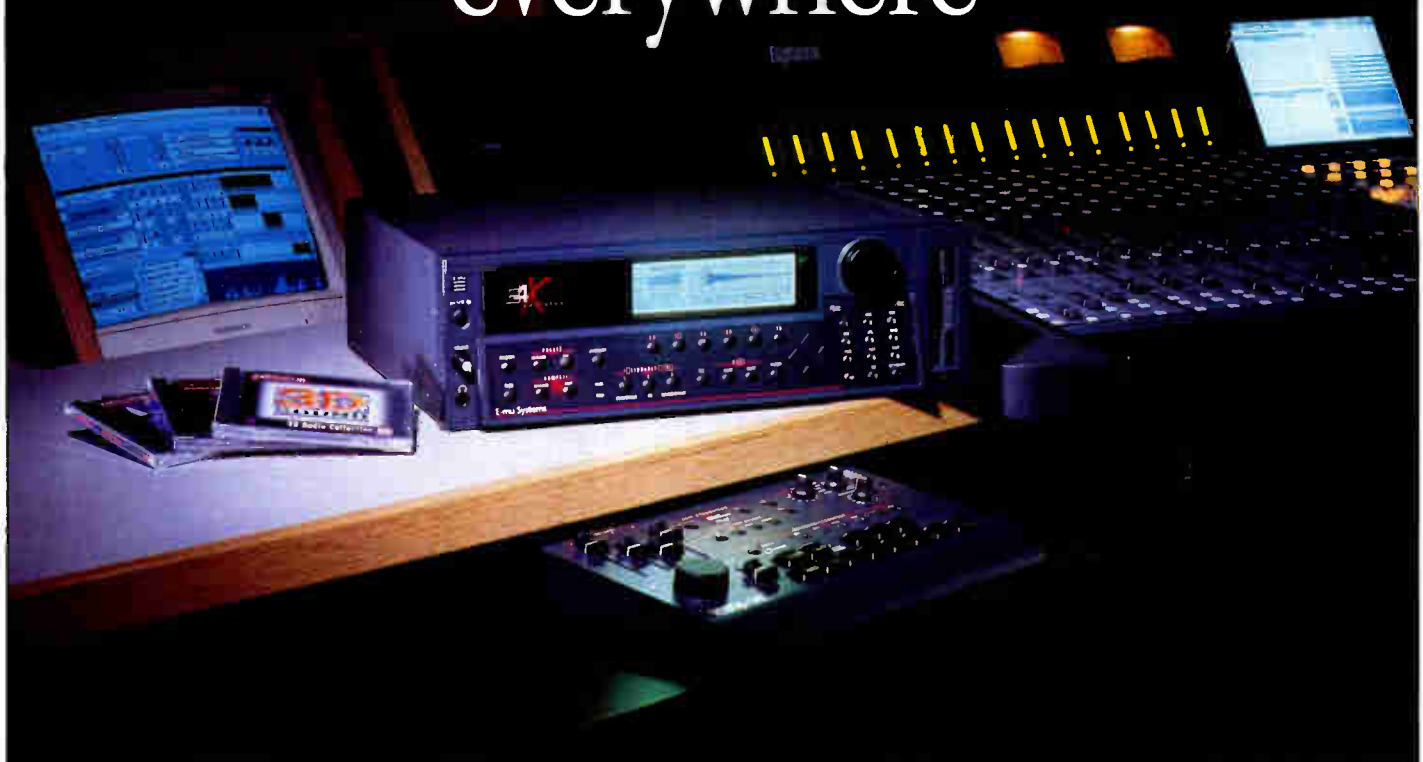

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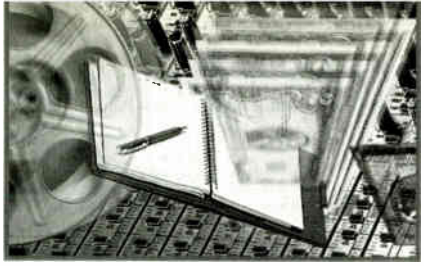


cut and to integrate with production tracks during the mix. Give your production crew time to shoot wild tracks, i.e., lines recorded without the camera rolling. Wild lines can be used to avoid the sound of practical machinery needed during a take, such as wind machines and generators, or to simply replace one blown word in an otherwise perfect take for picture and sound. Wild tracks are often indistinguishable from a sync take because the actors are in the right frame of mind (not to say pitch!) and the acoustics are, of course, a dead match—all of which are difficult to re-create in a studio months after the event.

There are times when for dramatic or technical reasons you must ADR material. In those instances, pick out which take is the print and which is the alternate, limiting yourself to only one.

• **Picture changes are *verboten*.** When you have very little money to spend on post sound, you should spend *none* of it dealing with picture changes. Any change, no matter how small, takes time. Lock your picture and walk away from it.

• **Make your film first, then worry about the soundtrack album.** You undoubtedly have many people whispering in your ear about a soundtrack album, pressuring you to cram songs into every corner of your film. Make no mistake—your film will be a success or failure on the strength of your story and the actors that you cast, not because of songs playing on the radio in the background. Don't waste your energy, much less compromise the film itself, in the service of a soundtrack album.

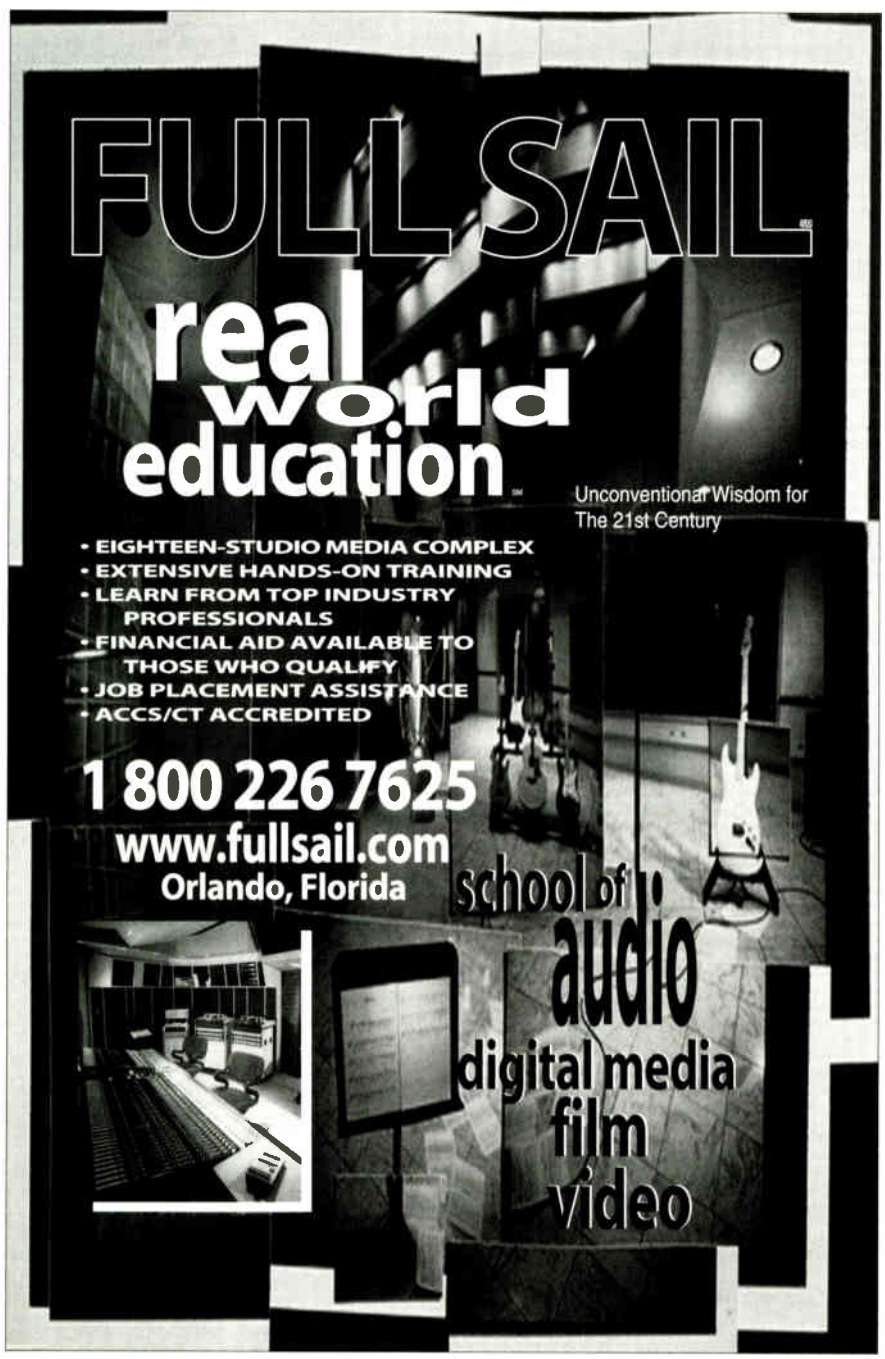
• **At the mix.** The mix is the first time that you will see everything coming together; understandably, it's a lot of fun. Try to respect the space itself and don't spend the whole time on the phone. A mix stage should be regarded as a set that is always in the middle of a take: The mixers need to have the complete attention of the room without having to worry about a problem slipping by because they couldn't hear! Have the operator hold all calls, which you can return during reel changes or out in the lobby.

As first-time filmmakers at the mix, it's very hard treading the line between obsequiously deferring to the mixers—"because they've done this before"—and bullheadedly telling them what to do in spite of their objections that they have tried your approach many times before and know it won't work. (I relish the story of one legendary mixer telling a very green producer in such an instance, "I've ruined more movies than you have made.")

The answer, of course, lies in having respect for each other's opinions and speaking up at the appropriate time. Often, this means *now*; not ten minutes later. This is particularly important when they're in the middle of a complicated sequence with a multitude of perspective and EQ changes.

• **Be aware of your eventual sale to foreign-language markets.** The final stages of post-production always breed feelings of just wanting to get the whole thing over with. But be aware that even after you finish your mix, there is still one more crucial sound element to make: the stereo music and effects (M&E) mix.

Any sale you get for overseas markets will specify a "completely filled" 4-track stereo M&E that is ready for the addition of dubbed languages. Good M&Es require background sound effects and room tone for every scene,



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not to mention virtually complete Foley footsteps and props. I think that, budget permitting, it's best to prepare and cut all of this for the original domestic mix. Not only will it be cheaper in the long run, but having everything there for the domestic mix gives you more options.

• • •

I have worked on many independent features in my career and indeed cut my teeth on *sex, lies, and videotape*, which is often referred to as the breakthrough film for modern independent cinema. While not every film will be lucky enough to have that level of success, first-time filmmakers need to be nurtured and supported. Please don't hesitate to write with any questions to 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 one of them would have to be that it smells good, unless you're talking about Bourbon Street.

—FROM PAGE 155, DESIGNING EDIT BAYS

Calif.). Vincent Van Haaff's Waterland Design Group does acoustic consulting, design and installation for music editing and effects facilities. Based in Los Angeles, Waterland has designed rooms for Capitol Records in L.A. and Sony Music in New York.

SMALLER SPACES

One trend spotted by these designers is a move toward putting more functionality into smaller rooms. This may come about as a traditional music studio is revamped for audio post, or as stereo post rooms grow into surround-compatible suites. "Today's editing rooms have to meet the established criteria that we've used for years," says Augspurger. "The major practical difference is that most new video production facilities are trying to fit their various functions into much smaller spaces than we're used to working with on a film lot. A great percentage of these, by a wide margin, are facilities that are built in existing buildings, usually conventional high-rise office buildings. There are inherent problems in terms of sound isolation, keeping background noise down, getting enough space for a decent voice-over booth, etc. There's a surprising amount of film audio being done in rooms about the size of an average bedroom."

"The problem I'm facing as rooms are being changed over to handle surround," says Van Haaff, "is people trying to cram more in a room than it was originally designed for. Some clients have experimentally set up their surround systems in an existing room that was designed for stereo only. Suddenly, they have rear speakers they need to match to the front speakers, so they may try a smaller speaker in the front—we get these tripods all over the room, as well as a bunch of subwoofers and amplifiers and effects equipment which still have to be located. Everything is then presented to me and they say, 'Can you make this built-in?' Of course, as soon as you build something in, it also changes the shape and acoustics of the room—the resulting sound may not match the experiment they were so happy with. It's a huge problem, and I often end up recommending that we just start from scratch."

"Thanks to the digital audio workstation," says Thoeny, "there's a proliferation of these smaller editorial rooms.

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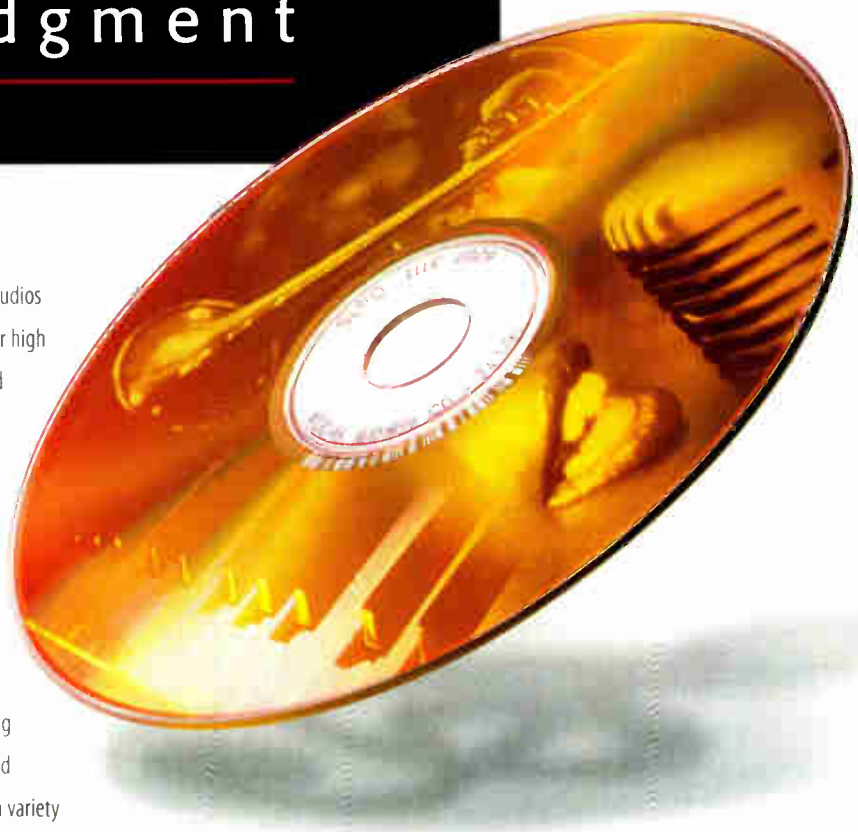

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Clients can now bring facilities in-house with a minimal investment and perform music editorial or sound effects or dialog or whatever right there. This gives them more control over the quality of the project as a whole. This is probably the biggest change I've seen lately."

As far as the facilities themselves, Van Haaff sees a trend toward *larger* floorplans. "I feel that more space is allocated to what used to be almost a side-arm of the overall production process," he says. "We see much more emphasis on the visual and sound effects—their editing has become so important. To keep track of all the elements that are going into the production, there are also prerequisites for more staffing, more assistants...A larger space is a necessity at that point, just to keep the whole thing rolling together."

THE MULTIPURPOSE ROOM

As technology brings change, facilities and rooms seem to be fine-tuning their focus in two completely different directions. At some levels, rooms are being revamped to handle numerous post roles; at other levels, rooms are being designed to specialize in far narrower facets of post audio. Augspurger says, "The larger organizations and a lot of the music studios—that is, the album recording studios—are building multiformat rooms, where they can do anything from album mixdown in stereo to album mixdown in three-plus-surround, to DVDs to TV audio, even film audio."

On the flip side, Thoeny sees many of his clients moving toward a higher degree of specialization. "We don't do much designing of 'multipurpose' rooms," he says. "We are still designing rooms that are very specialized—this one for music editorial, these are for Avid, these are for animation effects. The facilities want clients to know that a room was designed specifically for music editorial or high-end graphics, for example. Bigger companies in the major areas—New York, Chicago, L.A.—are very diverse, but the individual rooms are still very specialized.

"Out of the mainstream," he continues, "rooms can be more multipurpose. One day the room is doing one thing, it stays empty for a while, then they get a new project and are doing something else. At the lower end, I see more rooms that are trying to be all things to all people. You used to be able to make money recording music in the '80s; now many recording studios are in a tough business because they can't get enough per hour for their million-dollar consoles. They're getting into music editorial and Avid editing out of necessity."

"I am anticipating that much less music-only mixing will be going on in the facilities we're designing," adds Van Haaff, "but that mixing will be a complete joint affair. The visual will be the precedent for the musical in many cases, rather than the other way around. MTV came out of the idea of adding visuals to the music; it seems that visuals are almost becoming the forefront product for music. Music production is becoming more like the motion picture world, where the musical score is an important part—if not the *most* important part—of the film.

"At the moment," Van Haaff continues, "there is a very close integration between video and musical final products. We are integrating the visual side of the environment into the musical rooms more and more now, as clients request to do video/film editing in conjunction with the actual musical mix. It's not uncommon for the producer to want to have the TV mix, the MTV mix, the stereo for musical programming as

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well as the surround mix."

"There's a trend for the high-end digital edit bays—Flame, Harry, Henry—to involve sound, too," echoes Thoeny. "We're doing new Henry bays for 5.2 Post in Hollywood, and they want surround sound in *all* their rooms. Their clients want to be able to hear music videos played back in surround as they're editing."

FORMATS AND BEYOND

Driving many of the changes in audio post is the topsy-turvy world of audio encoding formats. "When it comes to formats," laments Thoeny, "everybody's confused. I just finished a DVD center, the first one that we've done. It consisted of two quality-control rooms, two production rooms and a 'living room,' a place where they can play back DVD discs like a consumer would. In spite of their commitment to DVD, they still wanted to keep very flexible for the different formats that they develop."

"The big concern," agrees Augspurger, "is whether or not DVD will be the next big consumer format, and whether we really will have to make five discrete channels."

Van Haaff sees clients thrown off-balance in the face of so many audio encoding options. "I deal with a lot of rooms that are put together with a flexible 'loudspeakers on stands' approach, almost haphazardly and with very little correlation between rooms," he says. "With music, there is some sense of a standard, a room volume that has almost become a prescription for success. With the new surround sound encoding technologies, I don't think such a prescription has been established yet."

Thankfully, many of the changes to the modern edit bay in recent years have been for the better. "The acoustic aspects of edit bays have definitely become more important," says Van Haaff. "A few years ago, the big question was one of placement of equipment so that the operators had a sense of control from a central point. More and more, we see that there is an understanding of the importance of the acoustics of the space. Video operators and editors are starting to discern the acoustic element, and producers are starting to ask for more correlation between the visuals and the sound." ■

Loren Alldrin is a Nashville-based writer, engineer and producer.

POST NOTES

Fairlight had record sales at the NAB convention in April, taking in more than $4 million in orders for the week and placing 75 systems for the month, most of them in the post community. Highlights included 96 channels of MFX3^{plus} and more than 500 channels of DaD, the digital dubber, for the new stages of **Creative Cafe Wilshire**. Also, **Westwind Media**, the hot L.A. sound for television facility, purchased three MFX3^{plus} systems and six 24-track dubbers...**Warner Bros. Post Production Services** bought two 88-in/72-fader AMS Neve Logic Digital Film Consoles for its long-form TV stages in Burbank; and WNDH in Boston purchased a 55 Series board for its live news programming...**Synchronized Sound**, a three-room Atlanta facility, took delivery of the first Amek Galileo console in the U.S., with full 7.1-channel surround monitoring section, and put it in Studio B...The technical committee of the Academy of Motion Picture Arts and Sciences upgraded the monitoring system at the flagship **Academy Theater** in Los Angeles, selecting JBL 4675Bs for

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At left: one of two AMS Neve Digital Film Consoles at Warner Bros. Post-Production Services. At right: The Academy Theater, recently upgraded with a three-way JBL speaker system and CyberLogic NC-812 amps.

the subs, a JBL 5674 three-way system across the front and 32 channels of CyberLogic NC-812 Series Power Systems for amplification...Panasonic selected Graham-Patten Systems to provide 52 D/ESAM 820, 400 and 230 Digital Edit Suite Audio Mixers for use in broadcasting the 1998 Winter Olympic Games from Nagano, Japan...Martinsound acquired an exclusive license to manufacture, sell, service and support ADR ControlPro and SpottingPro, developed originally by Lartec Systems...Audio Toys Inc. reports sales of several Pro° signal processors to Noisy Neighbors in Hollywood, where mixers make use of the preamps; and the company recently delivered 24 custom modified 8MX2 mixer/preamps to Unitel for use in their remote vehicles... **Todd-AO Video Services** signed a $5-million annual/two-year agreement with Buena Vista Home Entertainment to provide post services, including audio...**Leslie Ann Jones** joined Skywalker Sound, where she will mix and manage the scoring stage...Composer David Livingston and Marc Altshuler, both formerly of JSM Music, have opened DV8, a music/sound design company in Los Angeles. The composer roster includes the Dust Brothers, Joy Askew, Bill Purse and Alan Elliott... **Magnetic Music** and **Magnetic North** have consolidated in the latter's Toronto facility...**Steven Heinke** has switched from Bad Animals Seattle to Pure Audio, where he will be sound designer/senior engineer...Speaking of Bad Animals, sound designers Dave Howe, Mike McAuliffe and Tom McGurk took home another Emmy for work on *Disney Presents Bill Nye the Science Guy*...Check out **Wild Woods Digital Audio Post Production**'s Web site at www.wwoods.com...**Music Annex** sound designer/mixer Jon Grier, assisted by Mark Lindow, put the audio to three new bumpers for *Discovery Kids*, produced by Colossal Pictures...Across town at **DubeyTunes**, Vance Walden and Hunter Pipes recorded and mixed a series of national radio and TV spots for Starbucks Coffee...Ron Bedrosian (ADR/Foley), Dan Wallin (music) and Stan Kastner (effects) of **Olympic Sound Studio**, Los Angeles, mixed the romantic comedy *Till There Was You*. Sound Dog's Bob Grieve and John Sisti were the sound designers...Peter Fish of **National Sound, NYC**, created original theme music for half the new episodes of *CBS Eye on People*. ■

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STEPHEN CROES - Producer, Arranger, Engineer - Stevie Wonder, Fleetwood Mac, Kenny Loggins, ... *"The Indigo EQ2011 equalizer and C2021 Compressor are exceptional - both responsive and flexible. I can stomp or be subtle - hype a sound or just detail it. The EQs highs are especially sweet and the tube warmth translates to rich mids and lows. The compressor design is fast and friendly, great on drums, percussion and guitar. These are real tools for any level of music production."*

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No helmet, no hands. Rich Oliver doing acoustic calculations.

—FROM PAGE 155, RICH OLIVER

tween tuning as measured against a tuning fork or electronic tuner, and the way a guitar player in the real world works. If he's going to be playing a song in the key of E using barre chords toward the top of the neck, for example, the player will tune his instrument to that piece of music. Of course, he'll refer to the tuner and use its mathematical basis as part of the tuning process, but he won't be a slave to it.

"I use an analogous approach when I design a room," he continues. "I'll take the blind math and expand it to an extended musical staff—a big one with super-huge note values standing for the Hz centers. You have a problem at 500 cycles? That's approximately C5. How important is that note in relation to the other notes that will be used in the room? An engineer knows that cutting and boosting frequencies always involves compromise based on the relative importance of parts and frequencies. When I'm designing a room, I'm looking ahead, trying to make things easier for the engineer who'll be working there in the future.

"The second trick is to avoid standing waves not by relying on padding the walls but in the design of the room itself. You want to simplify the construction process wherever possible and minimize the use of traps.

"Finally, I try to design not a control room but a premastering room. Almost every control room has third-octave EQ on their speakers, but none of my major rooms do. I try real hard to make the room sound correct without any EQ. You should be able to hear an oboe, a kick drum or the Dalai Lama screaming in your room without needing any EQ to make it sound right!"

Oliver's conviction that a designer should blend empirical knowledge with real-world experience has been influenced by his work with some of the top musicians of our day. "Let's consider Keith Richards for a moment," he says. "When I tracked his guitar work on *Emotional Rescue*, I found him to be absolutely focused on his sound but not wed to a preconception of what it should be. By that, I mean that he would insist that we tinker around until the sound was one that he felt

—CONTINUED ON PAGE 237

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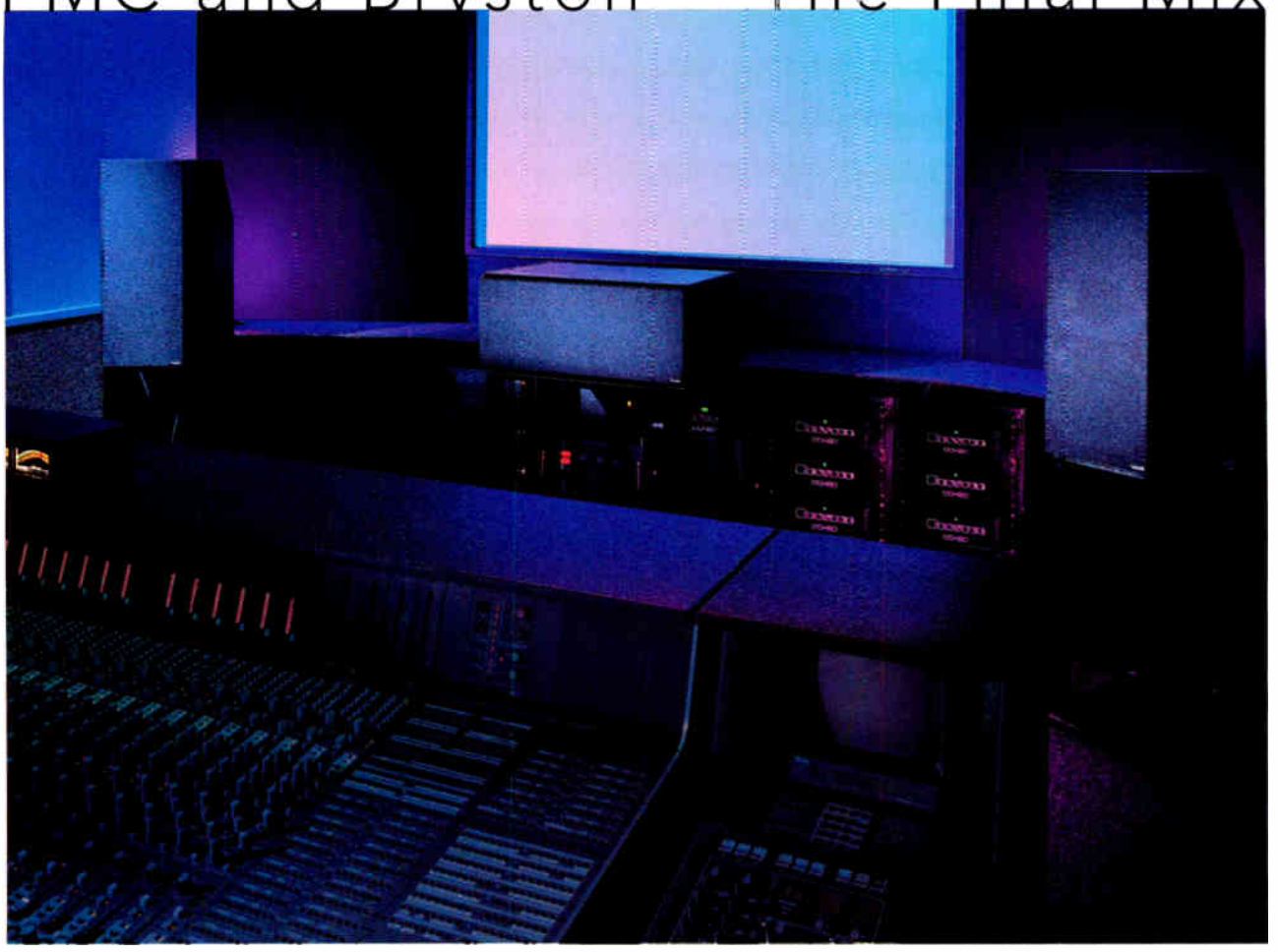

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New Audio Products For Film/Video Sound

MAXELL TAPE HEAD CLEANER

Maxell (Fair Lawn, NJ) has developed an environmentally safe, non-chlorine-based cleaning solution for magnetic heads and transports of professional VCRs and digital audio tape recorders. Available in 30ml, 250ml and 500ml bottle sizes, and in a 150ml size with an optional spray dispenser, Maxell's new CL-S solution is non-flammable and harmless to rubber and plastics. A single application is said to render tape heads clean and debris-free for more than 100 hours of tape running time.

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MCS RACK MOUNT COMPUTER ENCLOSURES

MultiMedia Computer Solutions Inc. (Haskell, NJ) announces three models of rackmount computer enclosures. The MCS 9500 ($525) and MCS 9500/H ($495) are designed to house the Apple PowerMac 9500 or 8500, but can accommodate any tower configuration less than 17.5x10x18 inches. The MCS 9500 occupies 10U of rack space and includes a storage compartment; the 6U MCS 9500/H mounts the PowerMac CPU horizontally. Optional front panels conceal the CPU yet allow access to disk drives and reset button.

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ADR CONTROL/ SPOTTING SYSTEMS

Martinsound (Alhambra, CA) has licensed ADR ControlPro and SpottingPro from LarTec Systems. The two systems automate a number of routine functions during ADR and Foley sessions. New features include support for nonlinear audio/video replay and a 9-pin serial control interface.

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SPOT SOFTWARE

Entertainment Data Solutions' SPOT software (distributed by Tracer Technologies, York, PA) is a playlist preparation program that allows users to capture frame-accurate hit points and descriptions while locked to SMPTE timecode. Features include Event Mover, Project Editor, View Filter and Import/ Export and sophisticated database functions provide shortcuts. EDLs may be printed and on-screen help is always available. Price is $495.

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HOLLYWOOD EDGE EFX

The Hollywood Edge (Hollywood , CA) introduces two new six-CD collections, the 3DSFX library of hard-to-find sound effects, and The Historical Collection, which includes dozens of effects from Academy Award-winner "Braveheart" and many gothic and medieval sound effects.

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LOCALIZER 02R PLUG-IN

Localizer, from Zeep.com (Paris, France) is a plug-in for Yamaha's 02R Project Manager program and runs on the Apple Macintosh or compatibles. Supporting the most popular multi-channel output formats (LCRS, 5.1 Stereo Surround and Quad), Localizer allows complex panning paths to be created and repeated. A demo version of the software may be downloaded from http://www.zeep.com.

