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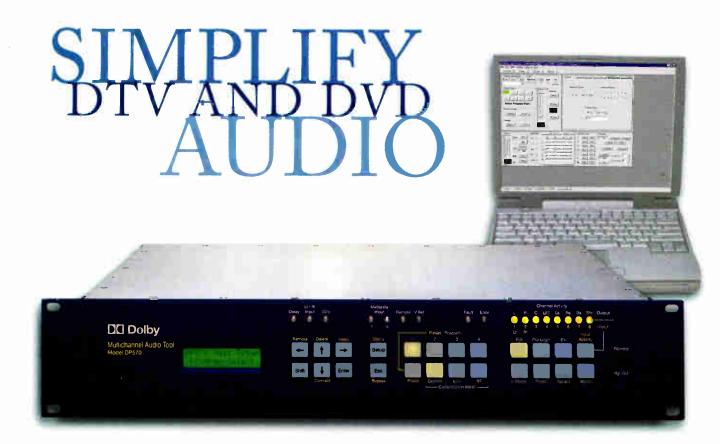
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MIX

FEATURES

On the Cover: Metropolitan Recording in Bryn Mawr, Pa., is the home of Chris Schwartz, founder and CEO of RuffHouse/Columbia Records, who opened the space in late 2000 as a full-service production facility. Designed by Martin Pilchner and in-house producer Ian Cross, the studio is built in a turn-of-the-century carriage house. For more, see the Class of 2001 on page 28. Photo: Dave King. Inset photo: Steve Jennings.

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> *Mix Magazine*

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> **- Rob James,**
> *Studio Sound Magazine*

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FROM THE EDITOR

HEAR, HERE!

It's ironic, but for all of the time many of us spend creating audio, we spend very little time listening. Sure, we hear things all day, but *listening* is an art in itself, and critical listening is the highest form of the craft. The difference between hearing and listening is about as wide as the gap between sipping a chardonnay and chugging a Coors.

As producers and engineers, we have to focus on the big picture and still be acutely aware of the minutiae. Musicians in the studio focus on the performance, and no amount of rattling, creaking, buzzing, rumble or hiss will sway certain players from their way of hearing. How often have you heard a take with great "feel," but then found that one bandmember is overly bothered by a slightly anticipated 32nd note in the middle of a four-bar fill that no one but that player can hear?

Critical listening requires training and practice in the ability to discern both technical flaws and performance issues such as tempo, intonation and pitch. (Of course, working with pitch-challenged vocalists or unsteady drummers also requires finesse and diplomacy, but that's another issue.) Unfortunately, expertise in the listening art can be severely hampered by inaccurate monitors or a poor acoustical environment. Too often, the investment in decent monitors or acoustical treatments is deferred in lieu of some cool new "must-have" effects processor or other studio toy.

This situation is made worse by the near-field myth: the erroneous assumption that the acoustical environment is unimportant as long as the listener is in the near-field. True, the acoustical effects of any space are reduced when monitoring in the near-field, but once playback levels get excessive, all bets are off. If a sub and/or surround speakers are added to the monitoring system, then the equation becomes infinitely more complex.

Some engineers have the amazing ability to compensate for quirky control rooms or lousy monitors, but is that the way you want to work? A key indicator of a monitoring system's health is how your mixes sound when played on other systems. A good mix should sound consistent on a boombox, headphones or a high-end home stereo; a mix that's boomy, thin, dull or overly bright signifies an underlying problem.

Another question is *how* we listen. Sitting exactly in the sweet spot of a great control room is fine, but occasionally standing off to the side with one ear plugged may offer a better indication of how the mix may sound to users under less-than-ideal conditions. One favorite trick is checking mixes on a car system, but here again, be aware that playback during rush-hour traffic will sound *very* different from the way it sounds in a studio parking lot at 3 a.m.!

In our annual issue devoted to studio design and acoustics, we look in-depth at networking a facility, laying the infrastructure for years to come. Also, Randy Alberts looks at what's new in acoustical materials, Maureen Droney chats with top designer Chris Pelonis, Buck Moore offers acoustical fixes for small concert venues, and we present the Class of 2001, spotlighting 19 of the past year's hottest studio installs. That feature alone may get you fired up about tweaking your listening space. And if you do, there might be a spot for you in our Class of 2002.

Let us know…

George P

George Petersen

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FEEDBACK

ALL WORK AND NO PLAY...

I have just returned from five months overseas and have been catching up on back issues of *Mix*. I thought Paul Lehrman's article on repetitive injury syndrome in the August 2000 issue was riveting. It was a validation, of sorts, for me. I have been ashamed to admit to myself, and others, that hours of pressing little buttons on my Yamaha 02R, ADAT BRC and my computer mouse could bring a grown man to tears. How many other engineers and musicians out there also fear losing their careers to RSI and tendinitis? It is not a trivial thing, and I hope to see similar articles in the future.

I would also encourage you to do a feature article on audio pros and musicians who are also parents, spouses, gardeners, runners...you get my drift. The pressure in our business to be "24/7" is incredible, but there are other choices. Success can be measured by means other than an SSL console and a bottomless mixing budget.

  Tom Blain
  Via e-mail

Tom, our "Fast Lane" columnist, Stephen St.Croix, has written articulately about the importance of a balanced life for members of the audio industry. Last October's issue includes a particularly incisive column on the subject.
  —*Editors*

RAVES FOR A MIX MASTER

In my experience, not enough credit is given to those who truly deserve the accolades, while marginally talented people get the bulk of the attention in the music business. Frank Filipetti is one of the truly deserving.