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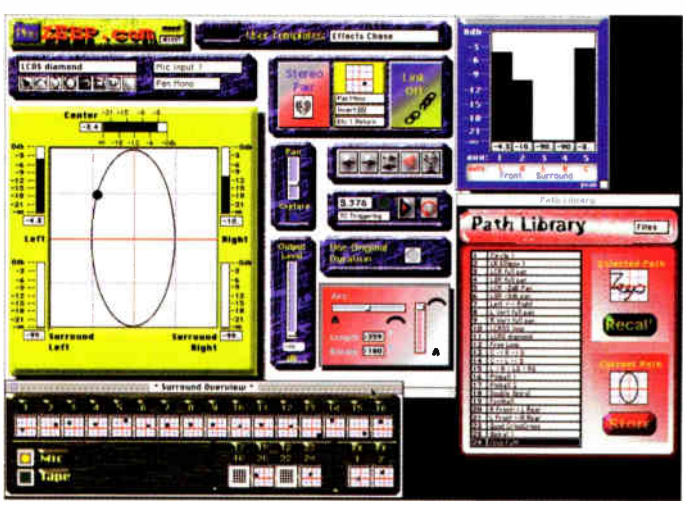

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NEW-VENUE WISH LIST

A SOUND ENGINEER'S PERSPECTIVE

Ever walk into a venue for the first time and wonder how much better it could have been if the manager or owner had a background in live sound? All too often, it appears that basic criteria that would enable sound equipment to work well in a new venue have not even been considered. Now, as Dennis Miller would say, I don't want to get off on a rant here, but...the equipment alone makes up only one part of an acoustic system that determines how live concerts will sound. The rest of the sound system is the room. Anyone who's provided sound services knows one secret to success is to get a speaker pointed right at the mix position. Getting at least one horn pointed at the mix engineer's head goes a long way, but what about the way the room, the speakers and the mix engineer's ears interact?

Distance is the enemy in venues where SPL is an issue. Promoters and venues often force the mix engineer to operate at the back, sides or balcony, which often doubles the distance from which the engineer is listening. It also increases the effect of the reverberant field while reducing the direct sound from the P.A. At extreme distances, room effect overpowers the direct signal from the P.A. Many engineers try to punch through the haze, raising the level of their mix by 6 dB or more in trying to compensate for a bad location, but making the P.A. louder actually has little or no effect on the critical distance at which the "room sound" takes over. Thousands of dollars can be spent for marginal improvements to a venue's acoustics, only to be erased by a couple of quick fader moves. Putting the mix position in a good seat instead of the worst makes the system sound better, which may, in turn, lead to reduced volume for all.

Placing the mix position closer to the stage also forces the engineer to come to grips with factors that can't be controlled directly from the FOH console, like the sound coming off the stage from backline and monitors, which can only be turned down by dealing with the people on the stage. By making it a shorter walk to the stage, it encourages the FOH engineer to make that trip more often to talk to musicians or monitor engineers and explore the area where worlds collide and where the "best" seats happen to be.

The "up close and personal" mix position sacrifices a few good seats, but with a tiered floor plan, this can be accomplished in a relatively small footprint with a minimum of blocked sight lines to the stage (and no loss of revenue from the "good seats"). Many casino showrooms have acknowledged this fact, dropping a booth into the center aisle at a cross-aisle, where a higher level of seating begins. This places standing engineers below the height of seated patrons behind them. Even without elevated seating, placing the mix position so that an aisle is behind it helps keep that aisle clear, making the usual traffic to and from it easier and less intrusive to the audience.

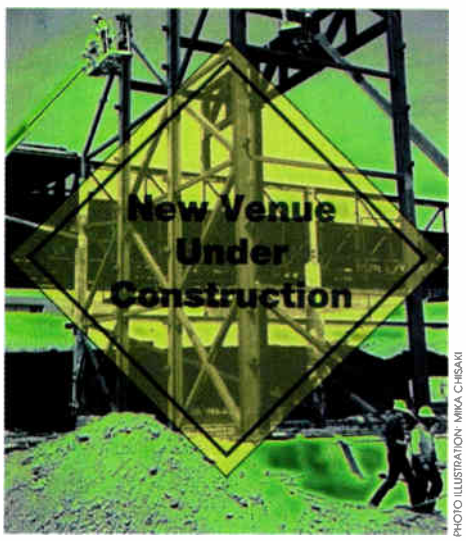


PHOTO ILLUSTRATION: MIKA CHISAKI

• How about the effects that low voltage or a dirty neutral has on the sound? Amps run out of poop early, digital gizmos begin dropping errors, and distortion goes up long before the whole rig goes south. A dedicated audio electrical service is often an afterthought, usually put in for the lights when the venue's service can no longer support the demands of typically overblown lighting plots. Isolation and grounding for the audio service can seem like an exorbitant expense to most facility managers, but it can be charged off to events as an electrical hookup charge and is well worth the expense in rooms that regularly put on live productions. When the alternative is renting a generator, promoters quickly see the light.

• For the sound engineer, it is imperative to have a speaker system that is directional enough to control the dispersion of frequencies to cover the audience without spraying the walls and ceiling. The best way to do this is to lift the speakers up in the air. The reason speakers go in the air is not just to increase seating capacity or to keep drinks off them. Almost as famous as the Fletcher-Munsen curves, the Inverse-Square law dominates the coverage behavior of most sound systems, with speakers delivering only a quarter of their power at twice the distance due to the spherical distribution of sound propagation. Raising the main speakers above the audience plane reduces the differences between the closest and farthest listeners. Halving the difference in the front-to-rear distance ratio from 4:1 (stacked) to 2:1 (flown) can reduce the difference in SPL from front to

—CONTINUED ON PAGE 176

BY MARK FRINK

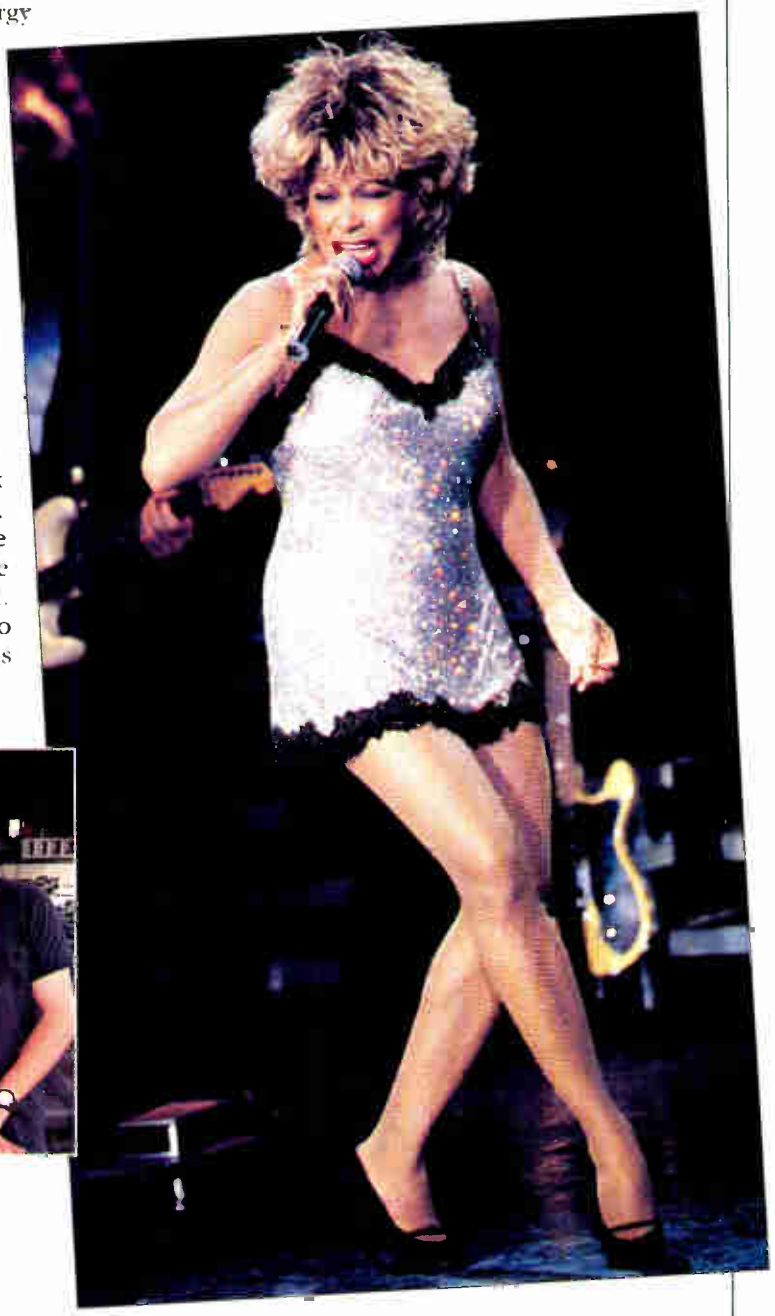
World Radio History

TINA TURNER'S WILDEST DREAMS TOUR

Capturing Energy Through Sound

Tina Turner is known for her high intensity and strength as much as her music, and that energy translates into a hectic, extensive touring schedule. Since March '96, she's performed more than 200 sold-out concerts worldwide, from New Zealand to Tasmania to Singapore to the Kremlin. She's now finishing up the U.S. leg of her Wildest Dreams tour, joined by opening act Cyndi Lauper. The tour showcases Turner's band of seven musicians and three dancers/back up singers and also features her biggest stage set yet, which is dominated by a huge backdrop in the shape of a human eye, the iris a Jumbotron video screen alternating various vintage film images of Turner with live feed.

Sound for the tour is being provided by Clair Bros. (Lititz, Penn.). Front-of-house engineer Dave Natale has worked for Clair Bros. since 1978, and has been on every Tina Turner tour since 1985 ("I think I've mixed 'Nutbush' 1,300 times," he says); last year, he spent some time mixing Bush (for details on the Bush tour, see the Tour Profile in *Mix*, July '96) before joining Tina Turner in South Africa for the tour debut. (When asked about the difference between the two tours, he says that on the Turner tour, "audiences don't throw Coke bottles around as much.")



PHOTOS: STEVE JENNINGS

L to R: Kirk "Eek" Shreiner, Dave Natale and Chad Shreiner

Natale says the audio production for the tour is straightforward; not many effects are used. He is mixing on a Yamaha PM4000 console, and his gear consists of two TC M5000s and three 2-channel Aphex 612 gates. As for Turner's voice, there's "not much going on, nothing to it," explains Natale. "She sings into a Shure 58, right into the console, no limiters, nothing, just EQ and a little reverb—TC M5000." Two dbx 160XT limiters are installed in his effects rack "to fill in the blank rackspaces," according to Natale.

Background vocals are also miked with Shure 58s. The saxophone is miked with a 409, built into a wireless pack; guitars are CAD 200s, and a Leslie cabinet is miked with a single

BY SARAH JONES

World Radio History

Beyer 88 for lows and Sennheiser 409s on high left and right. As for drums, the snare is miked with the standard 57, kick is an 88, toms are 409s, hi-hat and ride are AT 4041s, and overheads are AT 4033s with 8441 clips. Natale says that the Audio-Technica mics are the only pieces of equipment he hasn't used on tour before, and he's been pleased with their performance. Keyboard inputs are via Pete Cornish DIs, and the harmonica is miked with a Green Bullet. Bass, piano, drum machine and acoustic guitar DIs are all Countryman units.

Sound levels for the show are "as loud as I can make it," says Natale. "If you take all the harsh elements out of it, nobody cares how loud it is." He adds that the enthusiastic crowd is often much louder than the P.A. system.

Natale also mixes FOH for Cyndi Lauper, and says it's pretty much the same production for her, with the addition of a limiter on Lauper's voice. The console is a PM3000, and effects include Yamaha SPX 990s, a Yamaha REV5, three 2-channel Aphex 612 noise gates, five dbx 160XT limiters, and one Anthony DeMaria Labs C/L 1500 tube limiter.

Lauper is also using a FutureSonics wireless system, and singing into a Beta 58 head on a Samson UR5 receiver. "It's good because it has multiple channels," says system engineer Chad Shreiner. "Some wireless systems are limited to certain channels, and if you're in a venue where you have RF problems, you're going to have a lot of problems. This way, we can come in another channel; we like that a lot."

Shreiner flies the P.A. and assists Natale: "The monitor system, it's constantly changing. With Tina, it's like being the FOH engineer for her on the stage," Shreiner explains. "You're constantly mixing things, turning things up, down, on, off nonstop. You have to watch it all the time. She's wild with the microphone." Monitoring is certainly a mixing challenge: 16 monitor mixes are fed to the 40 Clair 12AM wedges onstage; 18 of those wedges are set across the front of the stage for Turner, who never stops moving all night. She has tested in-ear monitors in the past but prefers wedges. "Tina's from the old school; she likes to have the boxes in front of her," Shreiner says.

The main P.A. is a Clair Bros. system, consisting of 72 S-4s—32 P long-throws and 40 F short-throws—all carefully flown to avoid blocking video sight lines. The drive rack includes four CBA CTS S-4 crossovers, two Electro-Voice XEQ-3 frontfill crossovers, six TC Electronic 1128 programmable EQs and a TC 1280 stereo delay for front fills. Four MB 215 sidefill bass cabinets and two Clair M-4 mid/high sidefills are powered by Carver 2.0s. Interestingly, Natale mixes the sidefill monitors from his FOH position, off an effects send, post-fader. "I know all the cues, when to turn what up and down—she likes how it sounds," he explains.

Sax player/percussionist Timmy Capello is the only bandmember using in-ear monitors; he uses a proprietary Clair Bros. system. "He likes to run around onstage; by having the in-ear he can do whatever he wants," says Shreiner. "We have Clair in-ear monitors, our own design. Some people don't like them because they don't get loud. A lot of people want to put them so loud that they really damage the ear, where ours is nice and clean and crisp." Capello does remove the in-ears during an acoustic set, when he listens through the sidefills. In addition, he has his own effects rack: "We have TC EQs; Timmy likes a lot of high end. There's also a couple of [Yamaha] SPX reverbs," says Shreiner.

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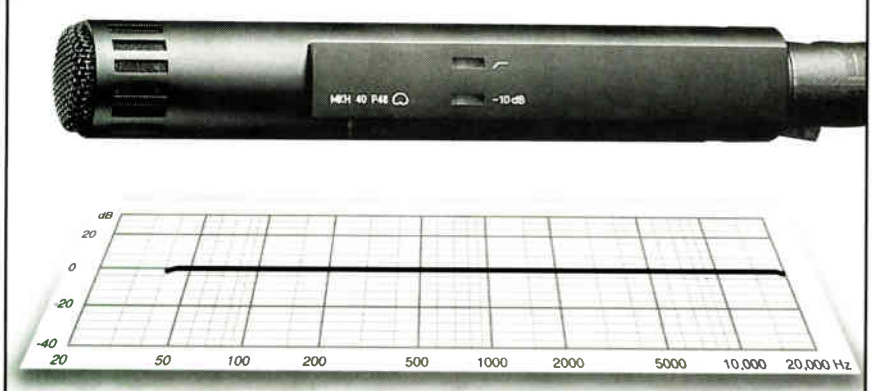

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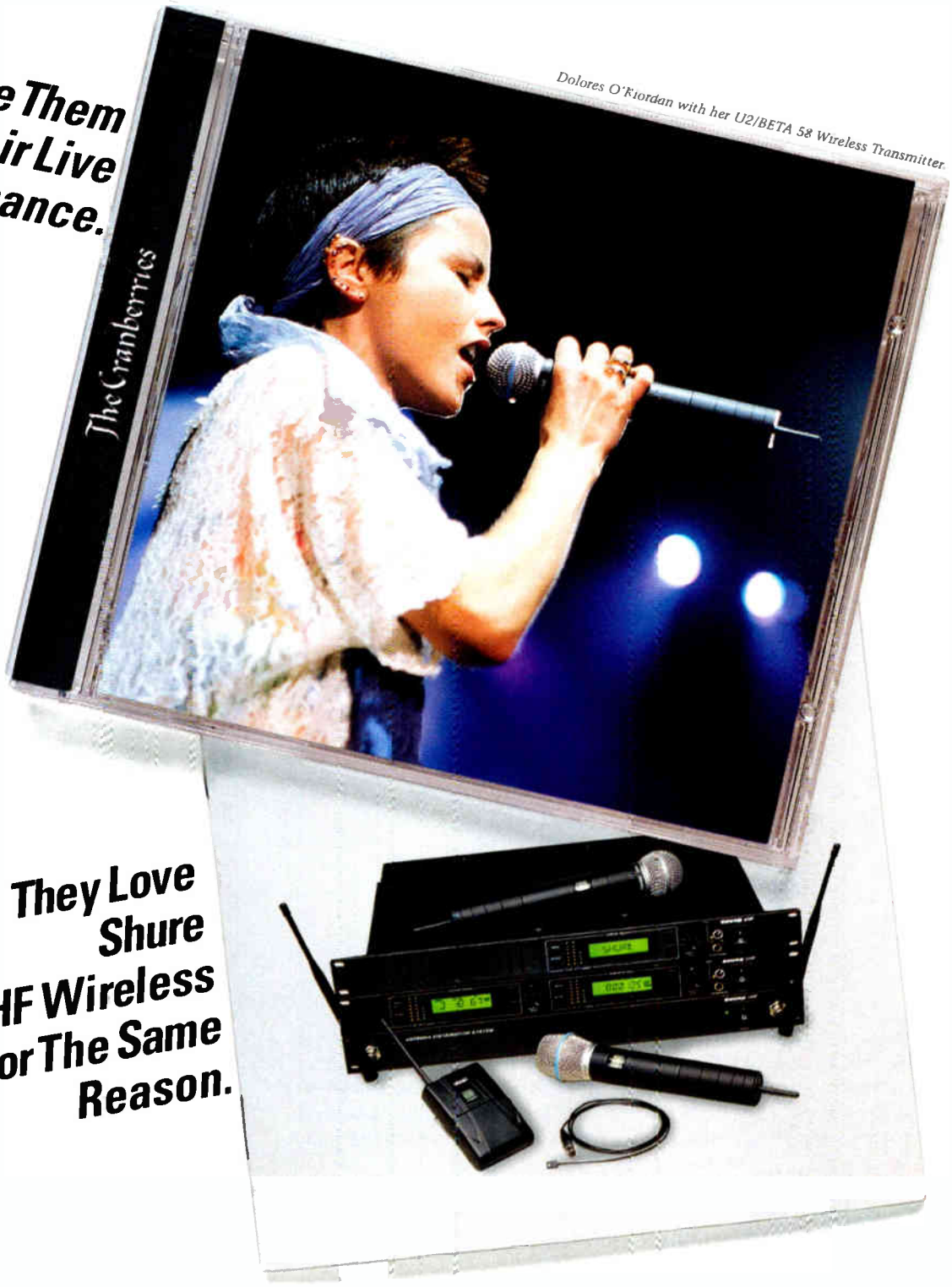

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Monitor mixer Ed Dracoulis mixes on a Yamaha PM4000M (a Ramsa S 840 is used for Cyndi Lauper) with some basic effects units in his rack: four Aphex 612 gates, one dbx 160A, one dbx FS900 with two 903 limiter modules, a TC 6032 remote head, some Yamaha SPX 1000s and 21 TC 1128 programmable EQs. (For Lauper, assistant monitor engineer Doug Deems uses SPX 990s, dbx 160As, and Aphex 612s.) "The way Ed mixes it, he doesn't use a whole lot of gates and effects," says Shreiner. "He lets things breathe; it's natural-sounding. There's only reverb on vocals, no reverb in the hall."

It seems that above all, the goal of the sound crew is to let the natural energy and intensity of Turner's performance come through. "She gives 120 percent every night," Shreiner says. "No matter how she feels, no matter if it's raining out, even if the crowd's low, she still gives 120 percent. She's a great lady." Natale agrees: "It's a high-energy show; she doesn't stop moving. The band's good, the sound's good—just turn the stuff on. It works." ■

Sarah Jones is Mix*'s assistant editor.*

—FROM PAGE 172, NEW VENUE WISH LIST

back by a factor of four. High trim on a P.A. not only gives it more even coverage, it reduces any beaming effects the transducers may have. It also increases the distance from the P.A. to open mics onstage, helping minimize gain before feedback.

• Contemporary seating plans often wrap the audience around the stage, placing more of the audience at closer distances, while asking the P.A. for wide short-throw coverage at the sides without blocking sightlines. The speakers must be raised so patrons can see the drummer. Height is our friend, but now we must find good locations for small front-fill speakers and subwoofers, if they are not flown. Sound systems that fly regularly require a half-dozen small ground-supported front-fill speakers to hit the front rows with direct sound. The attraction of 4-foot-high stages is that there are plenty of good locations for speakers underneath and on the lip of the stage.

• Acoustical blurring of the sound can occur because of low-frequency energy coming off the backs of speakers. Building a baffle to control lows can help. Recording studios acknowledge this by building soffits for their large-format monitors and even building carpeted alcoves for machines in the control room. Six sheets of plywood with hinges and a dozen yards of Rockwool or Sonex can make a couple of folding baffles that will fit around three-box arrays and can hang from the fly-truss. Many venues have an installed center-cluster or a delay ring that visiting acts need to tie into to get sound to the balcony or the lawn seats. Low-frequency dispersion of most speakers approaches omnidirectional, so baffling the back of house systems can make them more useful without having to strip out the last two or three octaves on the EQ. Also, hiding speakers by placing them behind a scrim makes them less threatening to patrons and, though we're now operating in the realm of psychoacoustics, can reduce complaints by taking the audience's eyes off the speakers looming above them.

• Speaking of bottom end, hollow stages are often troublesome at lower frequencies. A second layer of decking can help stiffen a resonant stage, and carpeting can go a long way toward muffling a hollow cavity while reducing reflections. Some productions carry a roll of carpet with them. A venue that keeps a roll on hand might find it surprising how often groups take advan-

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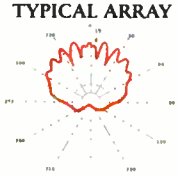
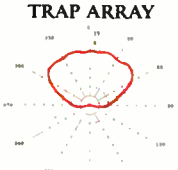
TYPICAL ARRAY



Problem: Three typical 60°H cabinets in tight-packed array. Severe lobing problems.

TRAP ARRAY



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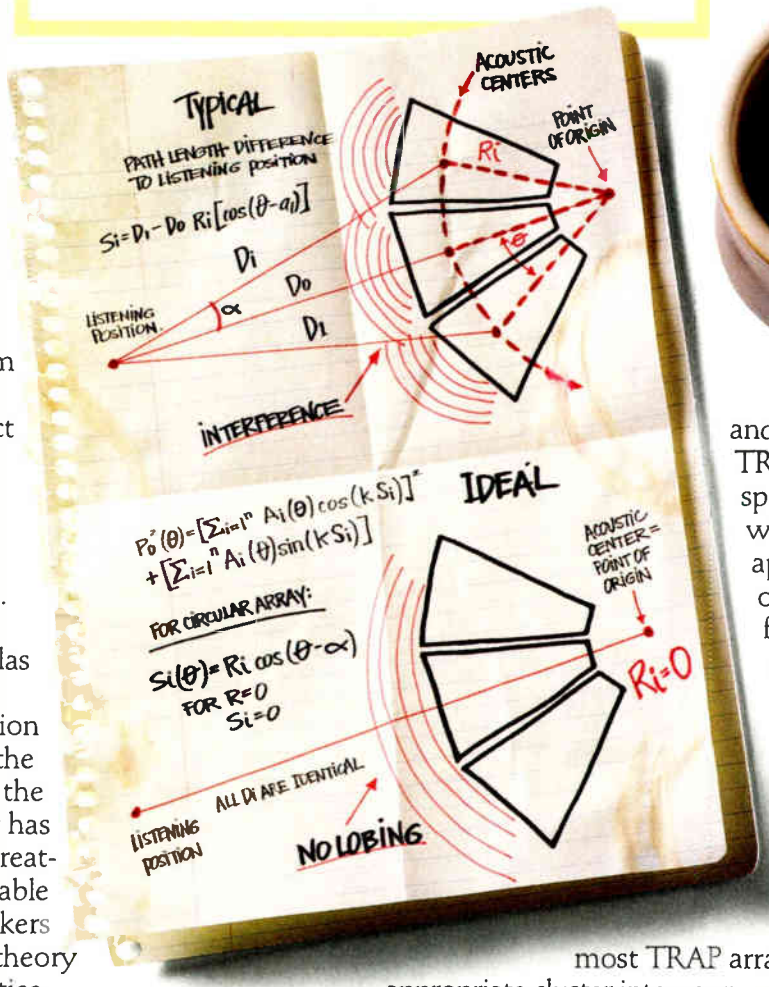

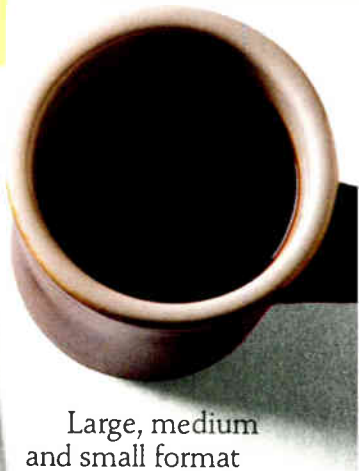

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World Radio History

tage of it and how much better the show sounds. Warehouse carpet vendors offer discounts on remnants, and outfits that re-fit large office buildings can sometimes locate large pieces of industrial short-nap for the cost of hauling it away from a job site. Traveling shows can do others a favor by making sure the tech rider includes carpet, which can then be provided for others once it's been procured.

• Dual-purpose venues should have dual-purpose wall coverings. Many venues used for pop concerts have been acoustically designed with sound reinforcement as a secondary function of the room. From concert halls to arenas, extra reflections and reverberation are commonly preferred for classical music or sporting events, giving sound reinforcement engineers a handicap before they start. Hard, flat surfaces are the enemy of amplified sound generated by point-source arrays. Soft coverings on walls do much to improve the sound in a room, and some newer facilities have seating with soft upholstery that makes up much of the acoustic difference when a patron is not seated. Some larger venues have adjustable panels to modify reflections. Simple arrangements of drapes on travelers can give smaller rooms modestly adjustable acoustics. On the other hand, if live sound is a venue's bread and butter, then just soft-

QUICKTIP

This one comes from Eduardo Garza Bolio (taudio@correo.tamnet.com.mx):

I'm a Berklee-educated sound engineer working in subtropical Tampico, Mexico, soon to pack bags and become part of the Klay Anderson Audio team in Salt Lake City.

First, I have to compliment you on your writing and coverage of live audio. Your recent "Less Is More" article was right on the money and a welcome change from the usual stuff in *Mix* (not that the articles on the megashows and prestige venues aren't interesting).

Anyway, on to the Quicktip: How many times do you find yourself mixing right against the back wall of a bad-sounding, way-too-live venue? Chances are relief is already at hand, in the form of your trusty console case. Place the top part of the case (you have to find a home for it, anyway) right behind you, against the back wall, with the foam-covered side facing you. The hard side of the case will block most of the back-wall bounce toward your ears, and the foam side will absorb sound coming from the front. Results: You hear more direct sound and less room sound, and comb-filtering nasties are reduced substantially. Clarity is increased. There is also a slight reduction of the typical close-to-the-wall boominess—not much, but hey, it's free.

The thicker the foam, the better. You should add more if the case only has a less-than-2-inch layer. Acoustic foam would look cool, too.

The case top should be propped up so the center is at the same height as your ears, in a horizontal (landscape) orientation. This will allow you to move about the console without leaving your tweaked acoustic space. Let me know what you think if you try it. ■

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en up the walls permanently. Whatever happens, don't let them paint the walls as a solution, as paint worsens even bad walls into a glass-like reflecting surface. Spray-on foam is an economical solution that can then be covered with an open-weave fabric for improved aesthetics.

On a similar note, soft space at the back of the stage cuts down the reflections from the back wall and clears up some of the sound coming into the room from the backline and monitors. Some touring productions have acknowledged this by planning copious amounts of heavy-fabric draperies into their set design. Heavy drapes with a modest space behind them have a wideband absorptive effect that reaches well into the low-frequency range. This also provides a convenient storage space upstage of the curtain for all the empties and dead cases that will be needed at the end of the show. In venues with permanent systems, mic stands and cables can be stored on the wall behind the upstage drapes.