It was gratifying to read the article on Frank [March 2001]. I was fortunate, as a co-producer (along with my business partner, John Vanore), to have worked with Frank on Michael Crawford's *On Eagle's Wings* (Atlantic Records) in 1997. As producers, John and I had been given wide latitude in trying to create an ethereal classical crossover CD (with elements of pop thrown in) that reflected Michael's boyhood in England as a chorister in Benjamin Britten's choir, while keeping his

finely honed Broadway vocal chops in full view.

With pre-production done at Ocean Way in Nashville on the then brand-new Sony Oxford, we eventually wound up recording the orchestral tracks at Windmill Lane Studios in Dublin on 2-inch analog at 30 ips, and then we cut the majority of the vocals and some instrumental overdubs at Sony Studios here in New York City on a 3348. All of the tracks from Ocean Way and Dublin were combined onto the 3348. It was not an easy project to pull together from a mixing standpoint.

While hunting around for the right mix engineer, Frank's name continually came up as *the* guy for this project. After conferring with Michael, we all agreed to use Frank for the majority of the recording. (Because of an earlier game plan with the label, Mick Guzauski wound up doing the two pop tracks for us. Mick did a great job as well.)

Within the first five minutes of working with Frank at Right Track on the Neve Capricorn, we knew that we had picked the right person. As he listened down to the tracks, I could see that he immediately "got" the concept. Within the first two days, the rough mixes were sounding great. As the project went on, we all came to appreciate Frank not only as an extremely talented engineer, but as a truly good person—the type of person that you'd always want on your project no matter what the material.

While Frank is dead-on in terms of his use of digital technology and his discussion of it, I think another important point for your readers and one not really touched on in your article is Frank's use of reverbs. To my ears, all of the best mix engineers have a unique and extremely musical approach to using reverbs, not only for ambience but for EQ, instrument placement/depth and, for lack of a better phrase, the "X factor." While most home recordists (and even a lot of good pro engineers) dial-up as many reverbs as they can get their hands on, engineers like Frank use reverb like a paintbrush. Also, many engineers hope to correct things in the mastering, never realizing that what they thought they had is no longer

there. And, should you think it's the gear he has, trust me, it really isn't the gear at all; it's the way he uses it and his music sensibilities.

I hope that *Mix* will revisit Frank on the reverb front. This is truly an area that needs more attention and one that will help your readers' mixes sound more musical.

Finally, check out Frank's work on James Taylor's DVD *Live at the Beacon*. I've never heard a better sounding live recording—ever.

  Jack McCracken
  Remarque Productions
  New York City
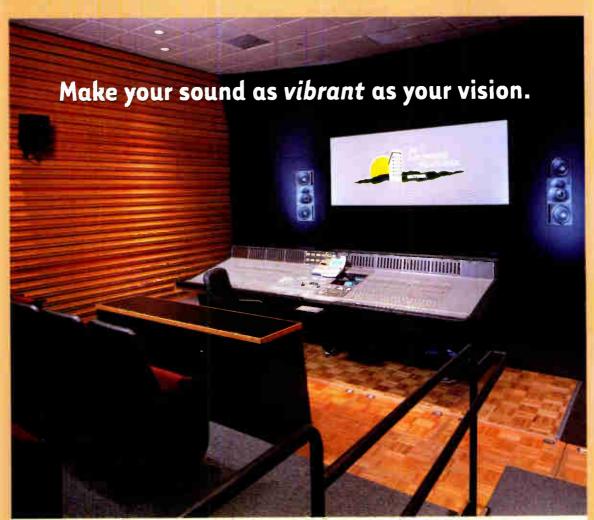
DON'T QUIT YOUR DAY JOB

In Jim Stagnitto's letter in the March 2001 issue regarding copyrights, intellectual property laws and the future networking of the music industry, he states: "...an increasingly networked world will accelerate the discovery, rediscovery and cross-pollination of all types of global music, and music lovers will have instantaneous, pervasive and (darn near) free access to this content." And: "I would humbly submit that people who produce music for a living are going to remain very much in demand..."

This is possibly so, but how good can the music be if musicians can only create it in their spare time, away from their day jobs? I agree that losing the corporate suits in charge of the mindless commercial music scene of today would be a good thing. But even the masters of old were paid and, in some cases, "kept" by monarchs or other patrons. You can't create music, or any art, on an empty stomach. The Internet may put the music back in the hands of the people, but without copyrights, intellectual property laws and proper financial compensation, Mr. Stagnitto's world of discovery and cross-pollination may be populated by nothing more than hobbyists.

  L. Anthony Johnson
  Via e-mail

Send Feedback to Mix
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CURRENT

PROFESSIONAL AUDIO NEWS AND EVENTS

INTERNATIONAL LATIN MUSIC HALL OF FAME, 2001

Joe Cuba (center) singing with Adela Dalto, Johnny Rodriguez and Larry Figueroa

On April 4, legendary Latin artist Graciela came out of retirement to sing alongside 11-year-old sensation Luisito Figueroa for the third annual induction ceremony of the International Latin Music Hall of Fame. Held at the Hostos Center for the Arts and Culture in Bronx, N.Y., the nonprofit organization inducted music legends Ruben Blades, Antonio Carlos Jobim, Xavier Cugat and Pedro Infante, and many others.

Posthumous inductions included Libertad Lamarque, Pete "El Conde" Rodriguez, Rita Montaner, Juan Morel Campos, Julio Jaramillo and Luis Carlos Meyer. Special recognition awards were presented to Rita Moreno, Dr. Cristobal Diaz Ayala, Rudy Mangual and other notable Latin artists. Johnny Albino and Graciela each took home the Lifetime Achievement Award, while the Beny More Memorial Award was presented to Joe Cuba.

For a complete list of winners and information about ILMHF, visit www.latin fame.com.

Alfredo "Chocolate" Armenteros was one of many performers that night.

NOTES FROM THE NET

It seems that with all of the legal issues surrounding file-swapping and other forms of downloadable music files, companies right and left are teaming up to be the "first" to debut a platform that is not only legal, but can serve as a model for future services. Software companies and labels from the Big Five have been teaming up in the past couple of months to forge a new superhighway that lets music lovers download music legally, without infringing on copyright laws.

Universal Music Group and EMusic.com Inc. have signed a merger agreement, whereby UMG will purchase EMusic's outstanding shares for $0.57 per share, valuing the company at $23 million. EMusic, which had problems launching its music subscription service that charged $9.99 a month for unlimited downloads, holds a catalog that amounts to nearly 13,000 albums, mostly from independent labels. In addition to the catalog, UMG will pick up EMusic.com-controlled RollingStone.com and DownBeat .com. UMG plans on using EMusic's distribution platform for its upcoming online music subscription service, Duet, with partner Sony Music Entertainment. Duet will launch through Yahoo! this summer.

RealNetworks joined up with AOL Time Warner Inc., Bertelsmann AG and EMI Group to create a platform for online music subscription services. Dubbed MusicNet, the service will host a collection of downloadable and streaming music that can be used across a number of networks. EMI, Bertelsmann and AOL Time Warner will each own a minority stake in MusicNet, which will function as a separate company, and none of the distribution deals garnered with MusicNet are exclusive. On May 1, it was announced that the long-anticipated merger between EMI and Bertlesmann AG was scrapped due to regulatory concerns. (The EMI-BMG merger would control more than 25% of the recorded, music market worldwide.) Sources at both companies said that the online service will not be affected.

Napster update: The file-swapping service was back in court on April 10, where it announced that it was acquiring Gigabeat .com for an undisclosed amount, though the deal will incorporate its assets. Gigabeat's music indexing technology will be incorporated into Napster's service to aid in locating and excluding illegally distributed music files from its servers. Gigabeat's co-founders, Dr. Wilburt Labio and Dr. Narayanan Shivakumar, as well as the company's engineering crew, will join Napster's staff.

NUMARK ACQUIRES ALESIS

After months of rampant rumors and speculation, Alesis (www. alesis.com) announced that it filed for Chapter 11 bankruptcy protection on April 27, 2001. The filing was made in conjunction with an agreement to be acquired by Numark Corporation. Numark manufactures professional DJ equipment including mixers, turntables, CD players, headphones and microphones. An auction for the company was to have been held on May 23 in U.S. Bankruptcy Court in Los Angeles.

Alesis said it will continue normal operations during its protection period; there is no word yet on new product development, but the company said it plans to follow through on technology announcements made at AES and NAMM.

In related news, Groove Tubes announced earlier that its three-year partnership with Alesis has come to an end. Groove Tubes retains all original product designs, intellectual property for its studio mics and processors that were invented before the partnership, and retains exclusive rights to the Groove Tubes trademark and GT logo.

Industry News

Producer, arranger and musician **Ron Fair** has been named president at **A&M Records** (Hollywood)...Physical Optics Corporation spin-off **Broadata Communications Inc.** (Torrance, CA) appointed **Burt Walker** as the new president and CEO...The first executive director for the **Blues Music Association** (Memphis) is **Maggie Mortensen**...NSCA **Education Foundation** (Cedar Rapids, IA) named a new board of directors: **Mark Dundas**, **Sandy LaMantia** and **Loyd Ivey Ivey**...The Academy of Motion Pictures Arts and Sciences (Hollywood) awarded **Fairlight** (Hollywood) a Scientific and Engineering award for the design and development of the DaD digital audio dubber...Oscar-winning sound re-recording mixer **Chris Jenkins** was named the senior VP of sound services at **Universal Studios** (Universal City, CA)...**Andrew Rosen** moves into his new position of regional VP of sales at **Clear Channel** (San Antonio, TX)...**Telex** (Burnsville, MN) appointments: **Tom Hansen**, VP of sales for live and installed sound, and **Garry Templin**, VP of business development for the company's pro audio division...**Jim Pennock**, VP of advanced technology, **Rick McClendon**, director of national sales, and **John Hansen**, director of engineering, join **Harman Music Group**'s (Salt Lake City) management team...**Jensen Transfomers** (Van Nuys, CA) promoted **Dave Hill** to general manager...**Craig Hannabury** joins **Digital Harmony** (Seattle) as director of sales for pro technologies...The new senior design engineer over at Hampshire, England-based **Audient** is **Martyn Flood**...Working with the sales team at **BC Electronic Sales Inc.** (Kansas City, MO) is **Tony Jones**. He will manage the St. Louis, MO, office and is responsible for portions of Iowa, Illinois and Missouri. In other company news, **Kent Clasen** was promoted to director of marketing...New distribution deals: **beyerdynamic North America** (Farmingdale, NY) is the new distributor for **MIPRO Electronics'** (Chiayi City, Taiwan) UHF and VHF wireless systems in North America. **ZAG Inc.** (Franklin, TN) acts as the exclusive U.S. distributor for **Funktion-One**'s (Bath, UK) Resolution Series. Anaheim, CA-based **Star Enterprises** is **Nexo USA**'s (San Rafael, CA) representative in Southern California, Las Vegas and Hawaii. **Level Control Systems** (Sierra Madre, CA) appointed **Marketing Concepts** (Dallas) as its representative in Texas, Oklahoma, Arkansas and Louisiana. In other company news, **Bardy Hayes**, sales rep for LCS, named **Production Audio Services** (Melbourne, Australia) as its exclusive distributor for Australia and New Zealand...**Genesis Microchip** (Alviso, CA) named **Baranti Group Inc.** (Toronto) as its design center...**QDesign** (Mountain View, CA) opened the doors of its new Silicon Valley office at 888 Villa St., Suite 110, Mountain View, CA 94041.