• Of course, live bodies are still the best acoustical treatment; there is no better medicine than "standing room only." Why do sound engineers inquire so often about how the show is selling? They must cover the room, and every extra speaker they put up degrades the direct-to-reverberant ratio. How many times have you put up the full rig and then turned off the top row of speakers? Pointing speakers at empty seats, walls

NEWSFLASHES

Professional Audio Systems speakers are part of a new sound system at the 18,000-seat **Coca Cola Starplex Amphitheater** in Dallas. The P.A., which was installed by Dallas' **Crossroads Audio**, includes 24 PAS TOC™ RS 2.2 loudspeakers with 12 CB-2 dual 18-inch subwoofer enclosures. Monitors include PAS SW-2s for stage and RS-2s for sidefill and drum monitors...**Concert Systems** (Manchester, UK) purchased a second Midas XL4 console...Two Level Control Systems LD-88 digital mixers were installed at the **Lance Burton Theater** at the Monte Carlo Casino and Resort in Las Vegas...**A-1 Audio** (Hollywood) will be providing equipment for Aerosmith's upcoming world tour. The P.A. will include more than 140 EAW KF Series speakers. Touring sound company **Chosen Sound & Lighting** (Longwood, FL) purchased 12 additional EAW KF850 concert loudspeaker systems. The company, which was started in 1988, recently provided gear for tours by **David Sanborn** and **Mandy Patinkin**...**Alan Parsons'** next tour will make use of a DigiTech Vocalist and Vocalist workstation to create "live" vocal harmonies...**Rock City Sound** (Red Hook, NY) purchased 12 L-Acoustics V-DOSC speakers from **Cox Audio Engineering.** RCS specializes in large-scale corporate audio/visual events...The **Billboard Live** club in L.A. installed Sony's VideoStore, a multichannel disk-based file server that allows patrons to choose music videos to be shown on the club's JumboTron screen...Forty Sennheiser wireless mic systems are being used in the production of *Jesus Christ Superstar* at London's **Lyceum Theater**...The 1,700-seat **Dollywood Celebrity Theater** (Nashville) took delivery of a 32-input, 12-output DDA Forum console. ■

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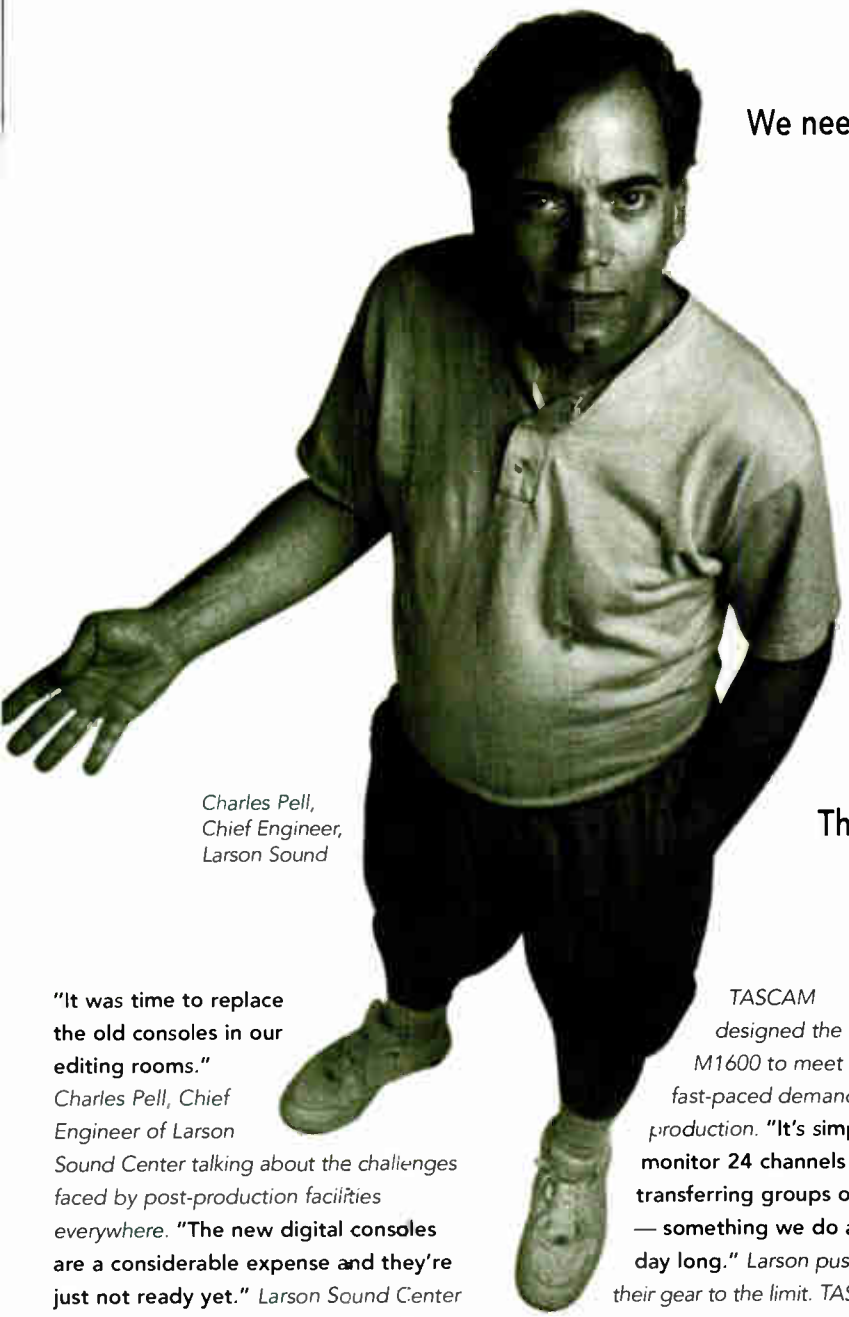

Charles Pell, Chief Engineer, Larson Sound

We needed new consoles for our editing rooms

We looked, we listened, we compared

We tried an M1600

Then we bought six

"It was time to replace the old consoles in our editing rooms." *Charles Pell, Chief Engineer of Larson Sound Center talking about the challenges faced by post-production facilities everywhere.* **"The new digital consoles are a considerable expense and they're just not ready yet."** *Larson Sound Center chose the M1600 post-production console from TASCAM.* **"We checked out everything — analog and digital — nothing beat the M1600."** *As one of the premier facilities for post-production and sound design for film and TV, Larson's editing rooms are used by dozens of editors, round-the-clock. So the mixers take a beating.* **"The M1600 can handle the hard use and abuse. It's fast, it's intuitive — our editors love working with it."** *The M1600, with its compact 8-buss layout, six AUX sends, extensive monitoring and push-button signal routing, is quick and easy to use.* **"The console sounds great — light years better than what we used before."**

TASCAM designed the M1600 to meet the fast-paced demands of production. **"It's simple to monitor 24 channels while transferring groups of 8 — something we do all day long."** *Larson pushes their gear to the limit. TASCAM durability can handle it.* **"Our techs love it because it's simple to maintain and service."** *The M1600 is a semi-modular design.* **"The other boards we looked at use a single motherboard design which is virtually impossible to repair."** *At only $1,699*, the M1600 is ideally priced for post-production.* **"For Larson, there was no compelling reason to buy anything else. The M1600 is fast, clean and priced right. Nothing offers more value or features."**

Get the full story and specs via TASCAM FaxBack at 800-827-2268, document #6610.

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Larson Sound utilizes the 24 input model of the M1600. • The 16 input model gives you 32 mix positions, 24 input model gives you 48. Manufacturers suggested list prices: $1699 for 16 inputs and $2,199 for 24 inputs.

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and floors lowers the sound quality for those who do show up. Of course, the best way to get people into the seats is with good acts, which every venue competes for.

With so many live concert venues to choose from, every facility is competing with neighboring venues to be the best room in their area. Most promoters can provide electricity, flat meats for lunch and four loaders; a good-sounding room that is "audio friendly" is not so common. Many agents and managers haven't seen the newest venues and rely on the visiting production managers to tell them about new rooms. If the venue has a good load-in, bus power, decent dressing rooms with a shower, and is sound-friendly and has decent acoustics, then it's already way ahead of many others. Venues that go above and beyond the call to provide outstanding support for live productions find they get the best pricing and first crack at top acts to fill the seats. Everyone involved benefits, all the way down to the patrons. Next time you visit a new venue for the first time, take a moment to pull the facility manager aside and make a few suggestions. You'll be helping yourself the next time you pass through town and doing the rest of us live sound engineers a favor. If they hear it from enough of us, maybe some of them will catch on. "Of course that's just my opinion, I could be wrong, and I am outta here." ■

Mark Frink is Mix*'s sound reinforcement editor.*

PHOTOS: STEVE JENNINGS

LEFTOVER SALMON

Regular clubgoers will be familiar with the high-energy shows of Leftover Salmon, a Boulder, Colo., band that has been a staple for about seven years, averaging 200 nights annually. "Imagine if you took an old Led Zeppelin tune to a reggae beat and amplified bluegrass instruments," says FOH engineer Steve Smith, who has been with the band since mid-1994. "Or electric slide mandolin with tube distortion. The shows last up to three hours, and I see people dancing the whole time." The five-member band, fronted by songwriter/guitarist Drew Emmit, is accompanied by Smith, road manager Tom Jackson (who also does monitors) and stage manager Jeffrey Lerner. Smith carries only a "small rack," that includes a TC Electronic M2000, Yamaha SPX90II and Presonus ACP8 8-channel comp/limiter/gate: "I use the Presonus on just about everything, because all eight channels can be linked. It helps keep the acoustic instruments on a level with the electric, keeping them out front." Whenever possible, the bandmembers, all of whom sing, use an AKG 457. "Drew grew up singing bluegrass around campfires," Smith says. "He's a dynamic singer, and he sings hard, so the 457 doesn't distort on the peaks and has real good rejection on monitors." ■

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New Sound Reinforcement Products

SPIRIT MONITOR² MIXER

Spirit by Soundcraft (Auburn, CA) announces the Monitor² mixing console, a 12-bus mixer designed for in-ear and traditional monitor mixing applications. Available in 24-, 32- and 40-channel frame sizes, the Monitor² includes a built-in mic splitter and features ten subgroups, 100mm output bus faders and 12-segment LED meters. Mono input channels feature the Spirit Ultra-Mic+ preamp, four-band EQ (with sweepable mids), switchable phantom power, phase reverse, highpass filter, 12 individual aux/monitor sends, PFL and mute, 60mm faders and signal/peak LEDs. Monitor mix bus outputs may be individually dimmed and feature individual highpass filters and mute and solo switches. Two stereo effects returns allow various line-level signals to be integrated, and engineer talkback may be assigned to any mix. A pair of "House" mic inputs allow ambient mics to be added selectively to any mix (essential for in-ear applications). Prices start at $4,700 (24-input frame).

Circle 314 on Product Info Card

AUDIX D4 KICK DRUM MIC

The D4 dynamic mic from Audix (Wilsonville, OR) is designed for applications in which precise low frequency reproduction is a priority, such as miking kick drum, toms, piano and sax. Featuring a frequency response that rolls off gently at 40 Hz, is flat at 63 Hz, has a slight bump at 80 Hz and is flat to 1 kHz, the hypercardioid D4 accepts inputs up to 144 dB SPL. Only four inches long and one inch wide, the D4 is small enough for easy placement in complicated percussion setups, and the 40 to 18k Hz response makes it recommended for a wide range of applications. Price is $289.

Circle 315 on Product Info Card

ALLEN & HEATH MIXWIZARD WZ16:2

Allen & Heath (Sandy, UT) kicks off its new MixWizard Series with the WZ16:2 compact mixing console, a 16-input, stereo out compact mixer suitable for P.A., 2-track recording, keyboard and submixing applications. Each channel features a balanced mic/line input, four-band (sweep mids) EQ, 80Hz highpass filter, six aux sends, pan, mute, PFL and 100mm fader. Other features include a pair of stereo line returns and an additional AB output that can provide pre- or post-fader LR outs, or a mono sum, or may serve as a local monitor out. A Quick Change connector feature allows the mixer to be desk- or rack-mounted. Retail: $1,195.

Circle 316 on Product Info Card

PAS FULL RANGE SYSTEM

The PAS RS-2.2 from Professional Audio Systems (Carlsbad, CA) is a full-range, single-enclosure loudspeaker comprising a 15-inch co-axial mid/high speaker with a 2-inch HF compression driver and a complementary 15-inch woofer. Combined with the PAS Time Offset Correction (TOC™) R2 signal processor, which provides fourth-order linear phase crossover, EQ, time correction and limiting, the system offers a 40 to 16k Hz frequency response and 1,000-watt power handling. Weighing only 124 lbs, yet capable of 129 dBm peak SPL, the RS-2.2 features a compact design that allows for efficient use of truck space and fast setup in stacks and flown arrays.

Circle 317 on Product Info Card

DOD ADDS GRAPHIC EQS

DOD Electronics Corp. (Sandy, UT) has added four new "Constant Q" graphic equalizers to its SR Series EQs. The SR831QX ($249.95) is a 2U, mono, 31-band, ⅓-octave unit offering both balanced XLR and ¼-inch connectors, up to 12 dB of boost or cut per channel, ±12 dB gain control, switchable 12 dB/octave highpass filters, bypass switch and LED bar graph to indicate output level. The SR431QX ($249.95) offers the same features in a 1U package. The SR430QX ($244.95) is a dual-channel, 15-band, ⅔-octave EQ in a 1U format; features are otherwise similar to the mono ⅓-octave units. The dual-channel SR430Q ($219.95) is identical to the SR430QX except that it offers only ¼-inch balanced I/O connectors.

Circle 318 on Product Info Card

SENNHEISER UHF WIRELESS

Sennheiser (Old Lyme, CT) introduces two cost-effective UHF (434-960 MHz) true diversity wireless mic receivers, the EM3031-U ($2,300) and the EM3032-U ($3,950). Both units offer 32 programmable UHF receiver frequencies and incorporate PLL synthesis. Frequency response is 40 to 20k Hz. HiDyn *plus*³ companion noise reduction allows a S/N ratio of over 100 dB. The EM3031 is single-channel; the EM3032-U is a 2-channel receiver with an integrated antenna splitter; both are compatible with all Sennheiser UHF transmitters. Sennheiser also introduced the SKM3072-U UHF handheld microphone transmitter ($1,600). Frequency response is 80 to 20k Hz. A 9V battery provides up to eight hours of continuous operation, and an LC display shows transmitting frequency and battery status.

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World Radio History

BY BLAIR JACKSON

ADVENTURES IN RECORDING NOTES

THOM PANUNZIO

FROM KING BISCUIT TO OZZFEST

by Blair Jackson

Over the past 20 years, producer/engineer Thom Panunzio has worked on literally hundreds of live recording dates with both obscure and popular bands. Since his early days working with David Hewitt, Panunzio has traveled the world, rolling tape in every type of venue imaginable—from grungy clubs to massive stadiums—and along the way, he's earned a reputation as one of the top pros in his field. Recently, we caught up with the ever-busy Panunzio long enough to chat about one of his latest CD projects—the multi-act live metal compilation *Ozzfest*, featuring Ozzy Osbourne, Slayer, Sepultura and a host of other headbangers—and his long association with U2, among other topics.

U2 in the late '80s

I know your role varies from project to project. What were you hired to do for the Ozzfest record?

I was the producer and chief engineer of the whole thing, but I had two mobiles. I had Le Mobile on the main stage with Guy Charbonneau, and he was the engineer in his truck, and then I had the Design FX truck on the second stage with Tom Wilson in it. They're both terrific live engineers, and without them I couldn't have pulled it off.

What was the setting for the concert?

It was at the Blockbuster Pavilion outside of San Bernardino [near Los Angeles], and there was a main stage and a second stage. The second stage was a little funky. The main stage was big, and it sounded pretty good. [The venue seats 30,000.] The main stage had Ozzy, Sepultura, Danzig—who is not on the record—Slayer, Biohazard, Fear Factory and Neurosis. Then Cold Chamber, Cellophane, Powerman 5000 and Earth Crisis were on the second stage.

Did you know in advance that there was going to be a compilation record made?

I knew we had two goals. One was to make a live Ozzfest record. Also, besides getting a great recording of the Ozzy portion of the show for a possible live record in the future, I also recorded everything the bands did because

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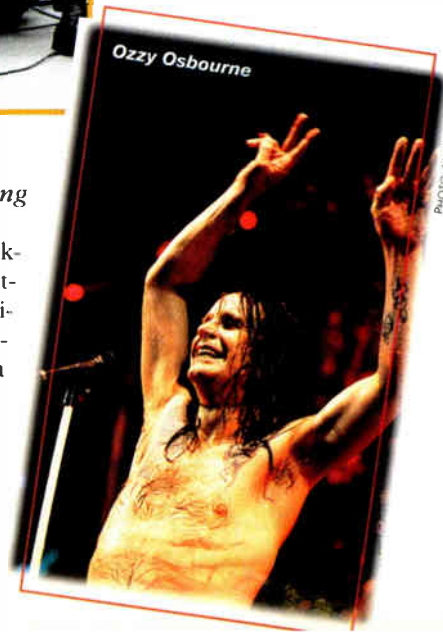

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GRAHAM PARKER & THE FIGGS

CAPTURED LIVE AT BOGIE'S

by Barbara Schultz

Since Graham Parker emerged from England's pub rock scene in the '70s, his success has been spotty. But that has more to do with the times than with his talent—that's a constant. This soulful new wave survivor still puts out a great album every couple of years.

PHOTO: GARY GERSHOFF

Left to right: Guy Lyons, Pete Donnelly, Graham Parker, Pete Hayes and Mike Gent

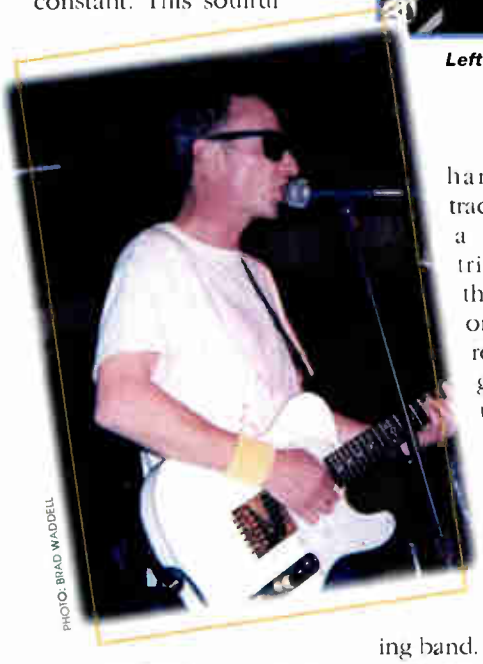

PHOTO: BRAD WADDELL

Last year Parker released *Acid Bubblegum* (Razor & Tie), a collection of well-crafted, angry pop songs—as the title suggests. When he went on the road to promote the release, he hooked up with New York club rock favorites The Figgs. "They met Graham at my farm," says The Figgs' manager/producer Brad Morrison. "I had a party here, and Graham had heard a track of The Figgs on a Graham Parker tribute record. He thought it was the only thing on that record that was any good. They ended up hitting it off and having this big drunken jam session, and then he called back ten days later and asked them to be his backing band. When they started playing shows, it immediately struck everybody that this was really good."

Parker and Morrison hit on the idea that they should record one of the shows live. "It was originally designed to be a promotional item," explains Morrison. "We'd issue it to radio and give attention to *Acid Bubblegum*. Subsequently, it became a commercial release. I think everyone was a little surprised with how well it turned out."

The live album, *The Last Rock 'n' Roll Tour*, was recorded one night last November at a 300-capacity club called Bogie's in Albany, New York. "It's The Figgs' home turf—a place where they came up through the ranks to be headliners," says

—CONTINUED ON PAGE 197

INSTANT REMOTE TRUCK

STEVEN REMOTE, ASL

"We had a gospel gig booked in Philly with the truck, and then about a week before that gig, we got a call from WBCN in Boston asking if we would record the Verve Pipe and Howlin' Maggie. They asked me if my truck was available, and I said, 'Well, I'm available, my gear's available, but my truck isn't.' The show was at the Paradise rock club [in Boston], and there wasn't really any room to set up my portable rig, so we literally built a control room in my buddy Boz's van the night before. We happened to have a 24-hour Home Depot by my

—CONTINUED ON PAGE 192

PHOTO: STEVEN REMOTE

Yamaha ProMix consoles in the van

World Radio History

JEFFERSON AIRPLANE'S "WHITE RABBIT"

by Blair Jackson

PHOTO: RAY AVERY/MICHAEL OCHS ARCHIVES

1967: Marty Balin, Paul Kantner, Spencer Dryden, Jack Casady, Jorma Kaukonen, Grace Slick

It was the summer of 1965, and U.S. record company executives were scratching their heads wondering what they could possibly come up with to counter the British Invasion. New York was hopping with the Lovin' Spoonful, the Young Rascals, the Blues Project and a few other bands. Los Angeles had The Byrds, Johnny Rivers, the Beach Boys and a group that was just starting out, called Love. And in the San Francisco Bay Area, there were rumblings from a slew of then-unknown bands that were all forming around the same time—The Warlocks (who in the fall of '65 became the Grateful Dead), Quicksilver Messenger Service, the Great Society and, beginning that summer, the Jefferson Airplane.

Though the Airplane, along with the aforementioned groups (and Big Brother & the Holding Company) came to be associated with psychedelic rock, their roots were mainly in folk music, and their first couple of albums could more properly be labeled folk-rock than acid-rock. Founders Marty Balin and Paul Kantner both came from the folk music world—Balin had been a member of a group called the Town Criers, Kantner had played around in various folk music clubs in the Bay Area and Los Angeles, and the two met at a San Francisco folk club called The Drinking Gourd. Lead guitarist Jorma (nee Jerry) Kaukonen, the most formidable musician in the group, had perfected his bluesy fingerpicking style (which borrowed heavily from Reverend Gary Davis) in various folk haunts south of San Francisco. The original lineup was rounded out by a folk singer named Signe Anderson (formerly of the Portland folk trio Two Guys & a Girl), bassist Bob Harvey and drummer Jerry Peloquin. The band's first major gig was at a club in San Francisco called The Matrix in August '65, and they instantly became a local sensation. Ralph Gleason, the *San Francisco Chronicle*'s hip jazz/entertainment critic, was an early champion of the group, which helped attract RCA Records A&R scouts to the Bay Area to check out the band. The Airplane signed with RCA in the fall of '65 for the then-huge sum of $25,000. Before they went in to record their first album, however, Peloquin and Harvey were replaced by Skip Spence, whom Marty Balin deemed looked more like a drummer than the guitarist he actually was, and bassist Jack Casady, who had played in a rock 'n' roll band with Kaukonen in Washington, D.C., in the late '50s, before Jorma moved to California.

The Airplane was a highly talented group. Both Balin and Anderson were strong, soulful singers and Kantner's more monochromatic vocal style blended perfectly with them. All three could and did handle lead vocals, and it was the combination of their voices soaring together that pretty much defined the group's sound. Though Kaukonen was a relatively inexperienced electric guitarist at the beginning, his fingerpicking technique translated to his electric instrument very effectively and he quickly became one of the guitarists that other guitarists wanted to check out.

The group's first album, *Jefferson Airplane Takes Off*, was recorded in February 1966 at RCA Studios in Los Angeles, with the group's manager, a flamboyant, Spanish-caped character named Matthew Katz co-producing with Tommy Oliver. Though it was not an enormous smash hit, it firmly established the Airplane as one of the most promising groups on the West Coast.

Now, a lot happened in between the time the band was signed in the fall of '65 and when they went back down to RCA to record their second album, *Surrealistic Pillow*, in November '66. First of all, there were huge changes in San Francisco's cultural landscape. The Haight-Ashbury section of the city, which had been a working-class neighborhood peppered with San Francisco State University students, blossomed into a center of art and music acitvity, with bands springing up like weeds, painters and designers exploring new media, like posters and light shows, and rampant experimentation with psychedelic drugs. Though the Summer of Love is usually pegged as June through September of 1967, when close to 100,000 young people from all over the world decended on San Francisco in search of free love, high times and rock 'n' roll, the truly golden time in the Haight was the summer of '66, when it was still an exclusively local cooperative scene. By then, the Dead and Big Brother and a hundred other groups were living there, and most of the Airplane had taken up residency in a turn-of-the-century mansion just a few blocks from the center of Haight-Ashbury and Golden Gate Park's eucalyptus-studded Panhandle. By 1966, there were a number of venues that presented rock 'n' roll dances regularly, including such legendary haunts as the Fillmore Auditorium and the Avalon Ballroom, and the Airplane were generally considered the top band in the city—they always headlined over the Dead and Quicksilver, for example.

There were changes in the Airplane's lineup, too. To the relief of everyone in the group, Skip Spence left the band to go to Mexico (he eventually returned to

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help form Moby Grape), and he was replaced by a veteran L.A.-based drummer named Spencer Dryden. More problematic was the departure of Signe Anderson in October '66, five months after she'd had a baby. But the search for her replacement turned out to be quick and painless. They raided the Great Society, an eclectic group that, ironically, had started after some of the founding members saw the Airplane's first Matrix show, and plucked their beautiful and charismatic lead singer, Grace Slick. Actually, the Great Society was breaking up anyway, so the Airplane offer came along at the perfect time for Slick. With Slick and Dryden in the band, the Airplane now had their classic lineup, and it was just two weeks after Slick joined the group that they went down to L.A. to cut their second album. Manager Matthew Katz was out of the picture by then, too, so RCA brought in staff producer Rick Jarrard to shepherd the sessions, and Dave Hassinger, a respected veteran with credits that included the Stones' "Satisfaction," among other hits, to engineer.

The sessions took place in RCA Studios' "A" room, which was equipped with a custom RCA console and a then-new Ampex 4-track recorder. (*Jefferson Airplane Takes Off* was 3-track.) When I asked Paul Kantner recently about the differences between recording the first album and the second album at RCA, he replied dryly, "Not much—by *Surrealistic Pillow* we didn't have to go into a closet with the janitor to smoke dope anymore."

Not that Jarrard and Hassinger were exactly hipsters. They were regular record business guys working with very loose, free-spirited San Francisco crazies. "I was very straight at that time still," Hassinger told me in 1985. "I remember asking Marty Balin what it was that attracted him to acid, and he said to me, 'Well, that person over there looks just like a skeleton to me—there's no flesh on him.' After that I didn't ask any more. To be honest, though, half the time I didn't know who was high and who wasn't. They didn't act weird, and they were always able to play their music. I loved the Airplane; they were fantastic. They had a funk about them, but they also had such great melodies. *Surrealistic Pillow* is one of my favorite albums that I've worked on. All those bands—the Airplane, the Dead, even The Byrds—needed very little producing; they needed sounding boards and people who could keep things running smoothly in the control room and trans-

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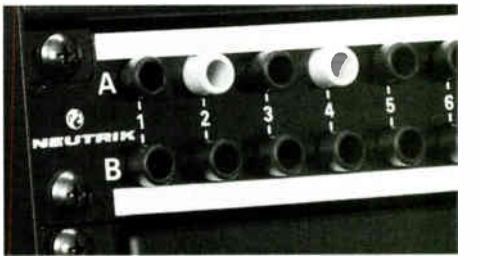

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late their ideas into sound. They certainly didn't need or want someone telling them what to do."

That's for sure. And the Airplane were sufficiently concerned about being able to communicate their ideas to "straights" like Hassinger and Jarrard that they brought the Grateful Dead's Jerry Garcia down to be an intermediary. "The Airplane thought it would be helpful to have somebody there who could communicate to their producer who *they* could communicate to," Garcia said. "And since they all knew me and I understood their music and understood what they were doing pretty much at the time, it would be far-out. I went down there and hung out and was a sort of go-between."

Paul Kantner noted, "Our first album had been made rather restrictive by RCA, and we were sort of unhappy with the results, and we needed to get more communication between us and the studio, and in some idiotic fancy of mine, we figured Jerry Garcia would be the person to communicate some of the things we were trying to accomplish in the studio. So [Hassinger] would know that Jack's bass should make the board *smoke*. Smoke comes out of the board, put another fuse in; don't try to damp it down.

"[Also] we would be rehearsing something out in the studio, [Garcia] would say, 'I have a nice little part that would work in there; maybe you should play this.' And he would pick up his guitar and go boom, 'Why don't you play that?' and he would play it so good that we said 'Why don't you play it? It sounds really good, and we can't play it better than that. Come on, help us out here.'

"But mostly he was there to serve as sort of a buffer zone between us and the other side of the window. A lot of what we were trying to do, both soundwise and lyricwise was eased quite a bit by his very gentlemanly manner. He was not harsh, not abrasive," as the somewhat volatile members of the Airplane could be.

The Airplane went to Los Angeles with a passel of great songs written by Kantner, Balin and Kaukonen, and bringing Slick into the mix added a new songwriting force. For *Surrealistic Pillow* she contributed two songs that the Great Society had performed: "Somebody to Love," written by Grace's ex-brother-in-law and former bandmate, Darby Slick, and her own "White Rabbit," which she described as "sort of a *Bolero* ripoff on the music and *Alice in Wonderland* for the lyrics." (In the Great Society's versions of the song, Slick's song was usually preceded by a long, Spanish-sounding introduction that heightened the anticipation for Slick's vocal entrance.) "The adults were saying, 'Why are you taking all these drugs? This is bad,'" Slick said. "But they had read us books like *Alice in Wonderland*, where she gets high, tall, takes mushrooms, a hookah, pills, alcohol. I was saying, 'You read us all this stuff

PHOTO: ALEX SOLCA

MASTERS OF REALITY AT THE VIPER ROOM

MARTIN SCHMELZLE, ENGINEER

"The new Masters of Reality live album [*How High the Moon*] came about pretty quickly; it was put together really fast. Chris Goss [leader of the band] said he wanted it to be really raw, so I started looking around for a remote truck, and I found Studio On Wheels, which I really liked a lot. It's an old Record Plant truck with a 44-input API and 550As, and I really liked the fact that it had Ampex 1200s in it—the 2-inch 24-tracks. It's owned by this guy John Falzano, who actually worked in the truck as part of my crew. It was very together sonically, and he knew exactly what was going on with the truck.

"We went into the Viper Room [a small, trendy Hollywood club] kind of not knowing what we were going to get. We set up quickly and then the only sounds I could get in the truck were at sound check: "Okay, I've got kick. Got it. Got snare drum." Bang, bang, bang. Over the years, I've learned to work fast. The band played a few songs for a soundcheck, but for me it was pretty much just checking things out—this is working here, we've got this plugged in there. Getting the compression and everything working—I compressed it pretty good going to tape with 1176s. The API board was great—no problem there.

"The miking was pretty straightforward: I had two mics on the [guitar] amps—a 57 and a 409 on each of those. On the keyboards, I had a DI and a mic on the amp, and the same on the bass. The drums I did a regular setup: on the snare, a 451 on the top and 57 on the bottom, and 421s on the toms and 452s on the overheads—a regular studio setup, and it really worked out well.

"For the audience, there wasn't a good way to hang mics in the back of the club, so I put three SM81s on the front of the stage—one on each corner and one on the center facing out—and that worked great. I just bused those together to a stereo track. We recorded at 30 ips because I was concerned about hiss on a couple of the slower tracks.

—CONTINUED ON PAGE 190

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when we were little, and then you wonder why we do it?'"

"White Rabbit" was one of the first tunes cut for the new album, on November 3, 1966. Kantner says that typically they cut the instrumental tracks live in the studio first, then added lead vocals and occasionally guitar solos as overdubs after the basics went down.

RCA Studios had their own echo chambers—which were used very liberally on *Surrealistic Pillow*—and it was also common to use an EMT plate reverb. The studio had a large complement of the top microphones of the day, including Neumann, Sennheiser and RCA models. The band would usually play several takes of each song, and then the best performance would be chosen and added to as necessary, rather than a take being comped from several different takes. *Surrealistic Pillow* was cut in 13 days for about $8,000.

The album was an immediate hit when it was released in February 1967. The first single from the record, "Somebody to Love," was released in March and made it to Number 5. "White Rabbit" came out around the first of June, and within a few weeks had made it up to Number 8 on the singles charts. More so than L.A. singer Scott McKenzie's bogus "San Francisco (Be Sure to Wear Flowers in Your Hair)" (written by another Angelino, Mamas & Papas leader John Phillips), "Somebody to Love" and "White Rabbit" were the real anthems of the Summer of Love—one was an intense paean to love, the other a phatasmagorical "trip."

Thirty years after that summer, those songs still bring back memories of those golden, hallucinatory days. *Surrealistic Pillow* was the Airplane's commercial peak, though they continued to tour and record successfully for a few more years. Their records no longer had the folkish innocence of their first two albums, however. With their next, album, the much more experimental *After Bathing at Baxters*, the Airplane would take on a harder, more electric sound.

Now, Grace Slick and Spencer Dryden have retired from performing. Paul Kantner, Jack Casady and Marty Balin still tour with a version of the Jefferson Starship, and Casady and Jorma Kaukonen are still the nucleus of Hot Tuna, which began as a Jefferson Airplane spinoff more than 25 years ago. Hassinger and Jarrard have dropped from sight, but *Surrealistic Pillow* is one of those records that will outlive everyone who was involved with it. ■

—FROM PAGE 184, THOM PANUNZIO

we wanted to have those tapes to give to them. I had specific songs that were chosen by Ozzy for the record from each band. Somebody like Slayer obviously had a lot to say about what song they wanted. In fact, a couple of bands changed the song they wanted after they heard the tape. What we did is we gave each band a DAT of their performance and made sure they were happy. We had two shows that we recorded—Phoenix the night before, and then the Blockbuster Pavilion, although they didn't have the second stage in Phoenix. Then each band came into A&M studios with me.

What's involved when you have to supervise two different trucks at one gig? They have different boards, right?

Guy has the old Neve, and Design FX has an API, but that's kind of irrelevant because you've got a different stage with a different band and a different truck.

But you're not making any suggestions about levels or doing anything to ensure consistency between them?

We're mainly just trying to get it on tape the best we can. The way the record sounds, it's like one band came out onstage right after the other. That was very difficult to make happen because of the two different trucks. But we had the same tape, same speed,

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same alignment—we went 15 ips Dolby SR. The real challenge came when we mixed it. Also, although some might say, well, it's all heavy metal, these are completely different-sounding bands for the most part. When you go from Powerman 5000 to Earth Crisis, it's a huge difference. What I had to do was make it sound like they were all on the same stage coming one after the another, which involved tweaking the audience quite a bit and having a lot of audience to work with.

So you used big stage ambience on the second stage bands?

No, we enhanced the applause from the little stage with a lot of outboard. But we didn't use Slayer's audience for Loco, for instance, or Ozzy's audience for everyone else.

Is there any particular challenge to capturing this kind of music live?

Not particularly. When you only get one shot, there are a lot of technical challenges. With Ozzfest, when you have Ozzy up there and you have so much power coming off the stage, you have to work within that world. You have to work with the monitor mixer, you have to work with the house sound person, and all that is going to affect my microphones. So it's not just working with the amps and the guitar; it's everything—you have to worry about the lights

—FROM PAGE 188, MASTERS OF REALITY

We discussed doing it at 15 ips, and if it had been a total heavy guitar set, I'd be okay with that, but because there were a few dynamic tunes, I thought we should go 30, and I'm glad we did. We also mixed to DAT as we went down.

"Afterward, we went to Hollywood Sound and we did three days of just listening to the stuff. Then we went in to A&M and mixed it pretty quickly in their Neve room. Actually, the first day I went in, I was mixing the first song for six hours or so and I didn't feel like it was coming together the way I was envisioning it. So I said, 'Let's listen to the DAT off the truck.' So we put that up and it sounded just so good. Chris agreed, so then we decided we should go more for that sound, so I stripped the mix down and simplified it: I turned a bunch of EQs off and went back to square one and minimalized. And that turned out to be the way to go with the whole record, and the mix was easy after that.

"We did multitrack edits to cut some of the songs down, because a lot of them were really long. But that was it. We didn't really fix much. What you hear is what it was, pretty much. I added a little 'verb here and there, but not much. I wanted to keep it a tight environment as much as possible to keep it like the club was.

"At the end, we had one more song to mix so we went back to Hollywood Sound and did that, and at the same time I bounced all the DAT mixes into the Spectral workstation and assembled the set in the Spectral, which I think is a great workstation. I've done a lot of stuff on them. Then, once everyone was satisfied with a sequence, I bounced the segues between the songs from the workstation to half-inch, so just the segues came out of the workstation. I think it came out really well, and Chris and the rest of the band are happy with it. It sounds like *them*, which is what we were going for." ■

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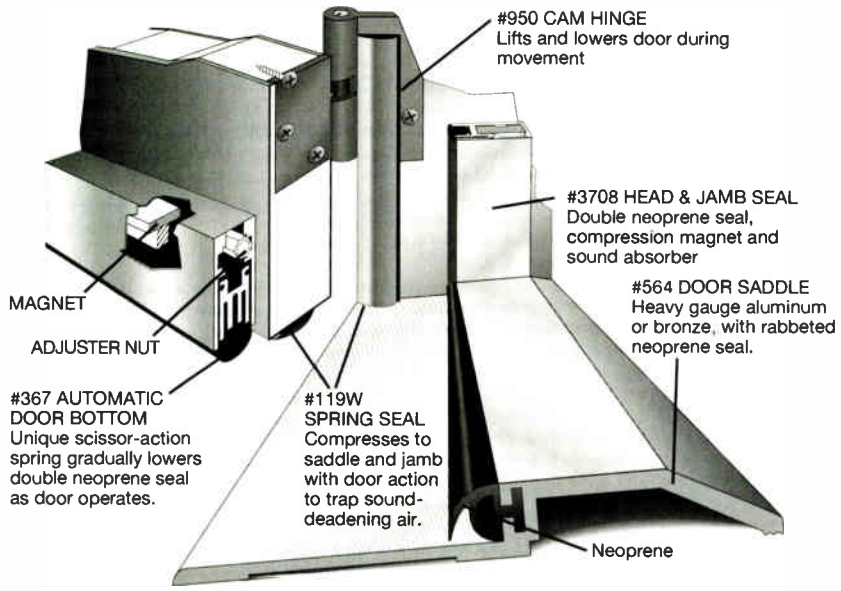

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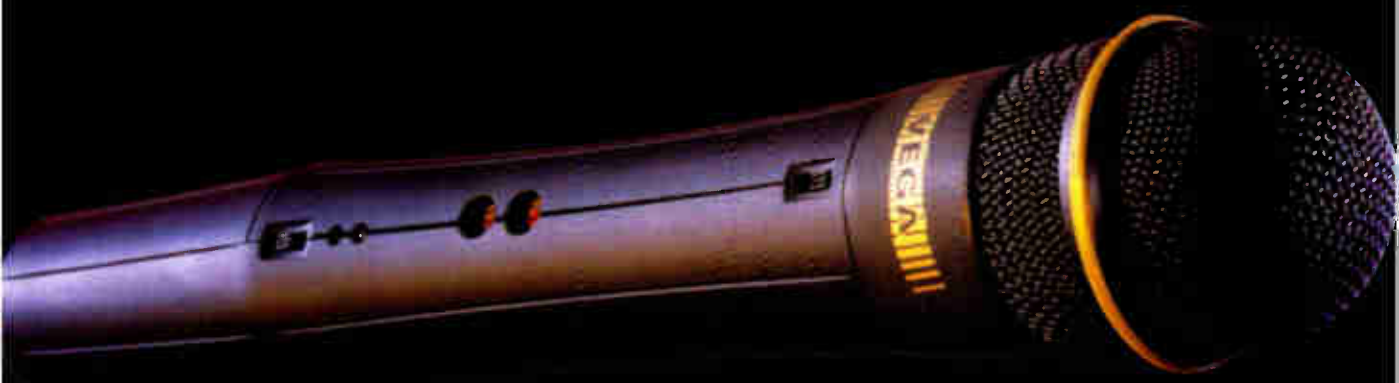

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buzzing if their lines are too close to your snakes. There are a lot of technical things to work out. Especially something like the Ozzfest where you've got 11 or 12 bands in one day.

Had you worked with any of these guys before?

I'd worked with Slayer. I produced and mixed their last live CD and video about a year ago. So that was a big plus and had a lot to do with me getting the gig, because they were such an important part of the tour. They were about the biggest band next to Ozzy.

How much tweaking was done to the music in the studio?

Almost all of it is completely live. We gave each band the opportunity to come into the studio with me for one night, and if there was anything obviously wrong or something that really needed to be fixed, we fixed it. But we didn't want to start overdubbing. When we had our first meeting, one of the things Ozzy said was, "We want this to be a live record. We want it to sound live and exciting. And we don't want to redo everything in the studio." So almost nothing was done in the studio. With Ozzy, his bass player had a problem with the jack on his bass—it kept going off and on—so we had to fix that because of a technical problem. But no other instruments were overdubbed. Which is a good thing, because some of these bands would be really hard to overdub because it's already like a complete wall of sound.

Which room at A&M did you mix in?

We used A and B; one is a Neve room, the other an SSL. We only used two rooms because of scheduling conflicts.

—FROM PAGE 185, INSTANT REMOTE TRUCK

shop, so we bought an air conditioner, plywood, etc., and built the van from scratch. Moreover, this wasn't just throwing stuff in the van—we actually showed up with a built control room in a van. When we got to the gig, we opened the two back doors and put in a pre-built wall that housed our CCTV monitor, Genelec speakers air conditioner, with a cable access hole for the audio, video, communication and power feeds. I did all the pre-production work ahead of time with the engineers from both bands. We already patched what compressors, EQs and gates I wanted to use up there. So we showed up, parked, tied in power, ran our audio/video feeds and we were up and running like the big boys. Everything worked out perfectly.

PHOTO: STEVEN REMOTE

Racks of EQs and outboard gear in the van

"We had 48 channels of API 3124M mic pre's, Focusrite ISA 215 EQs, Midas XL42 EQs and ATI Pro6 modules on the board. We used three Yamaha ProMix 01s for setting snapshots of the two bands' mixes. We utilized the API mic pre's and used the as Focusrite, ATI and Midas for signal processing. Then all I had to do was reset the mix snapshot and wait for show time to come around.

"Even though it may get complicated, we actually have enough gear to handle three dates in one night. Although my mobile unit looks like a full-blown permanently installed recording truck, it's not. You see, the way my truck is set up these days, everything is interchangeable inside—the console, unrestrained outboard gear and the multitracks can come and go. I designed and built a standardized central patchbay that interfaces to three ELCO/EDAC/XLR panels in the control cabin. We made a wide variety of harnesses that can plug into either my 96-channel Otari Status or ProMix 01s or the 02Rs, or my friend Dave's Trident console or whatever a client requests. The same goes for the multitracks, etc.—whatever the client wants is possible. For the Philly gig, we ended up using Dave's Trident console with my two Otari MTR90II 24-track machines. Dave was the engineer in charge in Philly, and I did my engineer/mixer thing in Boston for the live radio broadcast. We could not have had a finer dual session if we'd planned for it any better." ■

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Most of the main stage bands were mixed in A on the Neve, and most of the second stage bands were mixed on the SSL.

When you were recording the tracks live, were you using the Neve and API preamps on the trucks?

Yeah. With Design FX we used the APIs in the board. With Guy's truck, we had more than just his Neve board. We had a Soundcraft in there and another baby Neve because we had so many inputs.

Why would you need so many inputs on bands like these?

Well, even though the bands aren't that big, when you start adding the audience and some samples—like Danzig had a lot of inputs of just samples—and there were some settings we didn't want to change so we could leave them preset. That's the stuff that eats up inputs, like on the U2 tour. I just did U2 in Las Vegas, and they're just four guys; they used 68 inputs.

Is some of that for different guitar amps?

Different amps, so each amp has a different input; it's also a different track at times. But there's also a lot of samples being played. There's information coming down from computers and keyboard samples. Some of the drums they start with a drum program and then Larry [Mullen] plays along.

Who's triggering them?

They're all being triggered electronically by computers underneath the stage. You run a click—the band is hearing a click—and at certain times, certain samples or sounds get fired according to where they are in the show. It's all planned out perfectly, timewise.

How is working on this tour different from Rattle & Hum***?***

I've done all the [U2] tours since *Rattle & Hum*, but we didn't record anything as extensively as *Rattle & Hum* because then we were making a movie and a live record. Jimmy Iovine, who produced it, and I were on the road for a year to record that. We went all around the world.

Technically, this tour is not all that different from *Rattle & Hum*, or even the Zoo tour. *Rattle & Hum* was 68 inputs, too. There were always keyboards and samples being fired, but now there's more of the show being run by that. Also, they're wearing ear monitors now, so there are no stage monitors.

Is someone doing a rough mix of the shows as they go along?

No, we did a mixdown the first night only because the next night there was that ABC documentary and all the new live stuff was from that first night. So we got done with the show at close to midnight, and we stayed in the truck—me and the four bandmembers—until 7 a.m., mixing the stuff for the next day. They're really hard-working guys. They're the hardest-working guys and the best guys in the business.

Do you ever compare mixes you do with the front-of-house engineer's stereo mix?

We didn't that night because we were so harried. What I do, which is more important, and one of the reasons I was one of the mixers on the *Rattle & Hum* record—not because I was as good as or better than some of the other guys who tried to mix the record—is make sure I know what the band is sounding like in the house; in the audience. Every show I would walk out and stand in the audience for at least a number, so I could make sure that what was being heard in the truck was related to that. And when it came time to mix the record, there were a lot of guys mixing it and they weren't coming up with what the band wanted, so

CIRCLE AD NUMBER ON PRODUCT INFO CARD

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Bono called me and asked me to come in and try a couple of mixes, and I said, "Why do you think I'm going to be able to do a better job than this guy, who's one of the best mixers in the world?" And he said, "Because I know you know what the band sounds like live. You were there every night." That's really what it's all about. I don't like to mix a band in the studio without going to see them live first. Because, otherwise, you're missing a whole big part of what they do.

It seems like that would especially be true with bands that have triggered stuff, because how would you know what levels to put that information in the mix?

Exactly. We had an idea because we'd heard the records and Flood [producer] was working with me, so there was a lot of help and information beforehand. But there's nothing like walking out and hearing what that band sounds like live. If you haven't done that and you're trying to mix a record or trying to record a band live, when you walk out into that audience the light goes on: "Oh, this is what it's supposed to be." That's what I like to do, and I think it's what I do best. I'm not a producer who comes in and tries to change a band. What I try to do is capture what they do.

So many bands get into the studio and they have trouble sounding like they sound live, and it's very frustrating for them. For instance, with U2, they got off the road after a year, came into the studio and put headphones on and they're trying to cut a couple of tracks, and it just wasn't working. It was obvious to me what the problem was. They'd been in front of monitors that were bigger than most bands' P.A.s. They're going to come in and put these tiny little speakers on their ears and

DISNEY IN THE DOME

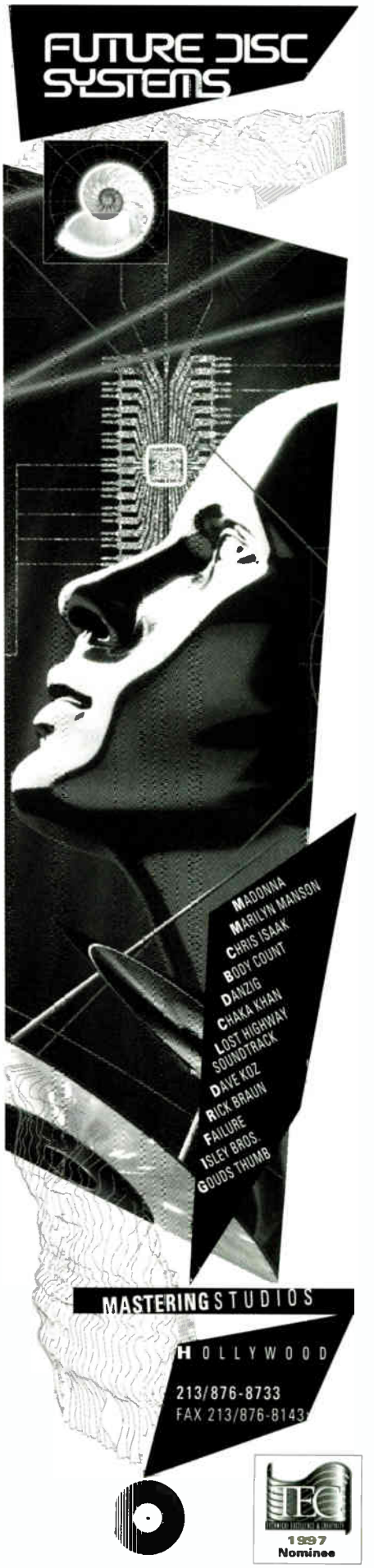
BILL SALTZER, SHEFFIELD AUDIO-VISUAL

"One of the most interesting projects we did was the premiere of Disney's *Hunchback* in New Orleans at the Super Dome last year. It didn't totally max out our truck, but the biggest challenge was that it required 140 inputs. Lee DeCarlo was the engineer on the show. They had a live orchestra, with Bill Conti conducting, and we individually miked most of the instruments. So that's quite a few inputs. And then the nature of the show was such that they kind of did a segment of each of their main animated films. They had someone come in and sing a song from *Aladdin* and from *Little Mermaid* and these other films, so you add in all the wireless vocal mics and it quickly jumps to 140 inputs. Now our truck has a 48-input SSL E Series console with G automation. It has a 24-input Neve, so that's 72 inputs. For the other inputs, we brought in a 40-channel Crest GTX-40 console, which worked very, very nicely for us. The string section got submixed on the Crest, and then that was brought into the SSL. We had no grounding problems really, no interfacing problems between the Crest and the SSL. Then we also had an additional 12-input Neve to augment the vocal mics.

"You walked in and it was just consoles everywhere. When you go to 140 inputs, obviously you're not going to be mixing every input. A lot of it gets set up and left. But the ergonomics were tough—Lee had another guy mixing vocals for him and they were facing opposite directions, so for them to both be able to see a video monitor at the same time was difficult.

"Lee was very laid back about the whole thing. In the end, he was very happy with the crew and the truck and everything. As an engineer he has very specific tastes in outboard gear, so we brought in some Pultec EQP 1As, Pultec NEQ5s, additional 1176s and some EMT 250s. Even though the show went up live to the Disney Channel, they also did a 24-track analog with SR recording just in case they decided to remix it later or redo any part of it.

"The only tricky thing, besides the number of inputs, was that the cable runs were 600 feet, so we did two cable runs of 52 pair, which is what we generally run on the truck, and then a third run of 28 pair. We have video production facilities back here [in Maryland], so we borrowed some DT12 stuff off our video truck, and made the rest of the runs with that. Our standard that we carry on the truck is 350 feet. But it worked out." ■



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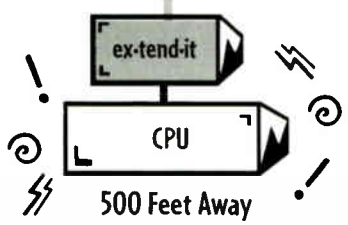

CIRCLE AD NUMBER ON PRODUCT INFO CARD

think they're going to be able to do what they did there? On that tour, we also recorded a lot of stuff at soundchecks, because you could stop and go back or whatever, but you still had the power of the P.A. and being on the stage. So when they got in the studio and it wasn't working out, I said, "This is ridiculous. Get the monitors in here. Not the whole thing, but bring a couple of wedges and set up in a circle—forget about the leakage; we'll deal with that—and let's get a vibe in here. That's what's important." So they did that, and they were happy right away.

Are most stadiums pretty well set up for live recording?

No, nothing is set up for live recording in a stadium. You do what you can to try to make your cable runs as short as possible, you split from the P.A., and you've got to get power, and make sure you've got enough power. With U2, we brought some generators, too. But with the Ozzfest at the Blockbuster Pavilion, you're outside and there's nothing there. It's a stage in the middle of nowhere.

How much of the U2 tour will you be on?

I'll go out whenever they need to record or if there's a live broadcast or whatever. They haven't decided yet. We'll do a bunch more stuff I'm sure, but nothing's been decided, and they're still getting the tour under way and have a lot of bugs to work out. They need to really tweak the P.A. just right for each stadium. The only reason they recorded the Las Vegas show was it was the first one and they wanted to get that first night on tour; plus, they had the TV special the next night.

Are there other live records you've recorded that you're particularly proud of?

You know, I used to run the mobiles out of New York with Dave Hewitt out of Record Plant, so I've worked with just about everybody. I did the Roger Daltrey thing a couple of years ago at Carnegie Hall, which was really a lot of fun and turned out great. All The Who came and played, and we had the Juilliard Orchestra and Eddie Vedder and Alice Cooper and the Spin Doctors and all these other people come and play with them.

But I've done so many. I used to do the King Biscuit Flour Hour shows. I did a couple of Stones tours. Live recording is something I started with when I began my career 20-odd years ago at the Record Plant. I was the only guy who worked in the studio as an assistant—I was Jimmy Iovine's assistant—and was also on the remote crew. So I'd work all week in the studio, and then on the weekend we'd go out and do Alice Cooper or Aerosmith or somebody.

Is this the truck that Kooster McAllister now runs?

Yes. Kooster was my friend from high school, and I brought him into the Record Plant. He's the only guy I ever brought into this business in 24 years. In 1974, I started at the Record Plant and I started with Dave Hewitt on the White Truck. Then, in about 1977 or so, Hewitt talked them into building the Black Truck, and I was basically in charge of running the White Truck when Hewitt got the Black Truck. I was also helping him build the Black Truck, but I needed somebody who could help me with the White Truck who was a real technical guy—something breaks, I don't fix it; I'm not a maintenance guy. And Kooster, who'd been i n bands and done this and that, came to work with me at the Record Plant. Now he *is* the Record Plant. Not only does he own the truck, he owns the name!

Have you ever thought of getting your own truck?

No, I don't have the time as a producer to run it, because basically that becomes your life. The good trucks are all very good, and I've developed relationships with a lot of them through the years. Usually, I'm involved in a project right from the beginning so I have some input in what trucks I use. So when they called me to do the Ozzfest record, where I needed two trucks, I called around and found what I wanted. With the U2 thing, if it wasn't somebody like Guy, I probably wouldn't do it. I wouldn't go out there and try to tackle a gig like that with a shitty truck, because I'd look bad. With *Rattle & Hum*, on the East Coast we had Hewitt's Black Truck. I've worked with him my entire professional life, so that's easy. Now Guy is my main West Coast guy. They're some of my best friends, and they're some of the best guys in the business, and they're there to help me. They're a big part of it. I'm not only getting a great truck, but also a crew and a main person I know very well.

Is there anything that's happened technologically since your King Biscuit days that has made live recording much easier?

Computers. Especially when you've got 12 bands, like the Ozzfest. You don't have 12 pencil marks on the board. You get a balance on each band, a preset, you punch it into the computer and

World Radio History

boom, go onto the next one. Then, when the show comes, you punch the button and you're back at those settings. That's the biggest help I can think of that's come along in years.

How about sonically?

Well, the trucks have gotten better. Hewitt built the first great truck—the Black Truck, which is no longer. Now he's got the Silver Truck, which is just so great. These guys aren't just putting your normal API or MCI in the trucks these days. They're putting old Neves and Flying Faders and so on. I'm not a digital guy, but when you get into a situation like this, to have two digital machines is really a luxury. When we did *Rattle & Hum*, we did it analog, so we had to have two trucks at every show. Instead of having a second machine for the spillover, we had a second truck. You have two 24-track analog machines in one truck, but that's not going to last the whole show, so when they're about to run out you start up another truck for the spillover. Now we don't have to do that. We have two 48-track digitals fit in the truck instead of four 24-track analog machines. Plus ADATs help also, because if you have a lot of samples, you don't have to use all the tracks for that. You can put them on ADAT and fly them in later.

Did you do that on Ozzfest?

Yeah, we used the ADATs on that and U2. We would have had to compromise if we didn't have that. Plus, it's always good for safety or if you're not sure if you're going to need something. Throw it onto ADAT and you have it there for later. So those format things—regular DAT, too—have helped also. You don't have to have everything on your multitrack. I just did an Alice Cooper live thing down in Cabo San Lucas, with Alice Cooper and Slash and Sammy Hagar and all these people at the Cabo Wabo club, but I couldn't get anyone to bring their truck down; I couldn't get anybody to bring their truck to Mexico. So Effanel put together a breakout package of ADATs for me and we flew them down in cases and instead of bringing a bunch of reels of 2-inch multitrack tape out of Mexico, which would probably never happen anyway, I just carried out a few ADATs, and we didn't worry about customs or getting ripped off or a truck getting ripped off down there.

Have you ever had any nightmarish live recording experiences?

One of the U2 shows when they first started [on the *Rattle & Hum* tour], we were at a stadium near Denver, out by the airport and Edge [guitarist Dave Evans] was on a Nady or Sony [wireless] system, and Adam [Clayton, bassist] was on a different system, and as soon as an airplane came anywhere near, which was quite often, you had the pilot's voice blasting out of his amplifier and also coming into my truck. That also happened to me with the Stones once at Nassau Coliseum. The Stones were up there playing loud, and all of a sudden, louder than the band, coming out of the monitors, we hear *"Mira, mira, donde estás? Donde estás?"* It was a cab outside with a hopped-up radio that came across the wireless lines—totally illegal, by the way. They found him in ten minutes and arrested him. But you're sitting in the truck, and suddenly you hear a pilot or some cab driver, it's pretty frightening.

Now, with U2, you could say it's part of the multimedia presentation. It's a concept.

[Laughs] Right! The past U2 tour, we had the band in Philadelphia or someplace and we had a live feed to a remote truck and I was mixing them, and it was coming through the phone lines. It was coming out live in the house for the MTV Awards, and Dana Carvey was playing the drums along with the band on a big screen 2,000 miles away. And right before we're about to start the soundcheck, I get a call that the phone lines are down in Oklahoma. What do you do about that? So I couldn't get the feed from the band. About ten minutes before the show, we got it, but with no soundcheck. You have to wing it. Same thing with the Roger Daltrey/Who thing at Carnegie Hall. It was the snowiest day imaginable and nobody got there for soundcheck; none of the trucks got there. We had a 70-piece orchestra and all these guys and we never had a soundcheck. So you just have to go for it. That's what the live thing is all about. ■

—FROM PAGE 185, GRAHAM PARKER

Morrison. "It's a long, thin room, about 40 feet wide by 80 feet long with a 12-foot ceiling. It's all hard substances, with an elevated stage that has a small drum riser."

The album was produced by Parker and recorded by Morrison in Steve Remote's ASL Mobile Audio Productions truck. "But since we were still under the impression that this was just going to be a promotional item, I had to save

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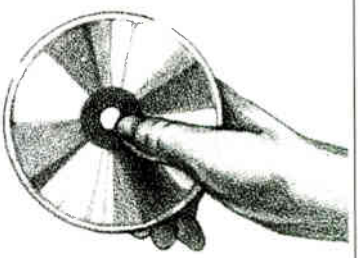

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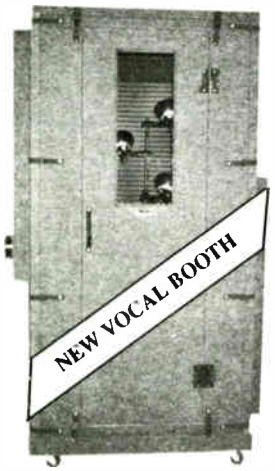

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Graham Parker and The Figgs on the Acid Bubblegum tour

money on every front," says Morrison, "so I brought a Tascam MS16 machine from my house and installed it in the truck so we could save on tape stock and on the truck's 2-inch costs." Morrison did use Remote's new 96-channel Otari Status board and Genelec 1031A monitors, though, and the owner was on hand at all times to make sure the project went smoothly.

Morrison took first split from the Bogie's stage and used a similar setup to what The Figgs use in the studio: an Electro-Voice RE20 on kick drum, a Shure SM57 on snare, Sennheiser MD421s on rack and floor toms, a couple of AKG 460s overhead, another RE20 on bass, SM57s on all three guitars, and SM58s on vocals. "I would never take DIs on guitars," says Morrison. The only way to get the personality of a guitar is to mike the amp itself." The mic choices suited Parker fine, too; he brings his own 58 vocal mic to every gig.

Morrison used all of the Otari's preamps, which he says he was quite happy with. He also used a good deal of UREI 1176 compression. "When you're recording live, the big issue you're worried about, especially with vocals, is whether you're going to have level for every moment," Morrison says. "You want to make sure that if he's swigging a beer and singing a song, you still get it on tape. So I hit him really hard going to tape, and I also cut tape very hot."

The mix was done at Trax East (South River, N.J.) by Morrison and the studio's owner, Eric Rachel. The facility is equipped with a Sound Workshop 34 console and KRK, Genelec and Yamaha monitors. They used the console mainly for returns, though, sending all of the tracks through Schoeps, Focusrite and Neve outboard EQs and preamps. Other outboard gear Morrison and Rachel used included dbx 160 compression and Drawmer gates on the kick and snare drums, and Eventide 3000 and TC Electronic M5000 reverb on the snare and on vocals. "We essentially custom wrote the program for each track as we put it up," says Morrison. "We mixed the whole record—22 songs—in three days."

The mixing process went smoothly, but there were a few important fixes. In the middle of "Saturday Night Is Dead," lead guitarist Guy Lyons broke a string and wasn't able to finish a solo, so Morrison and Rachel re-recorded the solo and edited it in. "To cop the sound [of the performance]," Morrison explains, "we miked up the same amps—same mic setup, same basic signal chain—and we played back the mix into the room so that it would sound like the mic did onstage, with the band bleeding in." They also repaired Parker's cover of the Prince song "Cream." Parker sang some verses in the wrong order, but backing vocalist Mike Gent sang them correctly, so the engineers flew the lead vocal out and flew the individual lines in where they should be.

The only other changes involved using Rachel's Pro Tools system to edit out lengthy pauses and stage chatter, and to deal with overenthusiastic audience members. "On 'Don't Get Excited,' there was a double stop in the middle," says Morrison, "and right at that moment, some drunken cowboy screamed 'Don't get excited!' horribly out of pitch and louder than anything else in the room. We eliminated a few people from the audience using Pro Tools." ■

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COAST TO

L.A. GRAPEVINE

by Maureen Droney

A group of studio heavy hitters led by producer/engineer Al Schmitt gathered in Capitol's Studio A for a live-band-with-orchestra-and-vocals session with Japanese vocal stylist Yasuko Agawa. With the help of arranger Greg Adams, they recorded seven Broadway show classics, including "I'll Take Manhattan," "Tea for Two," "Begin the Beguine" and "Somewhere." Agawa, who sings in English and has released more than 20 albums in Japan, is known for her theme-oriented records. The last one, titled *Le Cinema*, was comprised of songs from movies. Featured musicians at the Capitol session were Harvey Mason on drums, Melvin Davis on bass, Jai Winding on acoustic piano, Gary Herbig on saxophones and woodwinds, and John Chiodini on guitar, along with a 16-piece string session contracted by Suzie Katayama. Producer Schmitt, one of the acknowledged masters of live recording, kept things rolling (seven songs in six hours!). Schmitt of course, is particularly known for his string sounds, but he did this session a little differently: "I went for a warm, intimate sound on this session," he says. "That's what suited the arrangements and the sound of her voice. We didn't use

—CONTINUED ON PAGE 203

PHOTO: MAUREEN DRONEY

Al Schmitt (L), Greg Adams and Yasuka Agawa in Capital Studia A

NY METRO REPORT

by Dan Daley

James Sabella in his Long Island studia

Manhattan casts a long shadow, and most studios out on the periphery have known what it's like to be under it. But competition from both large Manhattan facilities on the one hand and from MDM-based home studios on the other have—in between the griping—produced some innovative responses. One comes from Jim Sabella, owner of Sabella Recording in Roslyn Heights, just over the city line in Nassau. Sabella has become a sort of analog evan-

—CONTINUED ON PAGE 208

World Radio History

COAST

SESSIONS & STUDIO NEWS

Immortal Productions in Canal Fulton, Ohio, recently opened its new, full-service recording and mastering facility, housed in a 120-year-old barn. Designed by studio chief engineer Cal P. Moore in conjunction with Russ Berger of the Russ Berger Design Group, the facility is equipped with a 32-channel Soundcraft console with Optifile automation and 24 tracks of Alesis ADAT-XT.