ON THE MOVE WITH SCOTT YATES

Who: Scott Yates
What: Partner and principal designer at Walters-Storyk Design Group
Previous Lives:

- Associate at Walters-Storyk in 1997
- Came to Walters-Storyk straight out of college doing production and drafting work
- Graduated from Rensselaer Polytechnic Institute (RPI) in Troy, N.Y., with a Bachelor of Architecture, 1991
- Worked at H&R Design during college summer breaks
- Worked directly for a builder in high school designing homes

In my CD changer: "My musical tastes are varied—from rock 'n' roll to jazz and fusion/progressive. Some steady favorites are Rush, Genesis, Yes, Dave Matthews Band, The Police and Chick Corea."

The one thing that drags me out of bed each morning is..."the creative process. Ever since I was a little boy, I have always been fascinated by the built environment all around us and how things are put together. It's the design process itself that's attracted me to the larger field of architecture. Our efforts result in a finished building or facility of some sort—a real product that can be moved through, touched, photographed and have a real impact on people's lives for a long time to come."

My favorite project so far..."There are so many that I am quite fond of for a number of reasons: the design, the location, the people involved in the project. To name a few, AR Studios in Rio de Janeiro, Brazil, Synchrosound Studios in Kuala Lumpur, Malaysia, Electronic Arts, Vancouver, B.C., Bernard Chui Home Theater, Nantucket, Mass., and Boardroom for Interim Services, Ft. Lauderdale, Fla."

From left, Sam Berkow, John Storyk, Beth Walters and Scott Yates.

MIX L.A. OPEN, TEC AWARDS NEWS

A few spots are still available for the Sixth Annual Mix L.A. Open charity golf tournament, Monday, June 11, at the Malibu Country Club.

Confirmed sponsors at press time include Audio-Technica, BASF/Emtec ProMedia, CE Pickup Company/Industrial Acoustics Company, Design FX, *Electronic Musician/Mix/Onstage Remix*, Miles O' Fun, Ocean Way, Quantegy, Record Plant, Sony Pro Audio, Soundelux and The Village. For more information, contact Karen Dunn, tournament director, at 925/939-6149 or KarenTEC@aol.com. Registration forms are also available at www.tecawards.org.

Steely Dan will be awarded the prestigious Les Paul Award by the award's namesake at the 17th Annual Technical Excellence & Creativity Awards, to be held September 22, at the Marriott Marquis in New York City. Engineer Roy Halee will be inducted into the Hall of Fame.

Borrowing from jazz, traditional pop, blues and R&B, Walter Becker and Donald Fagen created a sophisticated, distinct sound with compelling melodic hooks, multifaceted harmonies and a devotion to sonic perfection.

Roy Halee was a veteran staff engineer and producer for Columbia/CBS, whose credits include albums for Paul Simon, Blood, Sweat & Tears, The Byrds, Chaka Khan and many others. He was instrumental in setting up Columbia's satellite studios on the West Coast.

For a complete list of the 2001 TEC Awards nominees, please see page 74. For tickets or information about the TEC Awards, call Karen Dunn at 925/939-6149 or e-mail KarenTEC@aol.com.

JOEY RAMONE, 1951-2001

Joey Ramone, lead singer of the legendary punk band The Ramones, passed away at 2:40 p.m., April 15. Born Jeffrey Hyman, Ramone did not respond to treatment when he was hospitalized in March for lymphatic cancer. He was 49.

SEE THE PYRAMIDS

A LONG DENIAL

ILLUSTRATION JOEL NAKAMURA

irst, let me say something that I have always strongly believed: Never trust anything that is upside down. This one rule, this simple guide, has served me well my whole life.

As a little kid in Arizona, I quickly learned that it was better to sleep out in the open under the stars than in the spaces under rock outcroppings or in caves (not a lot of money in my early teens). And why was this true? Because the likelihood of a bird swooping down to whisk me away softly into the gentle night was quite low, and sleeping out in the open presented only a single plane of threat. Harbingers of pain or death, from 15 kilos to half a gram, were almost exclusively earthbound, and by sleeping

under the Milky Way, I reduced my exposure from a hemisphere to a much more manageable 360° plane. Were I to sleep in a cave, the insect portion of the Army of the Unwanted could attack from above, as well as below.

I like the ground under my feet, not hanging inverted over my head.