SOUTHERN CALIFORNIA

A&M artists Monster Magnet tracked their *Power Trip* LP in Studio A at NRG Recording (North Hollywood) with producer/engineer Matt Hyde and second Steve Mixdorf ...Eighth wonder k.d. lang mixed for her new Warner Bros. release, *Drag* (a collection of smoke-themed cover songs), with producer Craig Street and engineer Pat McCarthy at Ocean Way in Hollywood...Capitol artists Everclear mixed for their new release at Skip Saylor Recording in L.A. Bandmember Art Alexikis produced. Andy Wallace engineered and Ian Blanch assisted...Image Recording in Hollywood hosted Joe Cocker, tracking in the SSL 4056EG room for Sony Music with producer/engineer Chris Lord-Alge, assisted by Michael Dy...Toad the Wet Sprocket spent a week in Sony Music Studios in Santa Monica working on a "Columbia Cast" radio show as well as a Sony S.I.R.E.N. internet broadcast. The band worked with producer Mitch Makatansky, engineer Quake and assistant Troy Gonzalez...

Boulevard Recording Co. recently opened its redesigned recording and mastering room in Bergen, N.J. New gear includes a Soundcraft Ghost board, Manley and Summit limiters and Amek/Neve 9098 EQs.

NORTHEAST

La Face Records artist Dee Dee O'Neal mixed at BearTracks Recording (Suffern, NY) with producer Herb Middleton, engineer Mark Partis and assistant Rick Pohronezny...At Coyote Recording in Brooklyn, NY, The Insteps cut two self-produced songs for a Hellcat Records ska compilation with co-producer/keyboardist Glen Adams, engineer Albert Caiati and assistant Grace Falconer...

—CONTINUED ON PAGE 215

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by Bill Gibson

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—FROM PAGE 200, L.A. GRAPEVINE

room mics as I normally would, because even though we had the strings we weren't going for that big, open room sound. Instead, we kept things a bit tighter."

Even with the plethora of live band tracking going on these days, it's still a rarity and a pleasure to hear a whole song recorded at once. "It really is amazing to do an album live," says arranger Adams, who has worked with artists such as Elton John, Lyle Lovett, Michael Bolton and just recently Diane Schuur on her live recording also produced by Schmitt. "It's instant gratification to hear right away what it's going to sound like. And, of course, it's a challenge for me because it has to sound great out of the gate—the parts all have to be right the first time. This project was particularly fun because it gave me an opportunity to write arrangements with very lush textures. That's something that doesn't come around that often anymore, but this genre of music really lends itself to that style of writing. And of course the songs are great—they've endured the test of time."

Everybody on the session seemed to agree: The musicians all seemed inordinately happy to be playing on material with such great melodies—dancing was observed in the control room. Could be a new music trend here, accompanying that *Swingers*/Dresden Room hipster movement.

Meanwhile, over at Westlake/Santa Monica's Studio C another batch of industry vets were also cutting live—the seven-member Little Feat was in with engineer Ed Cherney at the board, coproducing with Bill Wray and Little Feat keyboardist and B3 master Bill Payne. The sessions included recording several new songs for the next Little Feat release and work on a compilation album that's a tribute to the "Easy Slider"—legendary guitarist/songwriter and Little Feat founding member Lowell George. The album features favorite tunes of that master performed by (in addition to Little Feat themselves) Bonnie Raitt, Jackson Browne and, rumor has it, the SubDudes and Mary Chapin Carpenter.

Guitarist Fred Tackett took a break from playing to fill us in on the project. "It's been in the works for a couple of years," he says, "the idea to get a bunch of people to pick out their favorite Lowell George songs. We picked 'Honest Man,' which Lowell and I had

—CONTINUED ON PAGE 206

Pilchner Schoustal Architectural Acoustics designed this new facility for Angel Mountain Productions (formerly known as Sloyer Sound) in Bethlehem, Penn. The floating live room was built with moveable panels that allow the recording space to be adjusted for a sound from dead to extremely bright. The control room is equipped with a 40-channel Soundcraft DC2020 console, 24-tracks of Sony PCM-800, and monitors by Quested, Genelec and Tannoy.

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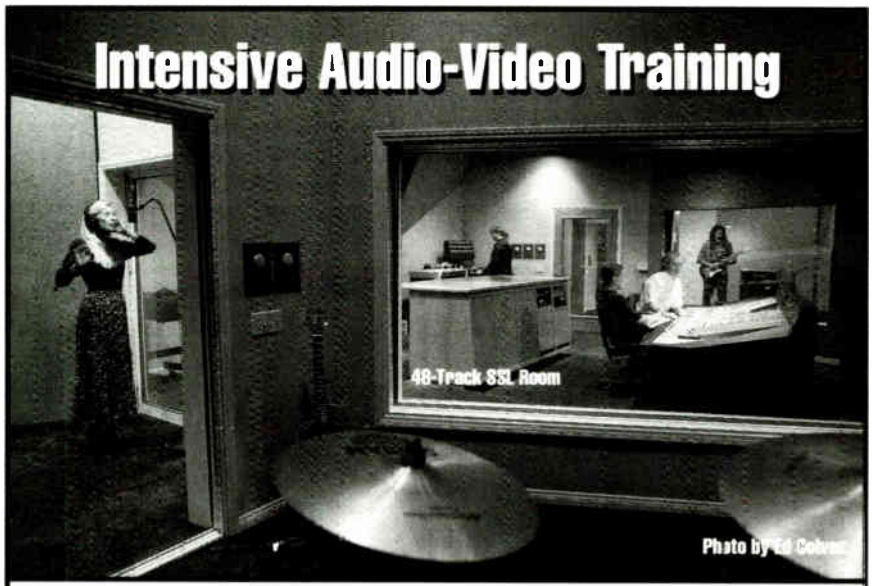

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—FROM PAGE 203, L.A. GRAPEVINE

written for his solo album *Thanks I'll Eat It Here*. It's a tune we've been playing in concert, so it was a real natural for us to play and for Shaun [Murphy, current Little Feat lead singer, dubbed "The First Lady of Little Feat"] to sing. It's always been one of my favorite collaborations with Lowell because I really love the words he wrote on it. It's very simple, about a stand-up, righteous kind of guy, and about how to live and let live: 'That's the way of an honest man, doin' the best he can...You don't need a vision or a religion, just understandin', it's not that demandin'...'"

The version on Lowell's solo record was a late-'70s-style funk take with clavinet and horns. "This time we've made it a little bit harder," says Tackett. The Little Feat band includes, besides Tackett on guitar, Payne on B3 and Wurlitzer and Murphy on lead vocals, drummer Richie Hayward, bassist Kenny Gradney, Paul Barrere on guitar and Sam Clayton on percussion. All seven played live on the cut. "We didn't use a lot of isolation and just really went for a blend," says Cherney. "They really are one of the greatest bands in the world; I love the way they sound together, and the real way to catch them is live."

"There are always trends in recording," adds Tackett. "Used to be everybody wanted to put all the instruments in their own boxes and have complete control over each one; now the trend is what we've been doing on our last couple of albums with all of us in the room together. That works for us, probably because we're onstage so much of the time playing that way."

Feat work fast—they got four tracks that day and mixed all four the next. "Yeah, we don't have enough time to be messin' around anymore," concludes Tackett. "Gotta do it, get it out there and get back on the road."

Live, Live-er, Live-est—Alesis clinician/producer/engineer **Jimmy Church**, assisted by Alesis "product evangelist" **Jeff Slingluff**, hit the road May 30 to record **Quiet Riot** at The Joint in Las Vegas' Hard Rock Hotel. According to Allen Wald, Alesis vice president of sales, six ADAT-XTs were used to capture the performance of the four-piece band before a wildly enthusiastic crowd of 1,600 radio station contest winners. "It was quite a scene," says Church. "The band played great, and the crowd went crazy. It's really a reunion album with original bassist Rudy

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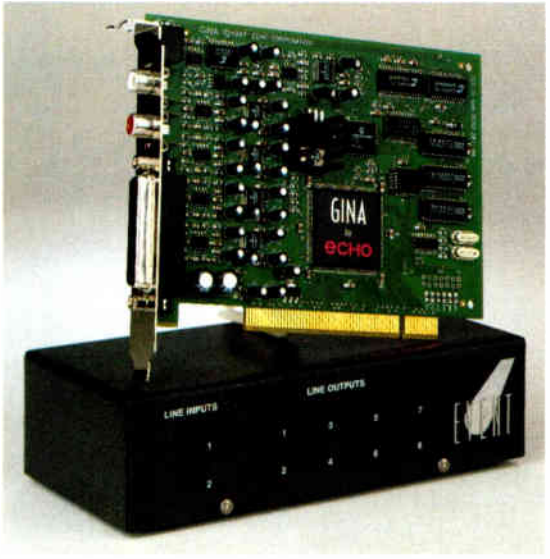

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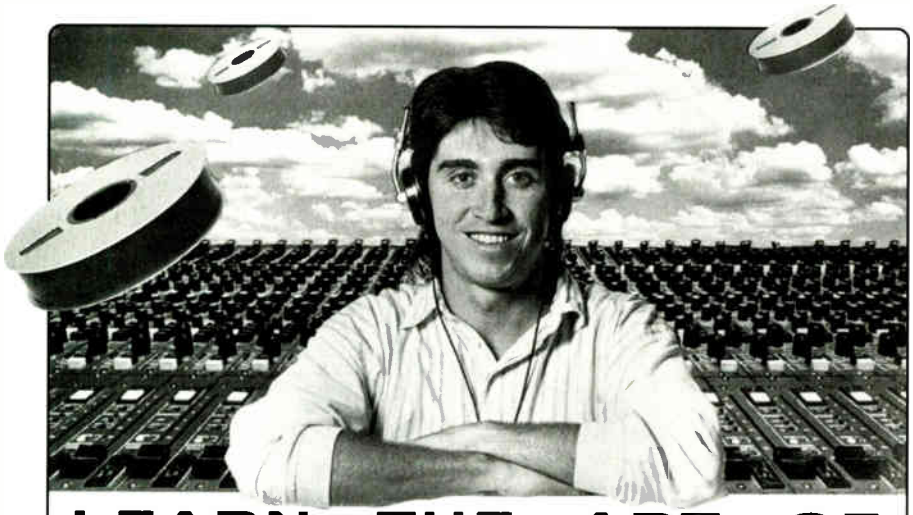

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Sarzo back in the band after 13 years, joining up with Kevin DuBrow on vocals, Carlos Cavazo on guitar and Frank Banali on drums. It was quite a challenge, because unlike most live albums where several shows on a tour get recorded in order to compile the songs, we only had one show and one shot at recording it."

No recording console was used—instead the team set up stage-left behind the monitor board, taking a feed from the stage splitter snake to the tape machines through outboard preamps: eight Neve 1073s, five Requisite Y7 tubes, two Amek 9098s, eight channels of GML and four channels of Neumann. Using the six ADAT-XTs enabled the crew to run two 24-track systems in tandem to seamlessly record the entire 1½-hour concert. Monitoring was through the new Alesis Studio 32 mixer, an inline 16-channel console that allows 32 channels of input.

The band aimed to please their diehard fans, performing hard-rocking versions of their hits "Metal Health/Bang Your Head" and "Cum on Feel the Noize," along with acoustic versions of "Thunderbird" and "Don't Wanna Let You Go," ending with their version of AC/DC's "Highway to Hell," which they recently recorded for an AC/DC tribute record.

Watch for the evening's recording to show up as Quiet Riot's next album, along with four new bonus songs. Alesis' Wald says proudly, "We're excited that Quiet Riot chose the ADAT format as their preferred recording medium for such an important project. The reliability and roadworthiness of the ADAT-XT has set a new standard for recording both inside the studio and on the road." ■

Got L.A. news? Fax it to 818/346-3062 or e-mail MsMDK@aol.com.

—FROM PAGE 200, NY METRO REPORT

gelist, wading out into the Manhattan club scene armed with a sampler CD of acts that have worked at his one-room, vintage-accented (Neve 8068, Studer A80, nine Pultecs) studio. With his rap, Sabella attempts to convert a generation that has grown up believing that, as he puts it, "The sales receipt from Sam Ash for a couple of ADATs and a Mackie console is the equivalent to a diploma for an education in pro audio."

Detailing his methods, Sabella says,

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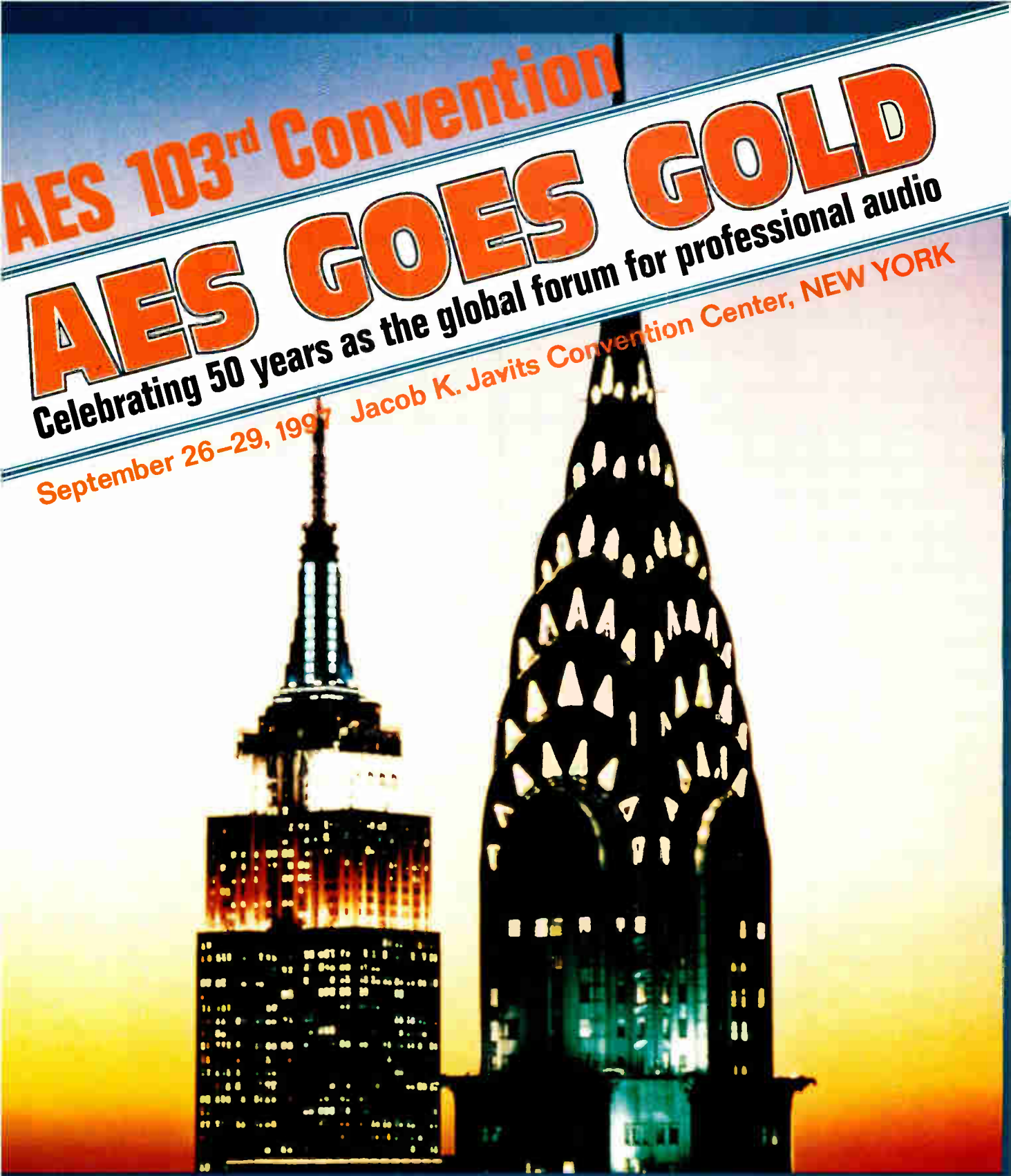

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"We went out one night to the Continental Club, and they were having a benefit where 40 bands played two songs each. I came up to them as they came off and gave them a CD and said, 'Hey, there's a way to get the sounds you're looking for using a real studio.' You can't sit around waiting for the phone to ring; those days are over. You have to go out to where the bands are and educate them, like when [Chung King Studios owner] John King went out and did that with the rap community years ago: go to them and explain what a real studio does. That's what I'm doing. And it's working."

Sabella acknowledges that it's harder than ever for studios these days to make a living for their owners, and that being outside of Manhattan is a double whammy. But like most real New Yorkers, Sabella plays as many angles as he can find. For instance, while a lot of studios have begun brokering CD replication and tape duplication services as an added revenue stream, Sabella's brother-in-law is a principal in Allied Digital Technologies, one of the largest replicator/duplicators in the world, which is based on Long Island. "Hey, I can give someone the highest-quality CD you can make, and I can get a good price from my brother-in-law," Sabella says with a laugh. "It's tough out there. You gotta do what you can. But one thing you definitely have to do is to reach out to new clients. And at least that's one thing Manhattan's good for: All the clubs are packed on to one little island." In addition to work with the club crowd, Sabella Studios has recently had in the Jono Manson band (with Jon Popper of Blues Traveler), guitarist Warren Haynes, and did sessions for a Johnny Thunders tribute CD.

Some other Long Island recording studios have been the target of a group of thieves in recent months. Since April, at least three Nassau County facilities have been robbed of expensive microphones. One estimate has pegged the area's losses in that category at between $40,000 and $60,000. In each case, the M.O. appears to be similar—a studio will get an inquiry about the facility and then schedule a visit, during which a studio owner or manager will, naturally, show off all of the studio's wares, including its microphone collection. A second visit is then arranged in which two or three people come in. What has happened then, in several cases, is that while the studio manager is in some way dis-

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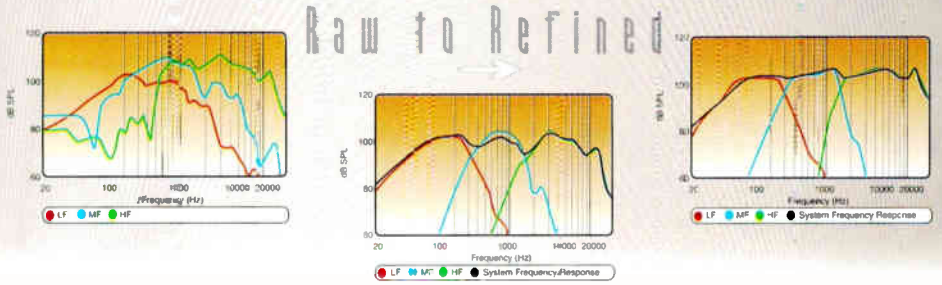

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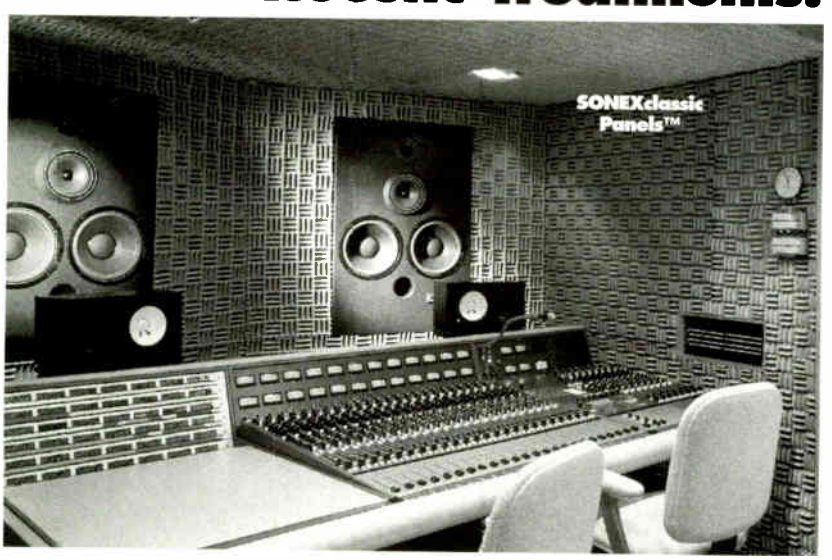

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tracted by one of the prospective "clients," another grabs valuable microphones that can be easily snatched, hidden and spirited out under a coat or bag.

Creative Sound in Massapequa was one of the first studios hit. Owner Fred Loshen says new "clients" showed up in April to see the studio and said they would return with a deposit. When they said they forgot their cash, Loshen directed them to a nearby ATM and went into his office to write a receipt. "I was waiting and waiting and thinking to myself it can't take anyone *this* long to get cash from a machine," he recalls. "I walked through the studio, and that's when I noticed that some mics that had been set up on stands were missing." In Creative Sound's case, an AKG 414 TL-2, a Sennheiser 421 and an EV RE20 were stolen. At Cove City Sound, owner Richie Canata says that he lost two Neumann 87s to the thieves in the same manner.

In other cases, studio owners have received calls asking if the studio was open at a certain time of night, and have noticed cars idling in their parking lots. That was the case at Tiki Recording, which has not been robbed, but where studio manager Inge Jannen noticed a strange car in the studio's lot that left shortly thereafter without its occupants ever getting out. Since the crime wave started, Jannen said that Tiki now locks its front door and visitors must be buzzed in, something the studio management never felt they had to do before.

Pie Studios, also in Glen Cove, had a visit from someone who may have been one of the perps. According to studio manager Ruth Devere, Pie was called by a new "client" who asked about hours of operation and scheduling a visit. Devere, who says she probes cold calls more than many other studios might, asked how the caller had heard about Pie. "He said he saw our ad in the Yellow Pages," Devere says. "We don't advertise in the Yellow Pages, so I was a little suspicious from the start." The suspects—Devere says they and their car matched descriptions that had been given to police by other studios—did show up unannounced three hours later but left without incident.

The fact that mostly expensive microphones have been stolen thus far suggests the thieves are at least somewhat knowledgeable about pro audio equipment. As Loshen sarcastically put it, "They have more than they need for

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Foreword by Bob Bralove

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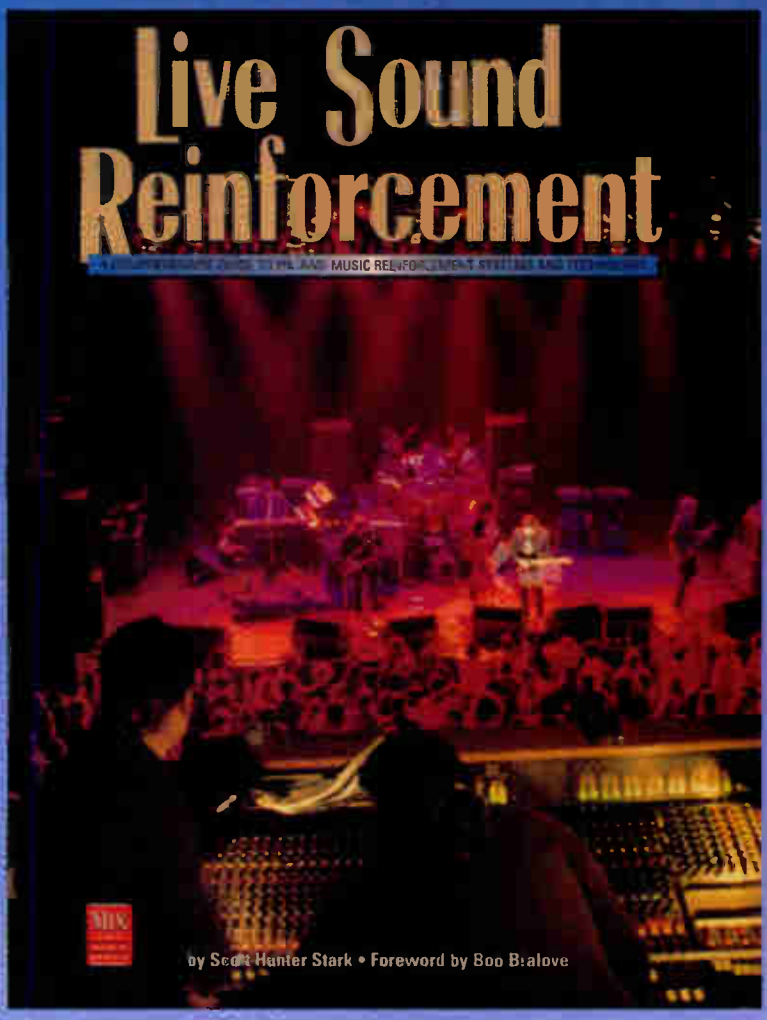

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a band at this point." This same M.O. has been reported periodically by Manhattan studios over the years, and indeed there have been recent reports of Manhattan and Connecticut studios being cased similarly, although no connection with the spate of Long Island crimes has yet been made. But it's the first time the scam has been experienced on Long Island to this degree of concentration, and it has significantly undermined the sense of security that many studios outside of Manhattan have felt, one which helps counterbalance the extra effort with which they have to market themselves as they compete with facilities in Manhattan.

Jannen contacted *Mix* and has been in touch with other area studio owners, and studios are cooperating with the area police departments; according to Jannen, the Glen Cove Police Department has assigned a detective to the case. The Seaford, N.Y., P.D. also reportedly has a detective assigned to the case.

"Studios have to have an open-door attitude," says Jannen. "That's how we get new business. Naturally, studio owners want to show off all of their best equipment. We don't want to conduct our business of recording, which most of us love and want to be involved in, in a state of fear and mistrust. But we do want to conduct our work safely. And hold onto our Neumanns."

Design Dept.—New York-based **Francis Manzella Design Ltd.** recently completed several local design projects. Manhattan Center Studios commissioned Manzella to redesign its control room and technical spaces associated with the 7th-floor Ballroom studio. The room, well-known for classical and film score recordings, now features a completely new multiformat, surround sound mixing control room. The room's 108-input Neve VR96 is augmented by an ATC 100-based L-C-R surround system, as well as Tannoy 215-DMT left/right music mixing monitors, and the design includes a dual main monitor system in the front wall in addition to a projection screen and multiple video monitor. FM Design supervised the completion of construction for a new SSL 4000G Plus mixing room for busy New York-based engineer/producer Tommy Uzzo. Mirror Image Studios' new room in midtown Manhattan features JBL 4430 mains, combined with a pair of 4645B subwoofers to satisfy Mr. Uzzo, in what has become an unrelenting search by dance, hip hop and R&B producers to

World Radio History

take the bottom where no record has gone before.

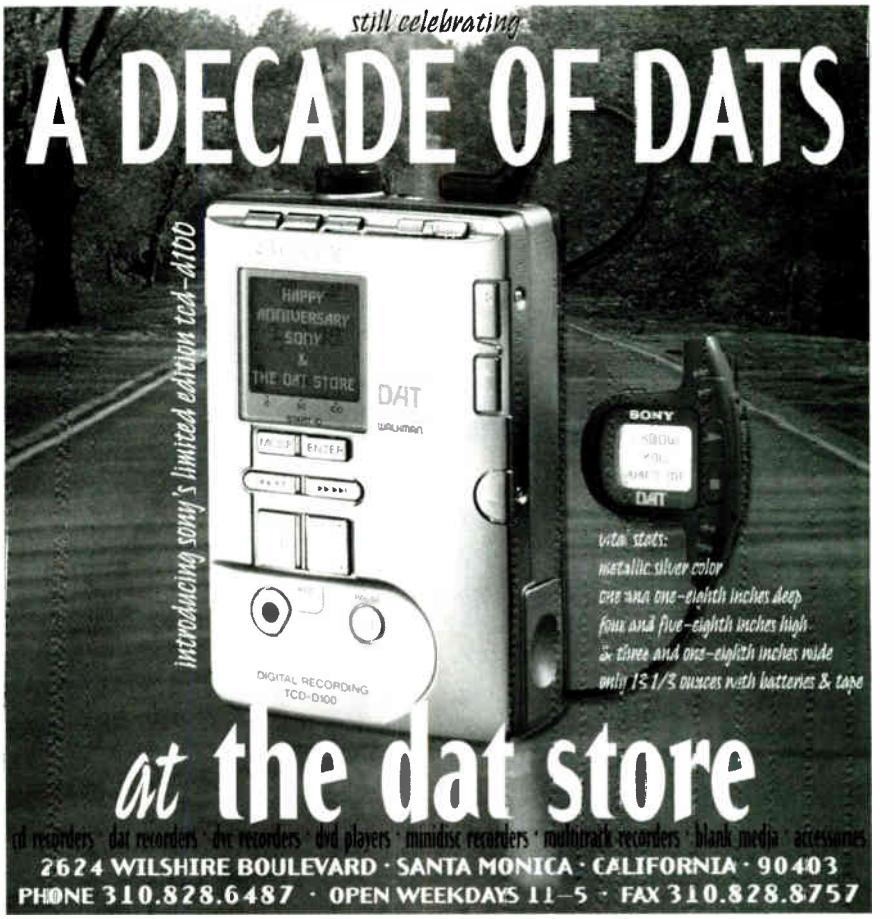
Speaking of new studios—and ones beyond the pale of Manhattan—R&B producer/mixer **Dave "Jam" Hall opened DMH Studio in Mamaroneck** in Westchester on May 22. The two-room facility, designed by his brother Anthony Hall, has a Neve VR64 with Flying Faders, a Sony APR-24 multitrack and Quested main monitors in the main room. Studio B is equipped with a Mackie 32x8 console, a Tascam MSR-16 and various close-field monitors. The facility is intended to be used for Hall's in-house productions for his label Hall of Fame Records and is available for rental by other clients. ■

E-mail New York news to Dan Daley at danwriter@aol.com, or send a fax: 615/646-0102.