In my mid-teens, as I grew into a full-on motorhead, the rule again applied. Yup, never trust anything that's upside down. It was a sure sign that an unpleasant situation was at hand if a car was on its roof or a bike on its handlebars. And it was a sure bet that if the entire world were upside down, you were

BY STEPHEN ST.CROIX

intimately involved in the unpleasantness at hand.

And then in the '60s, I came to not trust anything that was on the ceiling at all, no matter how amusing it might be. No cats, no furniture, no aliens and certainly no musicians.

I will spare you each confirming example in my life; suffice it to say, there was at least one for every year. I will instead skip straight to the Egyptian one. For all of the successes and mistakes that I have made in business, for all of the fortunes made and lost in the market (a fortune is anything over a buck), I have never made a certain type of mistake. I have always evaluated financial investment or commitment with the image of a pyramid in the

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back of my mind. Why? Well, to paraphrase one of America's great philosophers, Susanna Hoffs: "Build like an Egyptian."

Never trust an inverted pyramid, or, for those not technically inclined, never trust a pyramid that's pointy side down. Sure, there may be a great, flat, 4-acre playground for the rich at the top, but what happens if everybody decides to run over to the northwest corner at the same time?

Yes, one of the world's most stable geometric shapes, one of the hardest to knock over when properly installed (pointy side up as shown in the instructions on the back side of the dollar bill) becomes a worthless piece of unstable junk if it is built upside down.

From Mary Kay and Shaklee to big-business pyramid scams involving entire countries, I have always escaped unscathed by remembering this upside-down rule.

HAVE YOU GUESSED WHERE I'M GOING YET?

Those who have read me for decades must be getting to the point of figuring out where I am heading about now, so I will end that speculation immediately.

There is a strong temptation for me to take the statement "never trust anything that is upside down" and apply it literally to the subject generally at hand in *Mix*: audio. Were I to do so, we would now be transitioning into a column about the importance of absolute polarity in audio, or what some call correct phase. I would be launching into a dissertation on the evils of inverted polarity and how the human brain is not equipped to deal with inverted acoustic events. I would go into detail and cite physical examples that you would immediately sense as obvious and correct based on your own personal experience.

I would remind you that, while a bass drum produces a "negative" initial compression front (or atmospheric rarefication) to the drummer, the entire audience, as they are seated on the other side of the kick drum's membrane, is treated to a positive front, or an atmospheric compression. I might then argue that this positive compression front is what they know as "right," so it had better be the way you handle it in the mix or it won't be as convincing.

I would probably tell you about how you can drop a sax a few deebs in a mix and not feel it when the absolute polarity is correct, as opposed to when

it is inverted. And, as I am currently in Florida teaching non-audio people how to get improved intelligibility in acoustically hostile recording situations, I would certainly go on to show you how to do a human speech vs. noise test to prove how the brain deals with inverted asymmetrical waveforms and how intelligibility is affected.

And, of course, I would find it impossible to resist the temptation to touch on the old "why a single-speaker mono playback system must have its

When I "collected" and wired my first studio, there was no money, so the temptation simply to do the best I could was great. I knew that if I just went with what I had seen in real places and sort of tried to make it look the same, I could generate some business and make some music.

polarity checked" discussion.

But that's *not* where I'm going. I might sometime soon, or I might consider the Cliff's Notes rendition above enough, but that's not where we are going this month.

No, this time it's actually about building on a solid foundation. Hence, the pyramid.

FOUNDATION FOR WHAT?

Everything. A sort of life lesson. And I will, as I have a propensity to do, use myself as an example. For all of the mistakes that I have made to date, and there have been far, far too many to count (in 16-bits, anyway), I have never had a studio design, a car design or any other project within my control and field of knowledge fail. Really.

I have never had to go back and jackhammer my control room floor, because I didn't allow for a 256-channel snake back in the 24-track days when the bed was poured. I have never had

to work in a hot room because the AC was too loud during quiet vocal takes. (Well, actually I *have*, but not in one of my studios.)

I have never spent days or weeks chasing ground problems or drilling for new ground star points after a new rack had been installed.

IN THE BEGINNING...

Money was tight, *real* tight. When I built my first studio—wait—I can't say that it was even really "built"; it was more of a collection of gear in a room with fluffy walls. When I "collected" and wired my first studio, there was no money, so the temptation simply to do the best I could was great. I knew that if I just went with what I had seen in real places and sort of tried to make it look the same, I could generate some business and make some music.

But then I began to feel a bit uneasy and somewhat less secure as I began to list what was needed in detail. I realized that I wasn't quite so sure *why* I needed certain things and not others, and more importantly, *why the big boys were doing things for which I saw no need.* I knew that the facility I was using as a reference had 16 lines running between the 8-track deck and the console, and I knew that 16-track machines were coming. I wondered how and where they were going to lay the other 16 lines. Then I got the old "bridge when we come to it" answer. Not good enough.

I realized two things: that a bit of reasonable planning could save my anterior later, and that it was possible I didn't know enough in general to build a facility that could survive the future. So, I got help.

I resented the additional expense and time that this professional help was going to cost me, but I felt it was the only way to increase the odds of avoiding the pitfalls of the great unknown.
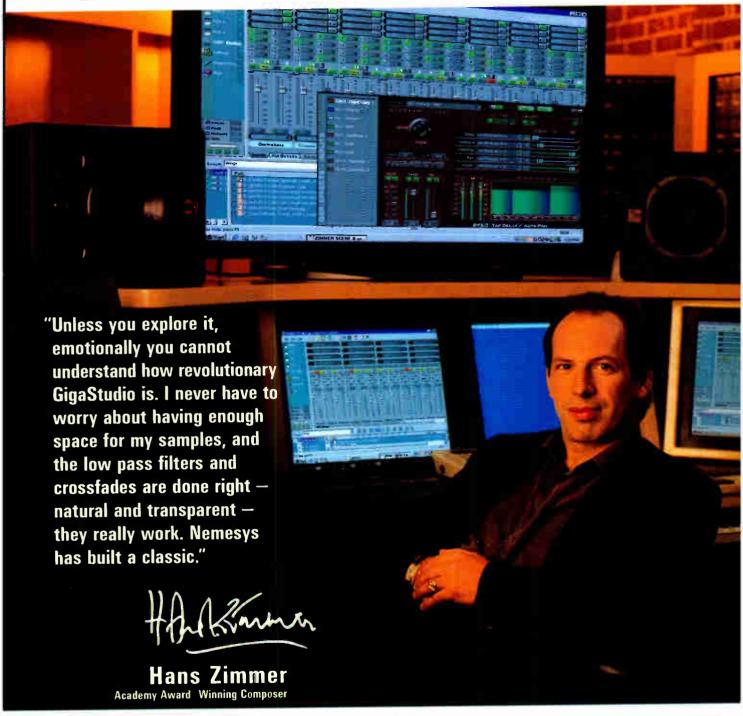
So, I built a tiny facility with no architectural commitment at all—to make some local bucks to pay the guru later. This postponed my dream studio for two years, but, in the end, it was the best move I could have made.

I used those years to learn. I learned what I really wanted, and what I didn't want. I learned how a little planning in the beginning could save weeks of downtime later when the time came to update. I learned that certain problems can *never* be fixed later and so had to be dealt with before the very first yard of concrete is mixed.

I learned that I was a very good en-
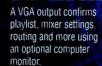
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MORONS, OXYMORONS AND TECHNOLOGY PATENTS

STUPID INTELLECTUAL PROPERTY TRICKS

ILLUSTRATION RICHARD DOWNS

If you want to see just how totally out of control the high-tech universe is, then go to your favorite Internet search engine and type in the words "bogus patents." NorthernLight.com returns over 250 results—almost all having to do with companies and their lawyers fighting over the legitimacy of new technology patents. Not over who did something first, but whether the patents should exist at all or not.

In the old days, patent fights were about timing: The development of everything from the sewing machine to the television is littered with cases in which one inventor or company claimed he (it was almost always a "he") invent-

BY PAUL D. LEHRMAN

ed something before some other guy did and therefore was eligible for compensation. And usually things were reasonably clear-cut: Either someone could prove that they had come up with an idea and used it first or they couldn't. Patent officers and judges could determine, with a certain amount of confidence, when one invention bore too close a resemblance to another, or when someone expressed the main points of an idea—the concept known as "prior art"—before someone else did.

The whole idea behind patents, like copyrights, was not just to ensure that an inventor could make

money from a new idea, but also to publish the details of the invention so that others could build on it—at the same time creating a reasonable monopoly for the original patent holder and requiring that others who want to use the idea pay a license fee. The patent system was supposed to restrict and regulate competition, not shut it off. But it also had another role: to spread knowledge.

Today, however, companies look at patents in a totally different light. A whole new industry has sprung up in "defensive" patents—let's take out a patent on this idea, even if we're not using it and may never, just to make sure no one else can. It's become particularly

nasty in the software world. Although software patents are illegal in Europe, in this country thousands of patents are applied for every year for techniques like handling e-commerce transactions, compressing images or tracking Internet users' habits. To make matters worse, a lot of these concepts are far from original—they've just never been patented before. Companies are staking claims on ideas that have been floating around for years and used by many, but that doesn't deter them from demanding royalties on "their" intellectual property.

For a patent to be valid, it has to be considered "non-obvious," that is, a genuine invention. A landmark Supreme Court ruling in 1882 read, "It was never the object of patent laws to grant a monopoly for every trifling device, every shadow of a shade of an idea, which would naturally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufactures. Such an indiscriminate creation of exclusive privileges tends rather to obstruct than to stimulate invention."

But the definition of what is "non-obvious," especially to those who smell money, seems to be rather fluid. I have personally been involved in a couple of scraps, within our own industry, over this issue. A few years ago, a keyboard manufacturer tried to patent the idea of velocity-based sample switching; that is, how hard you hit a key on a musical keyboard determines which sample will play. Very early in the days of digital
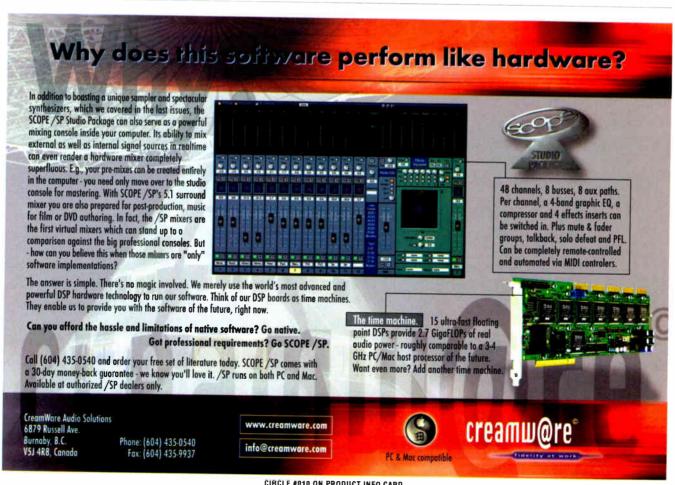
Probably half of the patents I've read are clearly invalid to anybody who knows the art.