—FROM PAGE 201, SESSIONS & STUDIO NEWS

Soundworks Studios in Watertown, MA, had Tone Cool artists **Kid Bangham** and **Amyl Justian** in recording an upcoming release produced by **Richard Rosenblatt** and **Bob Kempf** and engineered by **Brian Capouch**... Boston's **Sound Techniques** had **Popgun Picnic** in the Neve room mixing a new release with producer/engineer **Mark S. Berry** and assistant **Tom Richards**...Tracking and overdubbing on the 8038 at **Sear Sound** (New York City) was **Joan Osborne**, for Mercury/PolyGram. Osborne co-produced with **Pat McCarthy**, who also engineered, assisted by **Tom Schick**. Engineer **Danny Kopelson** was in on some of the early tracking...In Studio A at **Sweetfish Recording** (Argyle, NY), Ignition

The Otari Status computer-controlled console is the centerpiece of the main studio at the new Las Vegas headquarters of Voyage Records. The 3,000-square-foot facility includes two other studios, a sequencing room and an audio post suite, equipped with a Studer Dyaxis II. The new label's first release, now available, is an LP from country artist Bo Riddle.



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recording artists **Lughead** mixed tracks for their upcoming release. In Studio B, producer **Mike Siskind** recorded tracks with **Michael Ellis**. **Jeff Shears** engineered...Engineer **Bill Winn** mixed a project for **Paquito D'Rivera** and the Manchester Craftsman's Guild at **Soundmirror Studios** in Boston...

NORTHWEST

S.F. Bay Area-based rapper **Chunk** mixed new material for **E•lan Records** in Studio C at **Music Annex**'s Menlo Park, Calif., facility with executive producer C. **LA**, producer **Sean T.** and engineer **Mike Hersh**...Local scenesters **JoJo** recorded a few songs for Bulk Recordings at **The Blue Room Studios**, San Francisco, with producer **Dan** "The Automator" **Nokamura** and engineers **Todd Tate** and **Marc Senesac**...

NORTH CENTRAL

Producer **Tim Williams** did vocal overdubs at Smoke Eater Studios (Inkster, MI) with artist **Leslie Rochelle**. Studio owner **Mike Moore** engineered...At **Time Capsule** in Denver producer **Geoff Workman** was in tracking and mixing **House of Stone**...Latin rockers **Rico** mixed their latest at **Performance Recording** in Chicago. Also, the studio intalled Theil loudspeakers and Bryston amps and preamps in the mastering suite...At **Gravity Studios** in Chicago, **Bob Mould** produced three songs for Sony 550 artists **Verbow**. **Jim Wilson** engineered. Smashing Pumpkins drummer **Matt Walker** and his other band, **Cup Cakes**, worked on new material with engineer **Doug McBride**...**Stokely**, of the group Mint Condition, worked on a remix for Sony/Work Group artist **Sabelle** in Studio A at Flyte Tyme Productions (Minneapolis, MN). Engineer **Jeff "Madjef" Taylor** worked the board...Hard rockers **Attic Destiny** recorded a four-song demo at **BLR Studios** in LaPorte, IN...At **Smart Studios** (Madison, WI), **Doug Olson** completed mixes for an upcoming **Vandalias** album, and reggae artists **Natty Nation** tracked songs for their next one with engineer **Mike Zirkel**...**Sugarbuzz** recorded for an upcoming Parasol Records release at **Bam! Studios** in Chicago...

SOUTHEAST

Producer/engineer **Tom Lord-Alge** mixed singles for **INXS** and **the Catherine Wheel** at **South Beach Studios** in Miami with assistant **Leo Herrera**. Also in was Island recording artist **Mangu**, mixing with producer **Joe Galdo**, engineer **Cesar Sogbe**

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and assistants Juan Rosario and Angel Ylisastigui...DreamWorks recording artists Parental Advisory tracked and mixed for their second album at Patchwerk Recording in Atlanta with producer/engineer Joshua Butler. Ichiban artist/producer MC Breed was also in, tracking with engineers Butler and Mike Wilson...Patty Loveless mixed for Sony with producer Emory Gordy Jr., engineer John Guess and assistant Patrick Murphy at Masterfonics in Nashville...Hip hop heavyweights rocked the house at Criteria Recording in Miami: Doctor Dre, NAS, Foxy Brown and AZ, collaborating on a project called The Firm, cut tracks and vocals for an upcoming Interscope release. Dre produced, Richard Heredia engineered and Scott Kieklak assisted... Charlie Major tracked and overdubbed for BMG/Canada at Nashville studio Sound Emporium with producer/engineer Mike Poole and assistant Matt Andrews...Producer/engineer David Z mixed with A&M recording artist Johnny Lang at The Sound Kitchen in Franklin, TN. Tim Coyle assisted...At the Memphis, TN, House of Blues, Snoop Doggy Dogg recorded a track for his next RCA release on the SSL in Studio A with producer Marc Kinchen and engineer Kevin Haywood...Texan singer/songwriter Lonnie Hillard worked on an album of car racing (NASCAR, specifically) tunes at Catalyst Recording (Charlotte, NC). Bobby Allison and Derek Cope were among the NASCAR drivers contributing guest vocals on the LP...Raul DiBlasio mixed his latest album, *Solo*, with engineers Eric Schilling and Bob St.John at Miami's Crescent Moon Studios. Steven Menezes, Sean Chambers and José Maldonado assisted...

SOUTHWEST

Recent sessions at Future Audio in Dallas included A&M artist Zaykia doing a remix for an upcoming single, with

—CONTINUED ON PAGE 225

PHOTO BAXTER BUCK

Neil Grant of Harris, Grant Associates designed this room for Battery Studios, Nashville. The room's centerpiece is a 64-input Neve 8068 with a Fred Hill & Associates center section and 64 channels of GML automation. Recorders include a Mitsubishi X 880 32-track and an Otari MTR-90 24-track.

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Digital Audio Workstation for Macintosh

With Pro Tools Project you get 8 tracks of digital audio &, on some Power Mac systems, up to 16 tracks of playback & 64 virtual tracks! The Pro Tools Project system includes an audio card as well as award winning Pro Tools software. You choose either an 888 or an 882 I/O to complete the package. Project also features MIDI recording and playback as well as Quickpunch™ punch-on-the-fly & when your ready to ugrade, its ready too.

REQUIRES–
- Qualified NuBus or PCI Macintosh CPU
- Hard Drive, system software 7.1 or greater
- 24MB RAM minimum
- 14" monitor (17" recommended).

ProTools 4.0 Software
Digital Audio Software for Macintosh

Pro Tools version 4.0 software provides the next step in the evolution of Digidesign's award-winning digital audio production software for the Mac. Fully Power Mac native 4.0 features noticable improvements in every major area. ProControl™ support, improved automation features, realtive fader groupings & group nesting, plug in MIDI personality files, multiple edit play lists, Sound Designer II™ funcionality, Finder-style searching & sorting, and I'm out of breath.

WINDOWS

Session 8™
Digital Audio Workstation for Windows

Session 8 is a professional quality digital audio recording, editing, & mixing system created specifically for personal and project recording studios. Designed to operate with Windows 95 or Windows 3.1, Session 8 offers professional recording features, powerful random access editing, automated digital mixing, & unparalleled integration with most popular MIDI sequencers.

FEATURES–
- 8-channel direct to disk digital recording
- Random access, non-destructive editing
- Automated, intuitive digital mixing environment
- Built-in volume & pan automation
- Complete SMPTE frame rate support
- Frame accurate syncwith built in .AVI video playback window
- Digital parametric EQ
- Support for multiple hard drive partitions
- Auto sample rate convert to 44.1 or 48 kHz mono WAV file format
- Choice of audio interface options

SOUNDSCAPE
DIGITAL TECHNOLOGY LTD.

SSHRD-1
Hard Disk Recorder/Editor

A professional Multitrack Digital Audio Workstation, the SSHDR1 combines the highest quality processing hardware with easy-to-use Windows-based software. The most complete and affordable solution for high quality digital audio on the PC, the SSHDR1 has over 50 powerful editing tools and is expandable from 8 to 128 tracks, with up to 32 inputs and 64 outputs. Ideal for a wide range of applications ranging from project studios, to multi-unit 32, 48 and 64 track systems for major TV and film studios needing audio post production linked to video.

Version 2.0

SSAC-1
Accelerator Card

The new SSAC-1 is a DSP card that can be added to any existing SSHDR-1 system for faster processing as well as an additional 8 channels of I/O in the form of a TDIF port. This card is needed by anyone who wants to upgrade an existing system to V2.0.

SS810-1
8 Channel I/O

This rack mount unit connects to the SSAC-1 card via the expansion port to give you 8 XLR ins & outs with superb A/D-D/A conversion. It also features an ADAT Optical interface. The **SS810-D** comes without the analog converters for connecting an ADAT without additional channels.

CD & CASSETTE DUPLICATION

marantz
CDR615 / CDR620
Compact Disc Recorder

Both next-generation stand-alone write-once CD recorders, the CDR615 & 620 offer built-in sample rate conversion, CD DAT/MD DCC subcode conversion, and adjustable dB level sensing. Additional features include adjustable fade in/fade out, record mute time, & analog level automatic track incrementing. A 9-pin parallel (GPI) port and headphone output with level control are also included.

CDR620 ***Additional Features–***
- SCSI-II Port • XLR (AES/EBU) Digital In/Out and Digital cascading
- 2x speed recording • Index Recording and playing*
- Defeatable copy prohibit and emphasis • 34 key 2-way wired remote (RC620)

***Available on CDR615 w/optional Wired Remote (RC620)**

Telex
ACC2000/ACC4000
Cassette Duplicators

Designed for high performance & high production, Telex duplicators offer easy maintenance and operation. The **ACC2000** is a 2-channel mono duplicator while the **ACC4000** is stereo. Each produces 3 copies from a cassette master at 16x normal speed & by linking additional copy modules, you can duplicate up to 27 copies of a 60 minute original ***in under two minutes.***

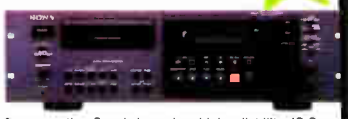
ACC2000XL/ ACC4000XL

The XL Series feature "Extended Life" cassette heads for increased performance and wear characteristics. They also offer improvements in wow and flutter, frequency response, S/N ratio & bias.

STUDIO DAT RECORDERS

SONY
PCM-R500

NEW PRODUCT



Incorporating Sony's legendary high-reliability 4D.D. Mechanism, the PCM-R500 sets a new standard for professional DAT recorders. The Jog/Shuttle wheel offers outstanding operational ease while extensive interface options and multiple menu modes meet a wide range of application needs.

FEATURES–
- Set-up menu for preference selection. Use this menu for setting ID6, level sync threshold, date & more. Also selects error indicator.
- Includes 8-pin parallel & wireless remote controls
- SBM recording for improved S/N *(Sounds like 20bit)*
- Independent L/R recording levels
- Equipped with auto head cleaning for improved sound quality.

TASCAM
DA-20/DA-30mkII

- Multiple sampling rates (48, 44.1, and 32kHz).
- Extended (4-hour) play at 32kHz.
- S/PDIF Digital I/O. RCA Unbalanced In/Out.
- SCMS-free recording. Full function wireless remote.

DA-30mkII Additional Features–
- Variable speed shuttle wheel
- Digital I/O featuring both AES/EBU and S/PDIF.
- XLR balanced and RCA unbalanced connections.
- SCMS-free recording with selectable ID.
- Parallel port for control I/O from external equipment.

Panasonic.
SV-3800/SV-4100

The SV-3800 & SV-4100 feature highly accurate and reliable transport mechanisms with search speeds of up to 400X normal. Both use 20-bit D/A converters to satisfy even the highest professional expectations. The **SV-4100** adds features such as instant start program & cue assignment, enhanced system diagnostics, multiple digital interfaces and more.

FOSTEX
D-15

The new Fostex D-15 is the least expensive timecode DAT on the market. It has a host of new features aimed at audio post production and recording studio environments.

FEATURES–
- Chase mode functions built in
- Hold the peak reading on the digital bargraphs with a choice of 5 different settings
- Set cue levels and cue times
- Supports all frame rates including 30df
- Newly designed transport is faster and more efficient utilizing a 4-motor design. 120 minute tape shuttles in about 60 seconds.
- Parallel interface
- Front panel trim pots in addition to the level inputs

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reputation for flawless performance & uncommon flexibility in the most demand- studio & concert sound applications. dual 1" Gold-sputtered diaphragms. flat on-axis response. • 126dB dynamic range. switchable 10dB and 20dB pad. • 20Hz–20kHz.

CAD
E-300
Studio Condenser Microphone
multi-patterned side address mic that combines vintage capsule design with vanced head-amp electronics, the E-300 s an unusually wide frequency response 10Hz to 20kHz & an exceptional dynamic nge of 137 dB. It also features extremely v self noise of 11dB. Ideal for even the ost critical studio applications.
own with optional ZM-1 Shockmount

nique powering of all Equitek Series microphones is accomplished with a r of rechargeable nicad 9-volt batteries combination with 48V phantom power. This over- mes inherent current limiting associated with most antom power supplies & can supply 10x the current.

audio-technica.
AT4050/CM5
Cardioid Capacitor Microphone
he AT4050 multi-pattern condenser expands upon the AT4033 to set the standard for dio performance mics.
capacitor elements.
ardioid, Omnidirectional, & Figure 8 polar pat- rn settings.
apor-deposits of pure gold on specially-contoured rge diaphragms are aged through 5 steps to nsure optimum characteristics over years of use ansformerless circuitry results in exceptional tran- ent response and clean output even under extremely high PL conditions.

AZDEN
UHF Performance Series
aking new ground, Azden's new UHF receiver and crophone transmitters offer superb performance and tures at prices far below anything you've ever seen.

41UDR UHF Receiver
rystal-controlled, PLL synthesized UHF receiver with 63 ser-selectable channels in the 794-806 MHz band. Up to systems may be used simultaneously. Features both 1/4- ch and XLR output jacks, volume adjustment and can be ick mounted.

41HT Handheld Microphone Transmitter
ewly-designed handheld with supercardioid um-direction- mic element and 63 user-selectable channels. Uses 2 AA kaline batteries or Azden ni-cads with the AMC-2A harging Station.

41BT Bodypack Transmitter
3 user-selectable channels, input level control, standby witch, locking mini-plug connector and metal clip. Ideal r use with lavalier and headset microphones or as an nstrument transmitter.

AMC Ni-cad Battery Charging Station
urns the 41HT into the only rechargeable UHF micro- hone available. (Uses Azden AN-1A nicad batteries only). ully charged, the 41HT will run for 4 hours. Charging time approximately 12 hours

SENNHEISER
ME66/K6P
Short Shotgun Microphone
his road ready mic system is perfect for camera mount and other short gun applications. It's profes- nal sound quality and affordable price combined h the flexibility of a modular setup make it a hard price to beat.

MIXING BOARDS

MACKIE.
SR24x4 • SR32x4
Sound Reinforcement Consoles
These consoles do for live sound what the acclaimed 8-bus series has done for studio recording. Both professional grade mixing consoles, the SR32-4 and SR24-4 were built to deliver the same kind of useful features found on "bigger boards" while standing up to 24-hr-a-day use.
- Fast, accurate, easy level setting via "solo"
- 4 submix buses.
- 3 band EQ w/ sweepable mids.
- 6 Aux sends.
- Globally switchable AFL/PFL.
- Mackies "VLZ" technology for low noise.
- Tape return to main mix, mono out w/level control

The new MS-1202, 1402, 1604 & SR Series all include VLZ (Very Low Impedance) circuitry at critical signal path points. Developed for Mackie's acclaimed 8•Bus console series, VLZ effectively reduces thermal noise and minimizes crosstalk by raising current and decreasing resistance.

TASCAM M-1600
16 & 24 Channel 8-bus Consoles
Great for modular Digital Multitrack setups and hard disk recording, the M-1600 is part of Tascam's next generation series of recording consoles. It features multiple options for inputs and outputs and uses the same, easy to install D-sub connectors as Tascam's more expensive consoles, all in "a compact design.
- XLR Mic inputs w/phantom power on 8 channels.
- Signal present/overload indicators on each channel.
- Balanced & Unbalanced tape returns & Balanced Group/Direct outputs using D-sub connectors.
- TRS Balanced Line Inputs on all channels.
- 3-band EQ with sweepable mids.
- 5 Aux sends (1 stereo)
- 4 assignable aux returns
- Perfect for use with DA-88 and ADAT setups

MINIDISC MULTITRACKS

TASCAM
564 Digital Portastudio
The Tascam 564 Digital Portastudio combines the flexibility and superior sound quality of digital recording with the simplicity and versatility of a portable multi-track. Using MiniDisc technology, the 564 has many powerful recording and editing features never before found in a portable 4-track machine.
JUST IN
FEATURES–
- Self-contained digital recorder/mixer.
- Uses low-cost, removable MiniDiscs.
- 2 AUX sends / 2 Stereo returns.
- 4 XLR mic inputs.
- Channel inserts on inputs 1 & 2.
- 5 takes per track, 20 patterns, 20 indexes per song.
- Random access and instant locate.
- Non-destructive editing features with undo capability include: bounce forward, cut copy, move.
- Full-range EQ with mid-range sweep.
- S/PDIF digital output for archiving.
- MIDI clock and MTC.

SONY
MDM-X4 MD Multi-Track Recorder
MD recorders are here! Offering up to 37 minutes of high-quality 4-track digital recording, the MDM-X4 is truely the next generation of personal multi-tracks. With a built-in mixer, exclusive Track Edit system, and a Jog/Shuttle wheel for sophisticated editing with ease, the MDM-X4 will encourage you to flex your creativity.
FEATURES–
- Records on high quality, removable MD data discs • 3.5-gen. ATRAC LSI for wide dynamic range
- 10 Input / 4Bus mixer.
- 2 AUX sends, 3-band EQ. • 11-point locator.
- Random access memory for quick playback and record from anywhere on the disk.
- Editing features include Undo, Redo, & Section-Song editing for flying material between different tracks.

STUDIO MONITORS

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NEW PRODUCT
Point Seven
DESIGNED FOR MULTI-MEDIA!
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- Front ported venting system for great bass response.
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- 85Hz–27kHz, ±3dB.
- 2kHz crossover for accurate phase and a wide "sweet spot" for mixing.
- Accurate flat sound reproduction.
- Great for studio and multi-media applications.

TANNOY
PBM 6.5II
Studio Reference Monitors
The PBM 6.5 II is the industry standard for studio reference monitors. They provide true dynamic capability and real world accuracy.
- 6.5" lowfrequency driver and 3/4" tweeter
- Fully radiused and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass.

SONY
NEW PRODUCT
SMS-1P
Powered Studio Reference Monitors
The new SMS-1P monitors are perfect for post production environments. They feature 2 types of inputs with independent volume adjustment, 15 watts of power, bass/treble control and shielding for use near computer monitors.

JBL
4206 & 4208
Studio Reference Monitors
The 4206 & 4208 studio reference monitors are 6" and 8" respectively. Both offer exceptional sonic performance, setting the standard for today's multi-purpose studio environments.
- Multi-Radial baffle ABS baffle virtually eliminates baffle distortion.
- Superb imaging & reduced phase distortion.
- Pure titanium diaphragm high frequency transducer provides smooth, extended response.
- ***Magnetically shielded for use near video monitors.***

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PRO CASSETTE DECKS

TASCAM
202 MKIII / 302

These decks provide high-fidelity sound reproduction and a wide frequency response, as well as a host of feciting & play back features.
- Dual Auto Reverse, Normal and high-speed dubbing.
- "Dolby HX Pro" extends high frequency performance and minimizes distortion.
- Auto sensing for Normal, Metal & CrO2 tape.
- Intro Check, Computerized Program Search, Blank Scan and One Program quickly find the beginning of tracks.

302 *Advanced Features–*

The 302 is 2 independent decks, each with their own set of RCA connectors, transport control keys, auto-reverse, and noise reducing functions. Cascade and Control I/O let you link up to 10 additional machines for multiple dubbing or long rec & playback.

112MKII/112RMKII

A classic "no frills" production workhorse, the 112MKII is a 2-head, cost effective deck for musicians and production studios. It features a parallel port for external control and an optional balanced connector kit for integration into any production studio. The **112RMKII** features a 3-head transport with separate high performance record and playback heads as well as precision FG servo direct drive capstan motors

SIGNAL PROCESSING

BEHRINGER
MDX 2100 Composer

- Integrated Auto/Manual Compressor, Expander & Peak Limiter.
- Interactive Gain Control (IGC) combines a clipper and peak limiter for distortion-free limitation on signal peaks.
- Servo-balanced inputs & outputs are switchable between +4dB & -10dB. ***NEW LOW PRICE!***

APHEX
107 Tubessence
2 Channel Mic Preamp

The 107 delivers outstanding sonic performance, as well as a great degree of presence, detail, & image.
- Up to 64dB of gain available
- 20dB pad with red LED indicator, 2 LED input meter
- Full 48V phantom power with red LED indicator
- Low cut filter at 80Hz, 12dB/octave
- Polarity inversion switch with LED indicator
- Switchable +4dB/-10dB output, 1/4" Balanced.

109 Tubessence
Parametric EQ

The Aphex 109 is an extremely versatile,high performance parametric vacuum tube EQ with professional flexibility and sound quality.

Great for "warming up" digital signals.

EFFECTS PROCESSING

JUST IN

Lexicon
PCM-80 & PCM-90
Digital Signal Processors

A great combination for any studio owner with an ear for the best. The **PCM-80** delivers high quality multi-effects based on the legendary PCM 70, maintaining Lexicon's high standards for sonic clarity and extrodinary processing power. The **PCM 90** is a digital reverb with its roots stemming from the studio standard 480L and 300L effects systems. Reverbs from telephone booths to the grand canyon, the PCM 90 is incredibly realistic. Together, they make an excellent addition to any rack mount arsenal.

Buy a PCM-80 and receive a FREE Pitch FX Card
offer valid thru 7-31-97

Lexicon MPX-1 Multi-Effects Processor

Lexicon's latest addition to thier Digital effects family, the MPX-1 features top-quality effects in an eay to use, 1 rack space unit. With 56 Pitch, Chorus, EQ, Modulation, Delay, and world-class reverb affects accesable from the front panel, as well as TRS and XLR balanced I/O and complete MIDI implementation, the MPX-1 creates a new standard for cost and quality in a multi-effects device.

t.c.electronics
Wizard M2000 Studio Effects Processor

The M2000 features a "Dual Engine" architecture that permits multiple effects and 6 different routing modes making it a great choice for high-end studio effects processing.

FEATURES–
- 250 factory programs including reverb, pitch delay, chorus, flange, phase, EQ, de-essing, compression, limiting, expansion gating and stereo enhancement
- 20-bit A/D conversion, AES/EBU and S/PDIF digital I/O.
- "Wizard" help menus, 16-bit dithering tools.
- Tap and MIDI tempo modes.
- Single page parameter editing, 1 rack space.

SONY
DPS-V77 2 Ch. Master Effects Processor

Sony's latest effects processor, the DPS-V77 yields excellent sonic quality combined with realtime control, a digital I/O and many more features that will put a smile on the face of any discerning studio engineer

FEATURES–
- 198 preset &198 user-definable programs.
- Control up to 6 parameters in realtime via MIDI information and an optional foot pedal
- Use the AES/EBU & SPDIF digital I/O to link multiple V-77s together & when working with digital mixers
- 10-key pad input
- Shuttle-ring equipped rotary encoder allows for quick patch changing.
- A noise gate circuit is provided ahead of the input for guitar players and other instrumentalists who want top quality effects without sacrificing tone.

ALESIS
QuadraVerb 2 2 Ch. Master Effects Processor

Alesis' most powerful signal processor, the Q2 offers amazing audio fidelity in a versatile multi-effects unit. Great for professional & project studio owners, its large backlit display making parameter editing intuitive and quick.

FEATURES–
- 100 preset & 20m user-edtable programs.
- Octal Processing allows use of up to 8 effects simultaneously in any order.
- Choose between over 50 different effects types for each block, including reverb, delay, chorus, flange, rotary speaker, pitch shift, graphic and parametric EQ, overdriver and more.
- 5 seconds sampling, triggerd pan, and surround sound encoding are built in.
- Selectable -10 dB and +4dB levels, servo-balanced TRS inputs and outputs.
- ADAT Digital Interface allows you to work entirely in the digital between the Q2 and an ADAT XT.

PRO HEADPHONES

AKG
K240M

The first headphone of choice in the recording industry. A highly accurate dynamic transducer and an acoustically tuned venting structure produce a naturally open sound.
- Integrated semi-open air design.
- Circumaural pads for long sessions
- Steel cable, self-adjusting headband.
- 15Hz -20kHz, 60Ω

SONY
MDR 7506

The Sony **7506**'s have been proven in the most trying studio situations. Their rugged closed-ear design makes them great for keyboard players and home studio owners.
- Folding construction
- Frequency Response 10Hz to 20k Hz
- 1/4" & 1/8" Gold connectors
- Soft carrying case
- Plug directly into keyboards

beyerdynamic
DT 770 Pro

These comfortable closed headphones are designed for professionals who require full bass response to compliment accurate high and mid-range reproduction.
- Wide frequency response
- Durable lightweight construction
- Equalized to meet diffused field requirements
- Padded headband ensures long term comfort

SENNHEISER
HD 265/HD580

The **HD-265** is a closed dynamic stereo HiFi/professional headphone offering high level background noise attenuation for domestic listening and professional monitoring applications. The **HD 580** is a top class open dynamic stereo HiFi/professional headphone that can be connected directly to DAT, DCC, CD and other pro players. The advanced design of the diaphragm avoids resonant frequencies making it an ideal choice for the professional recording engineer.

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otary 2 head design,
rect drive
otors.
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puts
w/phantom
ower)
nalog and S/PDIF (RCA) digital I/O.
2/44.1/48kHz sample rates & SCMS-free recording.
uilt in MIC limiter and 20dB pad.
RS jack w/ level control for monitoring.
ncludes shoulder belt, AC adapter, & battery.

PDR1000/PDR1000TC

head Direct Drive transport
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ncludes S/PDIF (RCA) and AES/EBU (XLR).
/R channel mic input attenuation selector(0dB/-30dB)
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luminated LCD display shows clock and counter, peak
vel metering, margin display, battery status, ID num-
er, tape source status and machine status.
ickel Metal Hydride battery powers the PCR1000 for
hours, AC Adapter/charger included.

)R1000TC Additional Features–

ll standard SMPTE/EBU time codes are supported,
ncluding 24, 25, 29.97, 29.97DF, & 30 fps
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VS1000 Master Sync module
nsures drift will be no more than
1 frame in 10 hrs.
VS1000 Headphone Matrix
rovides a rotary switch for selec-
ion of Stereo, Mono Left, Mono Sum, & M/S
(mid-side) Stereo modes.

JUST IN

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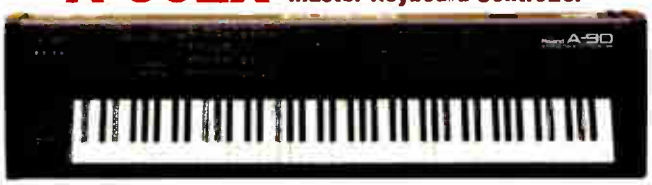
his is the least
expensive
rtable DAT
chine avail-
e. It features
kHz, 16-bit
npling, autc-
tic and manual
ording level, a long
y mode for 4 hours of record-
on a 120 minute tape, & an anti-shock
chanism. It includes a carrying case, a DT-10CLA
aning cassette and an AC-E60HC AC adaptor.

KEYBOARDS & SOUND MODULES

Roland A-90EX Master Keyboard Controller



The A-90EX is an 88-note, weighted master controller with one of the best keyboard actions currently on the market. It offers incredibly realistic piano sounds, powerful controller capabilities and "virtual" programmable buttons which can be configured to operate your software and other devices. The A-90EX combines the majestic sound of a concert grand, the expressive action of a fine acoustic keyboard and the comprehensive MIDI functions of a master controller—all in a portable stage unit.

Roland JV-2080 64-Voice Synthesizer Module

Roland resets the standard with the incredibly expandable JV-2080 64-Voice Synthesizer Module. This amazingly powerful package offers unprecedented expandability, digital signal processing, and remarkable operational ease, all housed in a 2-unit rack-mount design.

FEATURES–
- 64-Voice polyphony / 16-part multitimbral capability.
- 8 slots for SR-JV80 series expansion boards.
- 3 independant effects sets plus independant reverb/delay and chorus.
- 6 outputs, Main Stereo and 4 assignable.
- **NEW** patch finder and Phrase Preview functions for easy access to the huge selection of patches.
- Large backlit graphic display
- Compatable with the JV-1080, XP-50, and XP-80.

Roland JP-8000 Analog Modeling Synthesizer

Analog is back- FOR REAL! This synth delivers a killer array of real-time control, Roland's revolutionary new analog modeling technology, and FAT, FAT SOUNDS! The assignable ribbon controller, 4 octave keyboard, built in arpeggiator w/ external sync capability, and RPS function will make this little gem a must have for DJs and re-mixers as well as that funk musician looking for some new inspiration.

NEW PRODUCT

FEATURES–
- 8 note polyphonic, 49-key velocity sensitive keyboard.
- Newly developed DSP oscillator
- "Motion Control" recalls parameter changes in realtime
- Single, Dual, & Split mode, assignable "on-the-fly".
- 128 user/ 128 preset patches, 64 user/64 preset performances.
- Tone control, 12 chorus, & 5 delay effects. *Play of soul.*

PORTABLE HARD DISK RECORDING

Roland VS-880 V2

his new version of the popular VS-880 incorporates powerful additional software functions that allow you to get the most out of this baby's incredible creative potential.

EATURES–

uto Mixing Function records and
lays back your mix in realtime
asy recording with an inserted
ffect in "INPUT-TRACK" mode.
rocess the master output with
specific inserted effect such as
otal compression.*
cene change by MIDI program
hange message.
imultaneous playback of 6
acks in MASTER MODE recording.
igital output with copy protection.
0 additional effect algorithms (30 total)
ncluding Voice Transformer, Mic
imulator 19-band Vocoder, Horn
ancelor, Lo-Fi Sound Processor, Space
horus, Reverb 2, 4-band Parametric EQ,
0-band Graphic EQ, and Vocal Canceller.