—Raph Levien

samplers, this might have been considered a patentable idea, but by the time this manufacturer got around to it, it was already in wide use throughout the industry. It was an obvious feature for any sampling keyboard that intended to reproduce the sound of a real musical instrument. The folks who objected to the patent being granted contacted me, and I was able to point them to a user manual from an older instrument that clearly showed this concept being used to simulate a piano sound over a wide dynamic range. Having established prior art, they were able to have the patent application thrown out.
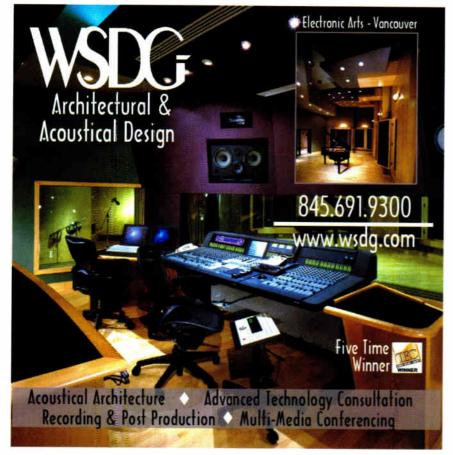
More recently, I was a consultant for a law firm on the other side of the fence. A research institution was suing a commercial manufacturer for using a signal-distribution scheme the institution had patented for, and I was asked for my "expert" opinion as to whether there was indeed infringement. My report read, "Yes, the defendant was infringing on the patent, but I could name four other companies that were also infringing, because the idea was so obvious it should never have been patented." I was thanked (and paid) and told that my presence in court would not be necessary. As far as I know, the case is still pending.

One of the problems with the current patent situation is that many of the people who work at the U.S. Patent and Trademark Office don't seem to be the ideal candidates for making fair and in-

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telligent decisions about the new concepts and ideas that are being thrown at them constantly. Given the ever-faster-spinning revolving door between business and government, it's not a stretch to think that many inspectors could be, as one report accuses, "former lobbyists for the mega-corporations they're supposed to be overseeing." Other reports say that patent officers work on a quota system, and so they can't afford to spend the time and resources investigating new filings. Whatever the reason, there is a new laxity in the patent office,

BountyQuest offers "bounties" of up to $25,000 for information that helps to debunk any of the dubious patents and copyrights on their list.

and large high-tech companies are taking advantage of it, often to smaller companies' detriment.

Computer writer Joseph T. Sinclair puts it this way: "For lack of trained personnel, the Patent Office in the last few years has approved thousands of patents regarding online [Web] business systems that will never hold up in court. Most of the patents have been filed defensively on the advice of attorneys. In other words, if a corporation sues your company for a patent infringement based on its bogus patent, your company can counterclaim for infringement on its bogus patent. The result is a wash and a moneyless settlement. But if you don't have a bogus online business systems patent or the money for an attorney, you're a victim in this Silicon Valley blood sport."

Therefore, a lot of ideas—like that signal-distribution concept—receive patent protection when they shouldn't. Raph Levien, an inventor and programmer active in the open-source movement, says, "The examination process for software patents is a sham—probably half of the patents I've read are clearly invalid to anybody who knows

The Class of 2001

19 OF THE HOTTEST NEW ROOMS TO OPEN THIS YEAR

On the Cover: Metropolitan Recording

Featured on this month's cover is Metropolitan Recording of Bryn Mawr, Pa., the home for founder and CEO of RuffHouse/Columbia Records Chris Schwartz, who opened the space in late 2000 as a full-service production facility for both the label's roster of acts, such as The Fugees, Cypress Hill, Lauryn Hill and Wyclef Jean, and "outside" clients. Designed by Martin Pilchner, of Pilchner Schoustal, who worked alongside in-house producer Ian Cross and builder Carl Schwartz of Schwartz Bros. Construction throughout the project, to re-use this turn-of-the-century carriage house, it incorporates the original vaulted ceilings and exposed trusses. The interior features a number of custom acoustical treatments that aid in maintaining a high degree of sound isolation and aesthetic appeal. The control room boasts numerous purpose-built modifications to yield better ergonomics and provide for a more accurate listening environment. Equipment of note includes a 72-input SSL J Series 9000 console, two Studer A-827 2-inch tape machines, Pro Tools 5.1 and an impressive array of contemporary and vintage outboard gear. Main monitors include Quested Q212s.

Sound on Sound Recording, Studio C
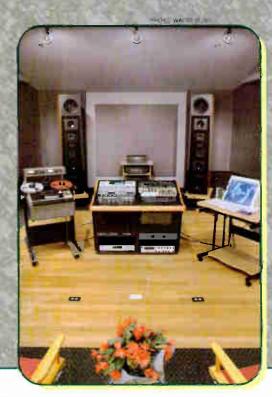
This New York City studio was redesigned by John Storyk with acoustical consulting by George Augspurger. The room features an AMS-Neve Capricorn digital console, Sony 3348 tape machine, Pro Tools 24 with Martinsound Multimax surround monitoring control; monitoring includes custom-Augspurger monitors with TAD components and five Genelec 1031A near-fields. The room was finished in September 2000.