- 100 additional preset effects patches.
- Use MIDI program & control change messages to edit and change effects.
- In total, over 20 powerful and convenient features in editing/sync sections have been added. Some require the optional effects expansion board

Fostex DMT-8 VL

The latest in the Fostex HD recording family, the DMT-8 VL truely brings the familiarity of the personal multi-track to the digital domain.

FEATURES–
- 18 bit A/D, 20 bit D/A conversion.
- Built in 8 channel mixer, Ch 1&2 feature mic & line level.
- 2 band EQ and 2 AUX sends per channel
- Cut/Copy/Move/Paste within single or multiple tracks.
- Built-in MIDI Sync., 5 memory locations.
- Dual function Jog/Shuttle wheel provides digital "scrub" from tape or buffer without pitch change. 1/2X to 16X.
- Divide the drive into 5 seperate "virtual reels", each with it's own timing information.
- NO COMPRESSION!

NEW PRODUCT

MIDI

OPCODE Studio 5 LX Macintosh MIDI Interface

The Studio 5 LX is arguably the most advanced MIDI interface on the market today. It incorporates a MIDI patchbay, MIDI processor, and SMPTE synchronizer with it's interface functions, all in a 2 rack space unit.
- 15 Independant MIDI ins and outs.
- SMPTE reads and writes all formats– 24, 25/29.97/29.97DF/and 30.
- Network multiple units, 240 MIDI channels each.
- 128 patches, unlimited virtual instrument control.
- 2 assignable footswitch inputs, 1 controller input
- 8X speed when used with OMS.
- Internal power supply.

Studio 3 & 4 MIDI interfaces, and Vision 3.5 sequencing software also available.

JUST IN

Mark of the Unicorn MIDI Time Piece AV 8x8 Mac/PC MIDI Interface

The MTP AV takes the world renowned MTP II and adds syncronization that you really need like video genlock, ADAT sync, and word clock sync, even Digidesign superclock!
- Same unit works on both Mac & PC platforms
- 8x8 MIDI merge matrix, 128 MIDI channels.
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- Fast 1x mode for hogh-speed MIDI data transfer.

Pocket Express Mac/PC MIDI Interface

With the pocket express you get a 2 in, 4 out, 32-channel interface that supports both Mac and PC. It also features a computer bypass button that allows you to use it *EVEN WHEN THE COMPUTER IS TURNED OFF.*

Digital Performer Macintosh MIDI Sequencer w/ Integrated Digital Audio

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World Radio History

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Steve Shafer Music, Chicago, opened a new, 5,000-square-foot facility designed by the Walters-Storyk Design Group. The studio features a Synclavier networked with a Postpro digitol recorder and a Euphonix console combined with an Otari analog recorder.

—FROM PAGE 218, SESSIONS & STUDIO NEWS

Gerard Hairston engineering...In at Bismeaux Studios (Austin, TX) was Sir George Martin with Goldie Hawn, cutting Goldie's version of "A Hard Day's Night" for a forthcoming Echo Records/Buena Vista Productions album (and documentary film) called *In My Life*, which will feature Beatles tunes as interpreted by Hollywood's finest. Word is this is the last project Martin plans on producing. Texan Larry Seyer and Englishman Rupert Coulson engineered, assisted by David Gratz and Kevin Cochran...Recent sessions at The Hit Shack, Austin, Texas: Curb Records artist Hal Ketchum, in with producer Stephen Bruton and engineers Danosworth and Jay Hudson; and Richard Backner, recording for MCA Records with producer J.D. Foster and engineer Andy Taub...

STUDIO NEWS

Former Geffen Records VP of recording David Donnelly recently opened full-service production and mastering studio Digital Dynamics, presently located in Hollywood, Calif. A new facility is under construction in Santa Monica, designed by Chris Pelonis...Patrick Leonard relocated his studio, Johnny Yuma, to one of the cabins on the 5,000-acre Caribou Ranch in Colorado, near the former site of the famed studio of the same name. Johnny Yuma's gear includes two Otari RADAR disk-based recorders. Leonard also started his own label, Unitone Recordings...Axis Studios (New York City) added a Bag End ELF-M integrator and a pair of Bag End D12-EC subwoofer systems to its Studio B...Green Room Recording (Nashville), owned by noted gospel producer Paul Wright III, installed a Soundcraft DC2020 console ...As part of a package of enhancements to its recording studio complex, the University of Memphis installed an AMS Neve Libra digital mixing console...L.A.'s Record Plant installed an 80-channel SSL 9000J, making the studio, with four rooms, an all-SSL facility. .The Music Lab in Hollis Hills, NY, installed a MegaMix inboard automation system into its AMR Production series 1600 console. Installation was by Scott Gramlich and control room design by Tom Maguire of TMI Engineering. ■

PHOTO: CHESTER DEGUIN

This is Control A at Big Sky Audio in Spingfield, Pa. Designed and constructed by owners Drew Raison and Andy Pellak, the room includes a Neotek console, a vintage 3M M-79 2-inch 24-track, 32 tracks of ADAT, and Genelec and JBL monitors. The studio offers music production and mastering to a Philadelphia-area clientele and has recently hosted sessions for Le Click (RCA/Logic) and Paul Murray (Columbia/Ruffhouse).

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—FROM PAGE 56, CONTROL ROOM DESIGN

always looking for new and better ways to do just that."

Storyk sees the computer leading the way to drastic improvements in auralization techniques and simulations. "The ability to predict what a space sounds like from the 3-D CAD model—that is the one everyone is looking for. Putting on headphones and hearing what the space sounds like from your computer—a lot of people are contributing to that outcome."

Studio bau:ton's Maurer thinks the day for studio acoustic simulation may already be here, but just barely. "Up until very recently, we designed all of our studios according to the basic applied physics of sound, but it was never a really exact scientific approach. A lot of the design decisions were made from the collection of data of previously built studios. But there was always this unpredictability of what happens after the drawings and the designs are finished, and what happens during construction. The client makes change orders, site conditions that you couldn't foresee force you to move a wall a little bit here or make an angle a little different there. Every time you do something like this, it will change the whole acoustic picture.

"Over the past few years, we have been following the developments of acoustical simulation programs, and nothing had come up that had taken all the concerns into consideration. They all had reverberation time simulation and reflection patterns and ray tracings, but they didn't take diffusion and some other things into consideration. They were sophisticated but not sophisticated enough to make a big difference.

"But that has just changed for us," continues Maurer. "We have been working with Professor Ahnert, a pretty well-known acoustician in East Berlin, who has been developing simulation and auralization programs, and he has finally got to the point that, we believe, there is a product that works. We have now set up a workstation where we are putting in all of our acoustical spaces exactly as they are as models, and we can simulate their sound. We can even specify the speakers and get a pretty ac-

World Radio History

curate image of what the room acoustics will be in real life. This is a brand-new development that will make a huge difference in almost everything we do. Now if we change even a little angle, we can immediately tell how it will affect the acoustics."

Grant sees promise in the continuing research into materials, which will mean access to a broader range of working shapes and textures. "Already, developments into optimization techniques mean that designers are no longer locked into using a series of off-the-shelf panels and materials to assemble a control room or studio. It is now becoming possible to design a facility purely from an aesthetic and functional perspective, and then use optimization techniques to modify the acoustic performance of the shell design. This frees the designer to consider ergonomics from a completely fresh standpoint and allows radical departures from conventional and orthodox control room design that will function well as monitoring environments.

"Second, a continuing and better understanding of the way that engineers, musicians and artists wish to work with the tools that are now accessible means that designers will have to move away from the conventional rigidity of past designs, rather than producing designs by rote. Both of these processes will put great pressure on designers."

Storyk eagerly anticipates the development of more tools and surface treatments for studio acoustics. "That's why I'm excited about seeing more smaller studios, because as the universe of studios expands, more people jump into the market place to make this stuff. One of the problems we've had is that our universe has been tiny, as compared to the universe of, say, lawnmowers. But as more people need more recording or pro audio or pro media environments, more people need five and ten thousand dollars' worth of treatments.

"There's a marketplace for our services that's developing," observes Storyk, "and the home theater world merging with our world just expands that universe of people needing these treatments. When there's more needed, there's more R&D. When there's more R&D, there are better products. I don't care what type of client buys it, I just care that there are improving products on the market." ■

David Schwartz, former Mix *editor-in-chief, still likes to wear his home studio recording helmet now and then.*

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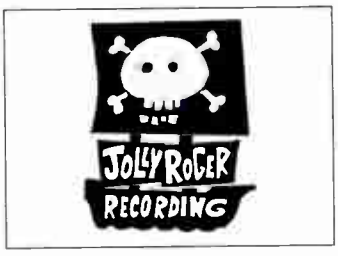

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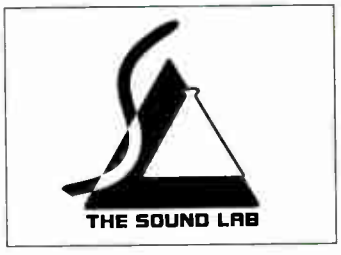

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—FROM PAGE 14, NOW YOU DON'T HEAR IT...

nomenon they have named HyperSonic™ Sound, or HSS.

HSS creates sound in air. I mean, *in air.* Just like heterodyning radio receivers, it produces audio by mixing a carrier (in this case ultrasonic) with audio side-bands. But this mixing takes place in the nonlinear medium of air itself (in fact relying on that nonlinearity), so the resultant sound is actually not generated at the transducer but all along a projected column of ultrasonically thrashed air in front of the transducer. Nice concept.

Want a bit more detail? The sound is generated indirectly in air as a conversion by-product of the interaction of ultrasonic waves. Inaudible ultrasound energy is projected, which in turn emerges as audio from whatever reflective surface it strikes. The acoustical sound wave is created in the air molecules by down-converting ultrasonic energy into the frequency range that humans can hear.

Now here it comes. Since this effect is produced without conventional speaker voice coils, cones, crossover networks or enclosures, it is free from the problems of said hardware. And you know how much I dislike said hardware. Anybody who knows how loudspeakers work has to despise them, because they *don't* actually work. Loudspeakers haven't changed since they were first invented in 56 B.C. I mean, they are called loudspeakers; not accurate speakers. There is a clue in there somewhere—the original design goal was to get loud. Now, don't get me wrong, I am amazed that there are companies out there who have beaten speaker "technology" into submission, producing boxes that fight valiantly to bring us music using these same old wire-wound party hats. For example, Meyer, Paradigm and a few others are using absurd amounts of corrective controlling technologies to bring actual music into our lives with their new active monitors. These are very, very impressive (and I will be showing you a couple of these here later), but they are still speakers and, as such, speak—with voices of their own.

In fact, that's the point. All this new active technology exists to oppress the very speakers they support. To suppress the sound of the system—the box and cones, the magnets and reactive inductors, the caps and resistors—and bring you the most phase-correct, neutral sound possible. But they still use silly party hats, be they paper, polypropylene, carbon fiber or Kevlar. They still have flexy, bendy cones and achy-breaky voice coils. Compared to the perfection theoretically available without mechanically introduced distortion, they suck (exactly 50% of the time, and then blow the other 50%). And that's the point. Mechanical audio drivers introduce mechanical distortion into the audio. Oops.

But HSS promises to free us from mechanical distortion and its associated joys. Mmm.

But wait...Perhaps more interesting is the claim that the inverse square law does not apply! Because the sound is generated along the entire length of the projected column, there is no amplitude loss as a function of distance from the transducer. Well, in theory there is no loss, but in reality there is a token real-world loss of 1 dB or so across a room. I like a company that bows to the laws of physics—at a rate of 1 dB per 30 feet or so. Think about what that can mean to you...

I have never heard this device. And you can't buy it—not yet. But if the developers can pull it off, it will change audio more than any breakthrough since Edison's wax cylinder.

BEAM ME UP, SCOTTY

HSS allows audio to be literally beamed to any desired point in the listening environment, providing amazing flexibility and unprecedented manipulation of the sound's apparent source.

The HSS people want you to visualize traditional loudspeaker technology as a bare light bulb and HSS technology as a flashlight. A traditional loudspeaker radiates sound in all directions, like the bulb does with light. A listener can stand anywhere in an acoustical environment and point to the speaker as the source of the sound. But if you stand to the side or behind the HSS flashlight, you can only see the light when it strikes a surface. HSS technology can direct the ultrasonic emitter toward a hard surface like a wall, and the listener perceives the sound as coming from the spot on the wall. The listener does not sense the sound as emanating from the face of the transducer at all, only from the reflection off the wall.

However, look directly into the lens of a flashlight and you will see the highest intensity. It will appear to emanate from the face of the flashlight. If you direct an HSS ultrasonic emitter directly toward a listener, the listener will perceive the sound as emanating directly from the face of the emitter. Another result of *beaming* audio is that the dispersion is tightly controlled, allowing sound to be projected much farther than with conventional loudspeakers.

Further, the dispersion characteristics of the audio wavefront can be altered by contouring the face of the HSS ultrasonic emitter. For example, a very narrow wavefront might be developed for use on the face of a computer screen while a home theater system might require a wider wavefront to envelop multiple listeners.

Here is an excerpt plagiarized directly from the HSS white paper: "The HSS concept originates from this theory of combination tones, a phenomenon known in music for the past 200 years as Tartini Tones. It was long believed that Tartini Tones were a form of beats because their frequency equals the calculated beat frequency. However, it was Hermann von Helmholtz (1821-1894) who completely reordered the thinking on these tones. By reporting that he could also hear summation tones (whose frequency was the sum rather than the difference of the two fundamental tones), Helmholtz demonstrated that the phenomenon had to result from a nonlinearity. Could a method be found today to utilize this nonlinearity of air molecules in a manner similar to the nonlinearity of an electronic mixer circuit?

"In theory, the principle appears quite simple. Yet, until now, no one has succeeded in making it work. Nobody has been successful in producing useful levels of sound output in this difference frequency range." Until now...

Sound interesting? They claim the

World Radio History

preliminary testing of the ATC proof-of-concept prototype shows the HSS technology should have the potential for a frequency response from below 10 Hz to 30 kHz with full bandwidth output of 120 dB at 50 watts! It needs no crossover and, therefore, has perfect phase and time alignment. Further, there should be no conventional measurable distortion in the audible bandwidth. And room interaction should be reduced by as much as 50 dB. Sound even more interesting?

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In my interview, Todrank said a lot of provocative things like "listening to HSS is just like listening to earphones, in that mono components of a stereo signal appear inside your head—if you want them to..." Certainly, a lot of questions remain, and I am awaiting a promised demo. If I have been bullshitted, then I admit to standing knee-deep in it while writing (and plagiarizing) the text for this column. But I don't think so.

Want to know more? Want to find out exactly how much of the text I downloaded? Here's the URL: www.atcsd.com. Have fun. ■

SSC used to despise "writers" who merely copied text from manufacturers' lit. to fluff out their columns. But now that he has tried it for the first time, he sees the temptation. Still, it's just another earthly pleasure to resist.

DELTRON GOTHAM
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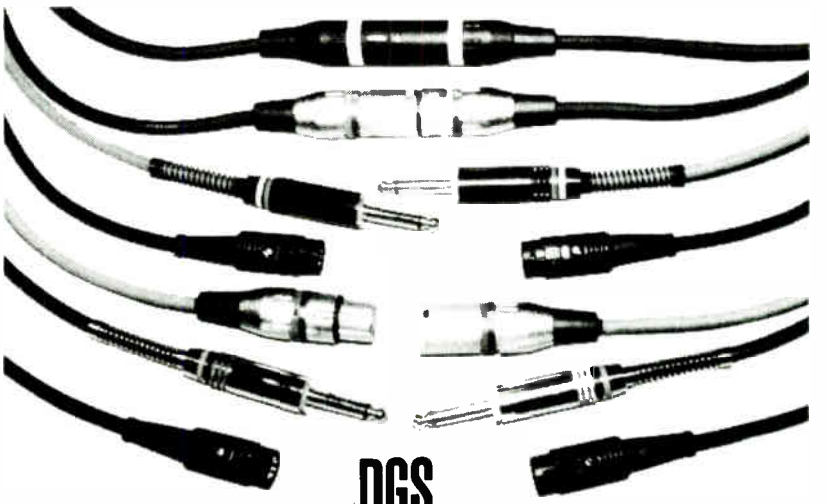

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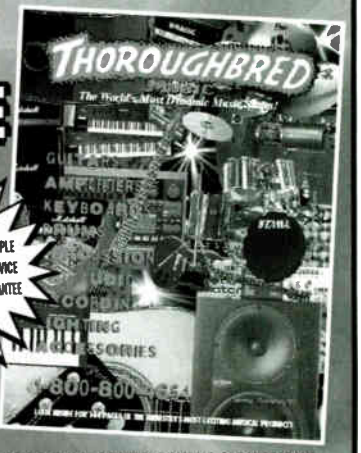

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—FROM PAGE 19, RETRO THIS, PART 2

and on my own system, I think we're at that point where talented engineers can create digital models of just about anything you want, that are good enough to fool just about anybody. And these models can be made flexible enough so that we can call up not just, say, a 12AX7, but *any* tube or transistor or capacitor or choke ever made, or that ever *could* be made. With modeling technology getting more sophisticated all the time, I'm sure it won't be long before we see a respectably convincing "tape saturation simulator" module, too.

Assuming the control interfaces are designed well, and assuming that there's a way to build serendipity into them, they should let us do amazing things—not just re-create the sounds of yesteryear but use our knowledge of them, and what makes them pleasing, to create new sounds. And we won't have to worry about drift, noise, impedance mismatches and getting the same sound tomorrow, or next month.

I will leave you with this thought about looking backwards. Once upon a time, there were radio station disk jockeys who were allowed to play anything they wanted to. There were executives and producers at record companies who were encouraged to find new talent (not just sign acts who sounded exactly like the current faves) and develop that talent over time. There were record companies who were judged on the quality of their roster, not on how the stockholders felt about their last quarter's numbers. There were acts who weren't tossed out on the street when their first album failed to go Molybdenum. The Beatles were encouraged to get past "Love Me Do"; Simon and Garfunkel got a second shot at the "Sounds of Silence"; and Bruce Springsteen was allowed to hone his craft and streamline his lyrics through two muddled albums until he could come up with an absolute masterpiece of a third. As I doze off listening to yet another "adult contemporary" station, I realize that's the "retro" part of the industry that we *really* need to revive. Because art takes time, and people need time to find their voices. And if it ain't in front of the mic or in the fingers, no amount of distortion, no matter how cool and '50s/'60s/'70s it might be, is going to save it. ■

Paul D. Lehrman is a product of the '50s, but he seems to still be operating within spec.

World Radio History

—FROM PAGE 102, RECORDING "CHO"

Tibbetts brought the tapes back to Minneapolis to begin working out how to add instrumentation to the vocal recordings. First off, he put all of the takes of each song together on one cassette tape and just played them, had them on in the background, no matter what he was doing. "It's a good way to let the music sort of seep into your subconscious," he says, "and it's also a lazy man's way out. At this point, I don't want to sit and listen really hard to things and try to figure out what to do. I would rather let questions answer themselves."

After a few weeks, it became clear to Tibbetts which takes were better than others, and then he began to do some pitch correction on the voices. "The nuns tended to start low and end high," he explains. "It just seems to be something that happens in folk music. You open your mouth and sing without a guitar behind it, you're going to end up in a slightly higher key. So I took a tuning device and worked out where they started. They start on D and they end up 50 cents sharp, right between D and D sharp. Then I'd notate what they sang. It was pretty easy, because it was simple, pentatonic five-note melodies. Then

GERARDO NUÑEZ'S "JUCAL"

Alula Records is a new international indie label out of New York City, founded by producer Angel Romero and artist/producer Akira Satake. The label got off to a good start in February with the release of two excellent albums: *Voices* is a collection of various traditional folk singing groups from around the world. And the second, *Jucal*, is a collection of Flamenco guitar pieces from Andalusian virtuoso Gerardo Nuñez.

PHOTO LOLA CORTÉZ

Nuñez, who at press time was recording his second release for Alula at Daiichi Kosho Studios in Manhattan, is a graceful and youthful player who has been perfecting his art since he was a boy. "In Jerez de la Frontera [where Nuñez grew up], it's very common to have a guitar in anyone's home," he says. "We had one and I started to play it. I later studied with 'maestro' Rafael del Aguila, who taught guitar to most Jerez players." Nuñez then studied guitar at the Flamencology College in Jerez and, later, moved to Madrid, where he played in Flamenco shows with other artists such as Enrique Morente, El Guito and jazz musicians such as Jorge Pardo and Tomas San Miguel.

Jucal, Nuñez's third album, was recorded in Musitron Studios in Madrid. "It's a small studio, with a 24-track Neve board, that has specialized in flamenco recordings," Nuñez says. "Paco Lucia and Tomatito also record there. It includes two percussion booths and a collection of Neumann microphones."

The album was recorded by engineer Jose Luis Garrido, whom Nuñez knew from playing on other artists' recordings. Recording Flamenco is nearly as specialized as playing it, and Garrido has a method that captures Nuñez' sound, which is at once very rich and very bright.

"We placed one Neumann microphone between the sound hole and the neck of the guitar, about 10 centimeters from the guitar," Nuñez recalls. "We had to compress the guitar a little because in flamenco playing you have very hard slaps on the guitar. We have two recording

—CONTINUED ON PAGE 234

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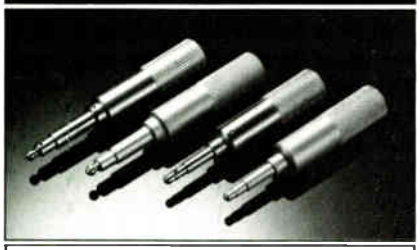

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I notated how fast they began to rise; I'd note that at a certain point, they'd go up, and I'd follow them with that pitch. This was before I put it on multitrack tape.

"Then I would put the two tracks—the stereo version of the nuns singing—down on the tape, adjusting the pitch of the tape recorder to go with them. There would be a tone coming off the tape recorder that I'd be watching on the meter of this device, and if they went sharp, I'd adjust the tape recorder so it went sharp. The net result, when you roll the tape back and roll it at normal speed, is that the curve is flattened out. That's the one really clever thing I did. I'm pretty proud of myself; I got them to sing in tune."

Tibbetts also combined the vocals on different takes. On the song "Kangyi Tengi," for example, he noticed that there were versions of Choying Drolma singing solo and versions of the nuns singing together that were in the same key, so he created a take that had Drolma switching back and forth with the group. "It was really fun to find out that worked," he says, "and it happened that the best moments of their takes crossed over."

After that, Tibbetts says it was all improvising. He'd sit in his studio full of instruments—guitars, ukuleles, banjo, bouzouki, etc.—and jam along with the nuns to see what fit. "I would have the nuns on two tracks, and I would improvise on six or seven tracks independently," he says. "On one track I'd try a 12-string. Then I'd forget about it and work on a bouzouki track, just listening to the nuns sing, and then I'd forget about that and try a gong cycle on the next thing. Or I'd try a round with the singing; in other words, echoing the singing so that they would be able to sing with themselves a half-measure off—sort of like "Row, Row, Row Your Boat" being sung as a round. And then two or three days after I started that process, I'd listen to every track with every other track and see what worked. Then I'd cut out the parts that didn't work and I'd be left with a painting with holes in it. It's fun and it's easy, and it's cheap inspiration. It was much better than what I could have figured out by just starting to compose.

"This way, elements are interacting and reacting with each other that I didn't plan. The gong cycle from Monday interacts with the mandolin track from Thursday, but they were not introduced to each other before Friday, but it's a good blind date, so I keep the best parts of the blind date and erase the rest. You do that with ten or 12 different tracks, and you've got something quite nice.

"Another thing is overlapping," he continues. "On the second tune, for example, there are backward guitars and forward guitars, and it has rounds. And sometimes you'll have a tonality between a backward guitar and the echo of a nun singing that suddenly creates a third object, something that is created from the intersection of the two things. Sort of like the ripple tanks we used to play with in physics class in high school. You drop two things in a body of water and the intersection of the two spreading patterns of ripples make something completely different. It happens with the way sounds come together. I love that. It's so much fun. It's like something you did and didn't do."

To record the instrument tracks, Tibbetts used his 16-track Tascam 3516

—FROM PAGE 233, GERARDO NUÑEZ

techniques: In the one I prefer, we place the palmeros [hand-clap players] in one booth and the percussionist in another booth, and I play in the main studio. We play live and use the first take as the foundation of the piece, and then we overdub guitar parts and fix any mistakes. The second way is to use a meter and record every part separately, but I think you lose a lot of freshness."

In keeping with Nuñez's preference, the new record is being recorded mostly live by engineer Scott Nell. Label founder Romero is the producer. "The more I discover about the richness and variety of the world's cultures and music, the more I become inspired to seek it out," Romero says. "During the past decade or two, America has seriously begun to look beyond its own borders musically. People have become increasingly curious and increasingly savvy, and it's our intention with Alula Records to quench this thirst." Look for Nuñez' next release this October, and look for Alula Records on the Web at www.alula.com.

—Barbara Schultz

World Radio History

PHOTO: CLAIRE WARREN

recorder and a Neumann TLM170 mic, along with a Lexicon LXP-1 reverb and a Lexicon Super Prime Time for long echos. "I'll play a 12-string note and send it through a volume pedal," he explains, "so you don't hear the attack, you just hear the second part, and then it goes through a long echo and sustain, a regenerating echo. I used that to get ideas for strings."

Altogether, the *Cho* project took about three months to come together, which is quite fast for Tibbetts, who normally spends many many months perfecting his self-produced recordings. (For a look at one of Tibbetts' more typical projects, see "Recording Notes" in June '94 *Mix*.) "I create these elaborate guitar cathedrals," he says. "Those are all, from top to bottom, integrated, strong. There's not a gap from beginning to end. In this piece, there's a lot of gaps, but I don't care. I think it's quite poignant. It's innocent and has its moments, and the moments that are quite endearing to me are when things started to collapse a little bit." ■

BITS & PIECES

EUROPE

Mikam Sound's (Dublin) new Electro-Voice DeltaMax system was used to provide sound reinforcement for the Russian State Ballet's performance of the *Nutcracker Suite* in Dublin in January. The Irish National Symphony also performed. The front-of-house engineer was Paul Ash-Brown...London rental company SLR is providing the P.A. system for the Help a London Child Awards luncheon. The system will include mainly Electro-Voice DeltaMax DMS1183s, supplemented by 15 flown Sx200s, all powered by EV P Series amplifiers, and using Klark-Teknik DN360 graphic equalizers. The event, which will feature appearances by pop personalities, will be broadcast on Capital Radio... Soundtracs reports sales of its Virtua digital console to a number of German facilities, including MEGA Music (Berlin), T.H.E. Sound (Berlin), Radio FFN (Isernhagen) and Hazelwood Studios (Frankfurt). The boards are being used mainly for music and jingle production...Two German theaters, the Prinzregententheater in Munich and the Deutsches Schauspielhouse in Hamburg both took delivery of new Cadac Concert consoles. The boards were supplied by distributor Amptown Sound & Communication GmbH (Hamburg)...Construction has begun on a new mixing suite for post-production facility PPV (Athens). The facility expansion was designed by the Walters-Storyk Design Group (Highland, NY). PPV serves approximately 70% of its local market's post-production requirements...

ASIA

CBS Sports Asia purchased eight Graham-Patten D/ESAM 820 digital mixers. The units will be used in broadcasting the 1998 Winter Olympic Games, which will be held in Nagano, Japan.. China's national broadcasting company, China Central Television (Beijing), installed two Penny & Giles Multiprocessor systems that will be used for post-production work. The purchase was coordinated by Technica Engineering of Hong Kong...Rinky Dink Studio (Tokyo) purchased a 48-input DDA QII console...A 64-channel Soundtracs Virtua console was acquired by China's Shanghai TV. The board was supplied by Chinese distributor DMT. ■

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—FROM PAGE 124, AUDIOMEDIA III

or other SMPTE-generating device via MTC. Session supports all the SMPTE frame rates, and audio file backups/restores can be loaded to standard audio DAT cassettes.

If you use the Digidesign Wave Driver software, you cannot use the Session software at the same time that another application is using the AM III card. Originally, I configured Cubase Audio XT to use the AM III. When I used either Cubase or Session by itself, they worked fine with the card. But when I synched Cubase to Session, I ran into a problem. The problem was that both programs couldn't be used simultaneously, even if Cubase was just being used as a MIDI sequencer and wasn't sending digital audio to the card. I solved the problem by reconfiguring Cubase to use my Windows sound card. Unfortunately, Cubase doesn't allow sound card reconfigurations from within the program. You have to reinstall the software in order to set your sound card configuration options. I therefore left Cubase configured for my Windows sound card at all times to avoid conflicts with Session when I want to slave Cubase to it. However, playing Cubase Audio XT's digital output through my Windows sound card instead of the AM III is a disappointment.

IN SESSION WITH SESSION

The Session system worked as advertised and sounded very good indeed. I was impressed by the sound quality, and I think it is suitable for professional applications. The frequency response, S/N ratio, dynamic range and lack of distortion all sounded very good to my ears, especially for a digital recording device in this price range. Recordings that I made sounded nearly indistinguishable from the original. I recorded both to my fixed SCSI hard drive and to an internal SCSI Jaz drive, and I never had any problems during recording, editing or playback.

The Session software also performed very well and never crashed or froze while I used it. It has a good feature set, and all the features substantially performed as indicated in the manual. The manual itself was also excellent and is one of the most thorough and well-organized and well-written manuals I have read in a long time. Overall, it's a very nice job.

One drawback of the Session system when used in a "tapeless" studio environment was brought to my attention by Todor Fay and Melissa Jordan Grey (the programmer and designer, respectively, of Bars & Pipes Professional sequencing software for the Amiga). After they filled up all eight tracks in Session, they wanted to mix down to a stereo .WAV file within Session so that they could then transfer that .WAV file to a CD-R. Session doesn't allow this, as it is necessary to mix down to an external medium, such as a DAT tape. *[Note: Session does support track bouncing, so it would be possible to bounce the mix to two separate left/right .WAV files and later combine them into a stereo .WAV file using shareware such as Cool Edit—Ed.]*

The Session software doesn't follow the Windows 95 User Interface Guide, and though it works under both Windows 3.X and Windows 95, it is a 16-bit and not a 32-bit application. For instance, you are limited to 8.3 file names and cannot use long file names, which Windows 95 supports. All of the windows can be moved, but most of them don't support resizing or minimizing. There are no Tool Tips when you place the cursor over a button. The Window menu only allows you to select the Session windows you want to open, but it does not provide options to cascade or tile those windows, as is standard in Windows 95. There is no Help menu and no online help whatsoever. So, although the Session software works, and works well, under Windows 95, it was not designed for Windows 95.

CONCLUSION

Other than the few complaints I have about the software, the Digidesign Audiomedia III card with Session software is a potent combination for recording, editing and playing back digital audio on the PC. It is suitable for professional applications, and its low price makes it a strong contender in the PC digital audio arena. If its I/O options suit your needs, then I highly recommend that you consider the Session system.

Digidesign, 3401-A Hillview Drive, Palo Alto, CA 94304; 415/842-7900; fax 415/842-7999; Web site: www.digidesign.com. ■

Dominick J. Fontana is an attorney in New York City. He moonlights as the owner/operator of Studio di Fontana, a multitrack/MIDI recording studio. He can be reached at Fontana@cis.compuserve.com. He wishes to congratulate the New York Yankees on their 1996 World Series victory.

World Radio History

—FROM PAGE 168, RICH OLIVER

comfortable with, and then he played wide and open within the sound that we created. He'd open up anywhere in that window and release something special inside himself. That sense of being tuned in to the larger issue while you deal with the specific environment is what I strive for as well."

Tony Smythe was a wildly successful jingle producer who tracked at Back Pocket Studios extensively before having Oliver design his personal studio, which he used for his company's dates and would open up for select record clients, including Chicago's Robert Lamm, who recorded a solo album there under the direction of Phil Ramone. Oliver laid down all the tracks on that project, but commitments kept him from executing the final mix. "Robert is another example of a person who is exacting on himself, needs to have a room that he can hear well in and a rough mix that gives frequency space for his singing, but he never gets so caught up in the minutiae that he loses the greater picture," Oliver says. "Being familiar with the way things work in the real world—that knowledge can be critical to the success of a room design."

Piers Plaskitt, former president of SSL in the U.S., has known Oliver for several years. "Rich designed Mystic Studios on Staten Island, which has one of our consoles," Plaskitt says. "He's an enthusiastic and perceptive individual. I see him as an epitome of the way the industry attracts people who have opposite characteristics within their makeup! Rich can seem radical, way off in the stratosphere somewhere, and yet he can figure out grounding schemes at the drop of a hat! He gets things done.

"The notion of working in the real world is an important one," Plaskitt adds. "I would say that a good room designer has the flexibility to adapt to the needs of the client whilst working within the constraints of a budget and maintaining timetable dead lines. It's all very well to be able to build a room at any price, but most of us have to live with the fundamental requirements of making mortgage and lease payments. Having a room designer who knows the market and what can and can not be achieved at different price points is essential to a venture's success."

His work over the years at Back Pocket Studios has earned Oliver the honorary title of "ultimate hairbag," an accolade that studio manager Jim Doherty says was well-earned. "It just seems that whatever problem you throw at Rich—from the early days of synching to picture when nothing really worked, to fixing tielines or mixing a session, he always gets the job done. And I've never heard any musician, including the high-end artists who have worked in Studio A over the years, have anything but good things to say about the room. That includes horn players, who generally don't like the way any room sounds!"

Oliver recently put the final touches on New York Noise, a commercial studio in the up-and-coming Gansevoort Market section of Manhattan. New York Noise is the partnership of engineer Craig Bishop and composer Rick De Pofi. Bishop has worked a lot of rooms in his career, which stretches back to his work on Tommy James' Number One hit "Three Times in Love," and includes mixing stints with Billy Cobham and Dave Valentin. He's also a confirmed Oliver fan. "Richie definitely brings something to the party. I strongly believe that we are getting more room for the money we're spending than any major design firm would have given us. Rich uses studios every day as an engineer. He knows what sounds good and what doesn't, and he also knows the whys of why things sound good!"

Oliver sits at the helm of Richard Oliver Productions and his credit list also includes Sting, Yes, Hall & Oates, David Byrne and the B-52's. He's garnered no less than 13 RIAA Awards, including nine Gold and three Platinum albums, not to mention a Grammy, and his rooms are widely praised by his clients—and his clients' clients. Still, his name recognition is not yet what his track record would suggest it might be.

"You know, I respect those peers of mine who have made the effort to extend their business reputation in the industry," he says. "Maybe if I could go back and retool myself for self-promotion, I would. But you only get to go around once, and I've strived to learn and experience as much as possible about the music-making part of this industry. That's what's driven me since I was a kid playing the guitar and singing in basements with bands. I'm fortunate in that by sticking to my guns, I've gotten to the point where the people I work with view my contribution as a unique one. When all is said and done, who could really ask for more than that?" ■

Gary Eskow is a New Jersey-based writer, composer and producer.

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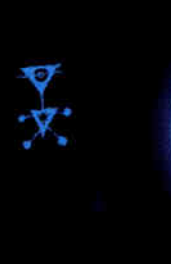

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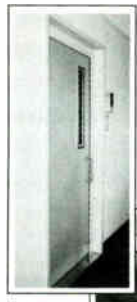

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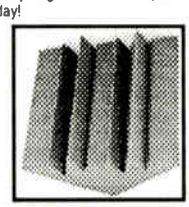

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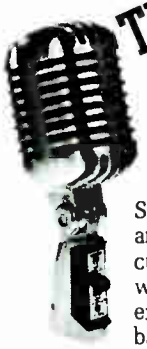

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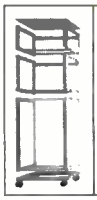

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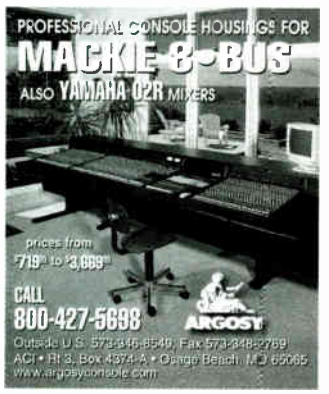

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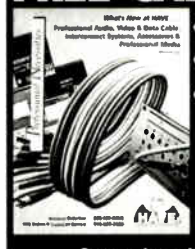

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LETTERS TO THE EDITOR

—FROM PAGE 256, FEEDBACK

noise-awareness, we thought was the best approach at the time. We brought the NoNoise'd tapes back to L.A. and EQ'd them using my favorite analog equalizers. These were all received with very positive reviews and were on the market for roughly a decade.

When MCA bought the catalog, we had an opportunity to update the sound on the first three albums again. This was roughly late 1992 and early 1993. The same original master tapes were used, but our digital ears had matured. We used very little NoNoise, mostly on intros and were able to stay much closer to the basic sound of the masters. Obviously, these are easily identifiable from the label, extra songs and new artwork. What Alan did here was to use this opportunity to combine the American and English releases and singles into a unified package giving the fans more for their money. These were finally released in 1993.

I find it ridiculous that this new regime of people controlling the Hendrix catalog find it necessary to belittle and even outright slander everybody who tried so hard to keep the music of Jimi Hendrix available to the world with as much integrity and quality as possible. For Alan, who was Jimi's friend and the only person in the music business Jimi trusted; and for me, who treasured his music long before I came into any professional contact with it, this has been as much a labor of love as anything else.

As far as Eddie Kramer is concerned, let's not forget that he is the person who first began the practice of replacing Jimi's chosen musicians with others. People have been knocking Alan Douglas for years for adding other musicians to unfinished tracks, Eddie Kramer being chief among them. Alan had produced Jimi during his life, at Jimi's urging. He was given the job of completing unfinished songs by Warner's. But consider the single and LP track of "Stepping Stone." It was released as a single with Jimi's new preferred drummer Buddy Miles on it while Jimi was still alive. After Jimi died, Kramer replaced Buddy with Mitch Mitchell, wiping out the Buddy Miles track in the process. This was recorded at a time when Jimi was finished with the Experience. Kramer did this in direct contradiction of what he knew Jimi's artistic desires to be.

I certainly expect that the new releases of the first three Jimi Hendrix albums should sound better than the last batch, which reflected early 1990s technology, as well as the more complex signal chain I used until recently. The first acceptable A/D converters didn't really become available until 1994 or so. And, of course, every good mastering engineer will have their own taste in equalization, so they definitely will be different, at the least.

I hope the new Hendrix regime can find a better marketing ploy than misleading the public about the work of the old regime (especially considering that Al Hendrix, Jimi's father, was involved in both) and that the quality and love put into future projects can equal that put into the past projects.

Joe Gastwirt
OceanView Digital Mastering

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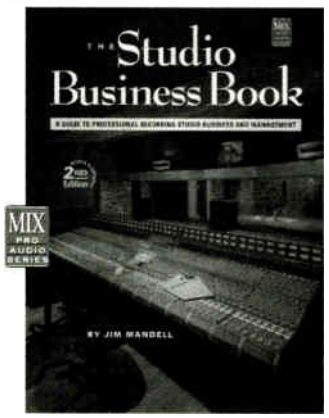

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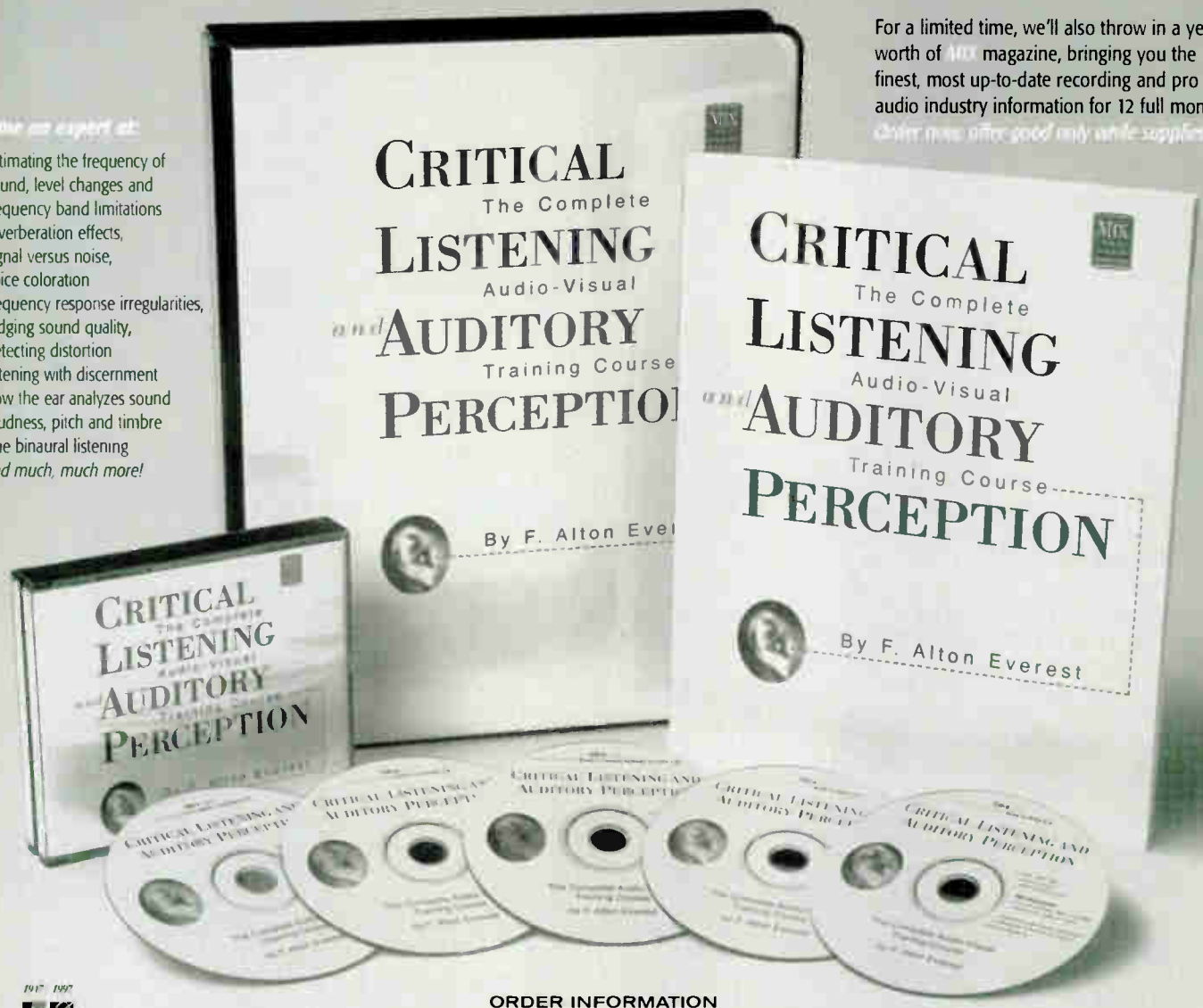

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FEEDBACK

FAN LETTER

Just a note to commend you and the staff of *Mix* on the fabulous July issue! In my opinion, the best issue ever, with great articles, humor from St.Croix (I'm still smiling) and news we can use. Keep up the good work. You're a valuable asset to all of us behind the boards.

Jeffrey A. Toland
Dogwood Productions
Wilmington, Ohio

BIG MISTAKE

Great article in the July issue entitled "Nashville Grows Up" (by Dan Daley). However, Nashville session guitarist Dann Huff was not a member of Mr. Big. His L.A. rock group was called Giant. Paul Gilbert is guitarist for Mr. Big. Thanks for a great magazine.

Keith McNutt
Olsen's Music Center
Russellville, Ark.

THE GRADUATE

"So you want to land a job in that glamorous industry, the recording biz?" ("Audio Education in Brief" May '97). To that I plead guilty, so I steered my dream to that fine educational institution just south of Music City. After three years and over $20,000, I graduated at the top of my class. Unfortunately, there are no classes in schmoozing or how to survive on unpaid internships after graduation. I expected to start at the bottom, but I also expected to be paid for my work. The Nashville studios have learned to survive quite nicely; by using an endless supply of free interns, they never need to actually hire anyone. And now someone (The Career Connection) has devised a system where the intern actually pays for the privilege.

Maybe I'll go to graduate school to learn the secret handshake and get my record biz decoder ring.

David Patterson
Knoxville, Tenn.

CORRECTION

We were pleased to see in print the very kind words of Malcolm Springer concerning the sound of our microphone (Recording Notes: "Off the Beaten Track," April '97). However, the name of our company was misspelled. The correct name is Empyrean Inc. Inquiries concerning our microphones can be made at 412/922-9494.

Tracy Korby
Empyrean Inc.
Washington, Pa.

WRONG AGAIN

Imagine this! You're sitting in the control room of your studio, you're recording one of the world's most respected artists, and then all of a sudden, one of the bandmembers walks in and says, "Hey, Patti, did you know that we're recording in a frat house?" Of course, all heads turned as if to say, "What the hell are you talking about?" and he responds, "Yeah, it says so right here in *Mix* magazine" ("Ring Around Manhattan," by Dan Daley, May '97 *Mix*).

I was totally taken unawares by this news. Neither of us had been interviewed for this article on an official basis. The last time we spoke to Dan Daley was in August of 1995. The only contact we'd had concerning this article was a request for a photo of the studio by another of your writers.

Without going into great detail, since Mr. Daley's last visit, we have purchased a 30,000-square-foot building, started putting in MIDI studios, purchased more equipment and built an isolation room that has dimensions unheard of in today's recording studio environments.

As you may remember, *Mix* always had an open invitation [when we were] at the Record Plant to come and interview artists and producers, as well as to report improvements in the studios themselves. That invitation is still extended to your magazine. We would welcome a visit, especially after we clean up the beer spills and dump the tub of grain alcohol.

In closing, I would like to quote Mr. Daley. This was taken directly from his write-up of August, 1995: "In short, IIWII does not seek to laboriously recreate the recording environments of the 1960s and '70s, a trend in the industry at the moment. Rather, it creates anew what people like Cicala did from gut feelings and dead reckoning in those days: conjure up a place whose intersection of time and space is both timeless and infinitely spatial—a place where anything can happen, unfettered by the timetables and conventions that have harnessed music into a product."

John Hanti & Roy Cicala
IIWII Recording Studios
Weehawken, N.J.

DIGITAL HENDRIX: STOP THE SLANDER

Amid all the hype and promotion of the latest, newest re-release of the Jimi Hendrix catalog, some assertions have been made that contain a good deal of disinformation, along with some implications that smear the names and reputations of people who do not merit such mean-spirited, self-promoting tactics.

First, let me address the big claim, the very reason why fans are being told once more to buy what they have already bought several times before: specifically, that these new releases represent the very first time Jimi's music has been issued in a digital format from the master tapes. WRONG. Here's the history:

The first time the catalog was issued in digital form by Warner Bros., it was mastered by an in-house Warner's engineer from EQ copies that were intended for LP production. When Alan Douglas heard the results, he insisted that Warner's have me remaster the catalog and replace the existing releases. In order do to the best job possible, we used original masters for *Are You Experienced* and *Electric Ladyland* (discernible from the multitude of edits on each tape) and the best copy of *Axis: Bold as Love* we could find—a non-EQ'd (i.e. flat, not EQ'd for LP) direct copy. The original master of *Axis* has been missing for as long as I've been involved. Alan, Warner Bros., PolyGram, anybody who ever had their hands in the pie, have done extensive searches for it both in the States and abroad for years to no avail. These tapes were transferred to digital using a JVC PCM 9000 A-to-D converter and taken to San Francisco for use with the prototype Sonic Solutions NoNoise system, which in those early digital days of hyper-

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Fade out slowly or twist the night away. Whether you choose the MS1202-VLZ* (rotary pots) or the MS1402-VLZ* (60mm faders), you'll own the best.

MS1402 • MS1202

Superb mic preamps with our renowned discrete, large-emitter geometry design. Headroom to handle screaming vocalists or miked kick drums. Yet audiophile definition and ultra-low (–129.5dBm E.I.N.) noise help capture the tiniest nuances.

Low Cut Filter on mic channels lets you use Low EQ on voices without boosting harmful stage rumble, mic thumps, wind noise, and P-pops. Unlike the 6dB or 12dB/oct. "filters" on some compact mixers, our sharp 18dB/oct. design doesn't sacrifice audible bass above 75HZ.

	MS1202	MS1402
Mic preamps	4	6
Mono inputs	4	6
Stereo inputs	4	4
–10/+4 switch[1]	no	yes
Total channel inputs	12	14
Aux sends	2	2
Stereo aux returns	2	2
Channel inserts	4	6
Equalization	3-band	3-band
True low-cut filter	yes	yes
Channel controls	sealed rotary	60mm faders
Master control(s)	ganged rotary	separate L/R faders
Ctrl Rm matrix	yes	yes
In-place solo	PFL	AFL/PFL
Metering	12-LED	12-LED
Stereo outputs	both XLR &1/4"	
Tape ins/outs	RCA	RCA
ALT 3-4 bus	yes	yes

Musical 3-band EQ with wide, natural midrange bandwidth centered at 2.5kHz.

Constant loudness pan control. When you pan a channel to the extreme left or right, the apparent sound level stays the same[2] as in the middle — a critical requirement for accurate stereo mixes... and a Mackie Designs exclusive.

Trim control with –10dB "virtual pad" and ultra-wide 70dB total input level gain range to handle any live or studio situation[3].

Beefy headphone amp.

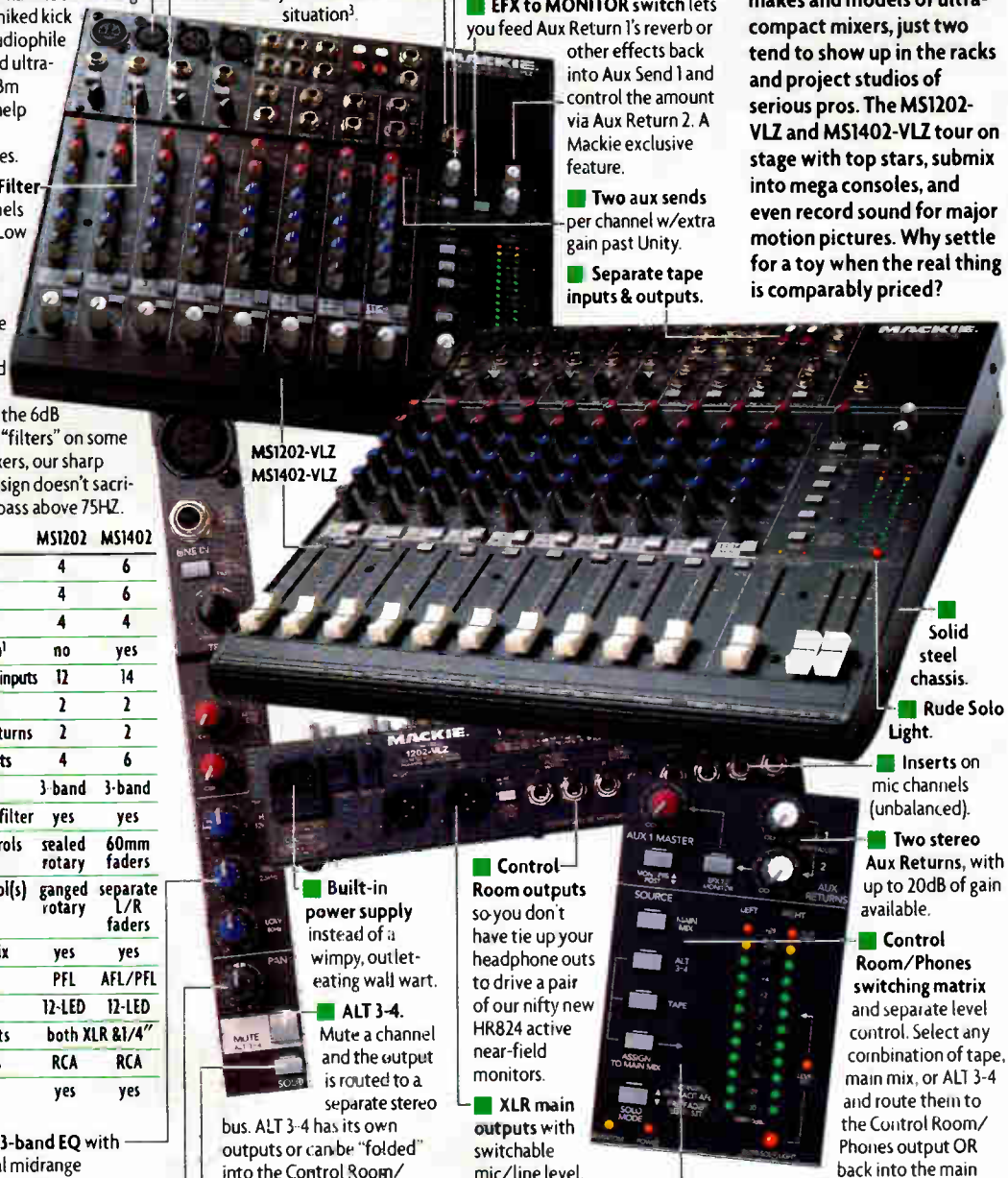
Aux 1 Master with 10dB of extra gain above Unity.

EFX to MONITOR switch lets you feed Aux Return 1's reverb or other effects back into Aux Send 1 and control the amount via Aux Return 2. A Mackie exclusive feature.

Two aux sends per channel w/extra gain past Unity.

Separate tape inputs & outputs.

Check around. You'll discover that even though there are about a gazillion makes and models of ultra-compact mixers, just two tend to show up in the racks and project studios of serious pros. The MS1202-VLZ and MS1402-VLZ tour on stage with top stars, submix into mega consoles, and even record sound for major motion pictures. Why settle for a toy when the real thing is comparably priced?



Solid steel chassis.

Rude Solo Light.

Inserts on mic channels (unbalanced).

Two stereo Aux Returns, with up to 20dB of gain available.

Control Room/Phones switching matrix and separate level control. Select any combination of tape, main mix, or ALT 3-4 and route them to the Control Room/Phones output OR back into the main mix. Consider the possibilities: easy assign to control room monitors, multitrack recorders, submixes, separate monitor mixes, broadcast, or 2-track tape feeds. A Mackie Designs exclusive.

Built-in power supply instead of a wimpy, outlet-eating wall wart.

ALT 3-4. Mute a channel and the output is routed to a separate stereo bus. ALT 3-4 has its own outputs or can be "folded" into the Control Room/Phones bus OR main mix.

Control Room outputs so you don't have tie up your headphone outs to drive a pair of our nifty new HR824 active near-field monitors.

XLR main outputs with switchable mic/line level.

Stereo in-place solo (1402) retains channel's correct position in the stereo mix. A soloed channel's operating level appears on the main LED display. Solo is PFL (pre fader) on the MS1202-VLZ, and globally switchable to AFL (after fader) on the MS1402-VLZ.

Above right: The MS1402 Control Room section. MS1202-VLZ is similar except without Phantom LEDs, Level Set LEDs and global AFL/PFL solo switch.

Below: A few of the 400+ folks who work at Mackie Designs in Woodinville, WA, 20 miles north of Seattle.

1) On stereo channels.
2) This would make a great album title for the '90s.
3) Except possibly drummers who drink triple espressos.

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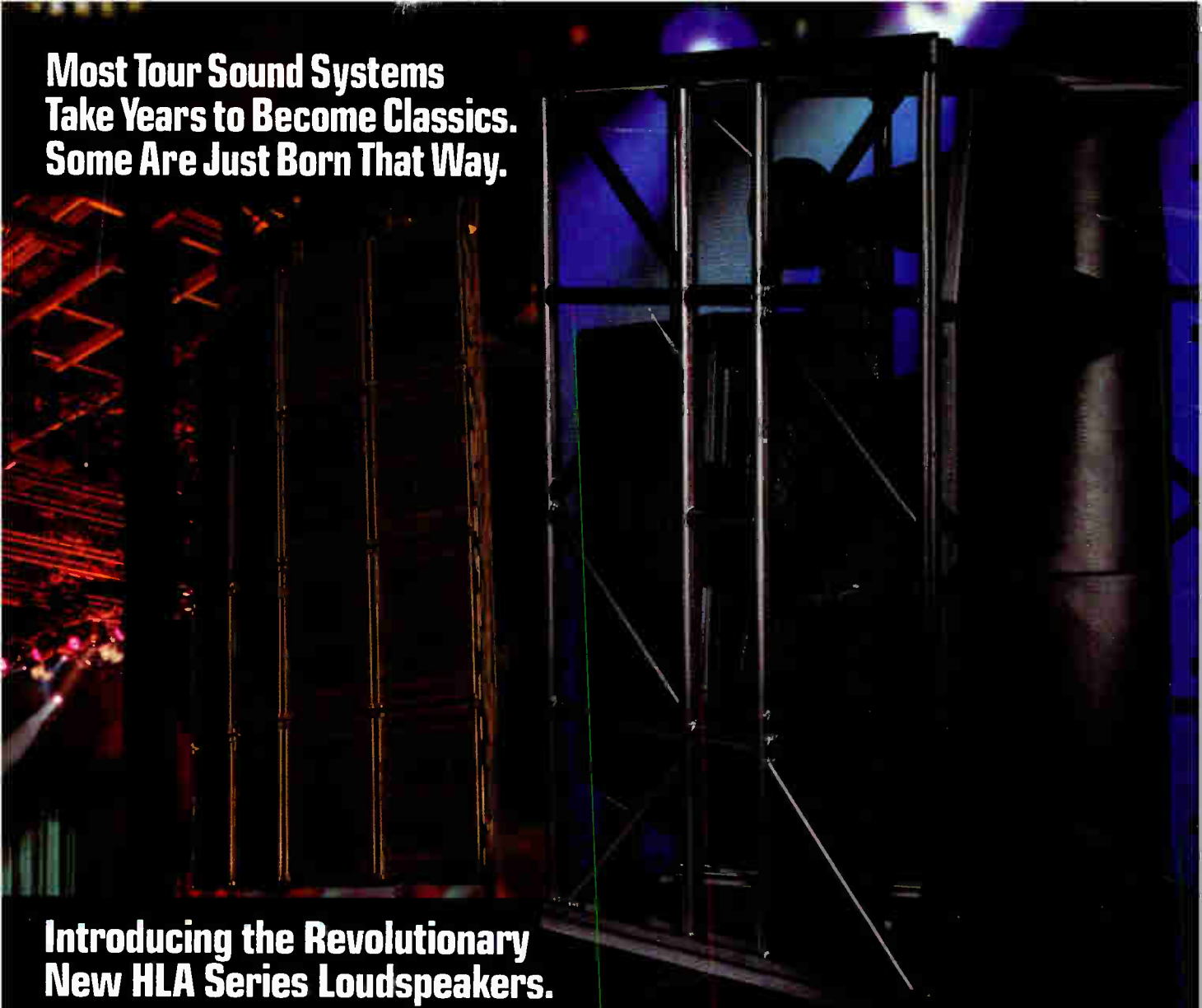

Most Tour Sound Systems Take Years to Become Classics. Some Are Just Born That Way.

Introducing the Revolutionary New HLA Series Loudspeakers.

Once in a great while, an idea comes along that can be considered truly revolutionary. Well, it's once-in-a-great-while-time again. Introducing the HLA Series and its centerpiece, the 4895 Three-Way -- a metamorphosis in tour sound technology from JBL Professional.

At the heart of the series are two DCD drivers, a 10" and a 14", which offer the ultimate in performance at as little as 7 lbs. per driver. This is accomplished with a new Neodymium magnet design and new voice coil topology which vastly reduce the need for steel. Dual Coil Drive was chosen because it has two magnetic gaps and two voice coils in each driver. This doubles their power-handling capabilities.

To provide each listener with better quality sound, JBL engineers designed a new, three-way MultiBand Waveguide™, powered by the two DCD drivers in a composite magazine with a large format compression driver. The composite magazine gives the drivers the rear compression load required to balance the acoustic resistance furnished by the waveguide. To minimize distortion, Optimized Aperture™ technology is used to supply the longer path length required for precise pattern control. To make the most of this increased efficiency, we then placed the entire system in our patented SpaceFrame™ enclosure, which allows it to be easily tilted and aimed to give the audience even coverage with minimal overlap.

To keep pace with this extended performance, the HLA Series also features our powerful 4897 Subwoofer, which has an innovative composite enclosure made of carbon fiber and aluminum and new port technology. The net result is 3dB more output than any other 18" system in existence and dimensions conveniently equal to the 4895.

Put all its remarkable components together and the HLA Series represents a radical departure from any professional sound reinforcement system currently in use -- one that offers unparalleled flexibility, ease of setup and the most seamlessly uniform coverage ever. With this revolutionary, not just evolutionary, new tour sound system, JBL has given a whole new meaning to the already universally respected "JBL Loaded". If professional sound matters to you, write to JBL Professional or visit our website at jblpro.com. A change for the better never sounded so good.

4895 Three-Way

1997 Nominee

HLA Series

JBL PROFESSIONAL

Tilting the Balance

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www.jblpro.com

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