PHOTO EDWARD COLVER

Glenwood Place Studios

Chicago Recording Company owner Alan Kubicka's new West Coast venture, this facility was renovated by VP Phil Bonnano and acoustician Carl Yanchar of Wave:Space Inc. in 2001. Located in Burbank, Calif., the studio features a 72-input Amek 9098i by Mr. Rupert Neve, Wave:Space custom monitors, Studer A827 Gold Edition analog 24-track machine and a complement of outboard gear from API, Lexicon, Manley and TC Electronic.

M-Works Mastering

Opened in March 2000, this 2,700-square-foot-facility, designed by George Augspurger, comprises three mastering suites, two of which focus on traditional mastering with a third room dedicated to 5.1 and DVD applications. Located in Cambridge, Mass., all three rooms master to Sonic Solutions. Studio A monitoring is handled by Dunleavy SC-5s, while Studio B uses Tannoy DMT-12s and Studio C a Genelec 5.1 system. Studio C also includes a Sony XBR 32-inch monitor for film sound work. Recent projects include Aerosmith, Aimee Mann and the Mighty Mighty Bosstones.

Chris Beck Music Studio

Santa Monica, Calif.-based Chris Beck Music Studio is the picture of modernity with three Yamaha 02R consoles interfacing with a MOTU 2408/Digital Performer hard disk system for this music composer's own workspace. Designed by studio bau:ton in August 2000, the room enhances the natural light that streams in from the open spaces in the skylight, windows and glazed door. Monitoring is done through PMC MBI-P.

Bogart Recording Studios

This new studio in North Miami, Fla., opened in March 2000, was acoustically designed by Andy Munro of Munro Associates and Dave Malekpour of Pro Audio Design. The live room's 16-foot ceilings, stone walls and hardwood floors welcome the likes of the Backstreet Boys, Mariah Carey, Gloria Estefan, KISS and Prince. The control room is based around a 56-input SSL 4000 G Series console and an Otari RADAR II 24-bit digital recorder. Monitoring is through Dynaudio C4A and M1 near-fields. The studio is also equipped with Alesis ML9600 Masterlink multitrack recorder and Apogee AD/DA converters, as well as a healthy array of outboard gear.

Studio Atlantis

Opened in August of 2000, the new studio bau:ton-designed
Studio Atlantis (Hollywood) boasts a Trident 80B 56-input console
with Uptown moving faders and Herzer mods for commercial
recording. The aquatic-themed room features a Studer A-80 or Pro
Tools recording and has a variety of monitoring options, which
include UREI 813-B time-aligned monitors, modified by Vernon
Systems, and Yamaha and Tannoy systems. Clients include The
Temptations, Matt Sorum and Slash.

Secret Garden

Opened in October 2000 and designed by Chris Pelonis of Pelonis
Sound and Acoustics, owner/artist/producer Ben Margulies and
Mike Lee of Dreams and Designs, this Santa Barbara, Calif.-based
studio features an Amek Einstein console, Otari 24-track recorder,
Pro Tools Mix-plus, Tannoy 215 mkII and Mackie monitors. A full
complement of outboard gear is represented by Avalon, Focusrite,
TC Electronic, Eventide, Oram and Neve.

Cartee Day Studios

This 7.1-equipped, Nashville-based studio was built from the
ground up by Michael Cronin Acoustic Construction and opened
in February 2001. The 20x30-foot control room features an
AMS-Neve VXS 72 console. The main monitors are Munro
Associates DynAudio M4+, and near-fields include KRK E-8s
and Yamaha NS-10Ms. The studio also features a Studer D-827
and an 827 Gold tape machine.

The Body

Carter Burwell's personal studio (New York City) was designed by John Storyk and
Scott Yates of Walters-Storyk Design Group in May 2000. Furnished with a
Euphonix System 5 console and three-way Genelec 1037 5.1 monitoring, the stu-
dio also hosts such gear as Digital Performer, Pro Tools, Korg Wavestation, Yamaha
TG77 and a Roland VP-9000 Variphrase processor. Burwell's film composing credits
include Three Kings, Being John Malkovich and Fargo.

5.1 Entertainment Group

Redesigned in April 2000 by the studio's own audio team, this two-room facility hosts a Soundtracs DPC2 digital production console, M&K surround sound speakers, Pro Tools hard disk recording, Studer A827, and Tascam DA-88, 78, 98, as well as Apogee 24/96 converters. The main tracking rooms also have two Euphonix R-1 48-track tapeless recorders. Located in Los Angeles, the interior design was handled by Jane Brooks Interiors and Dianne Caillat.

PHOTO EDWARD COLVER

PHOTO JAMES WILSON

Sonic Arts Digital Audio Services, Mix2Pix Suite

Opened in May 2000, this Russ Berger Design Group-designed studio was remodeled to fit seamlessly into the historic motif of downtown Cincinnati. The facility boasts two identical control rooms with a central machine room, Pro Tools MIX Plus, 16-channel Pro Control, Quested 5.1 surround monitoring and an extensive complement of mics for use in ADR and Foley. Most clients are working in film sound and use the studio's high-resolution, large-screen video projection for mix-to-picture work.

Rainmaker

This Richmond, Va.-based multiroom facility employed the design of Recording Architecture of London Inc., to build the two control rooms, two studios, MIDI production suite and ancillary spaces, which opened in June 2000. The interior is augmented with a spattering of exposed brick and hickory floors. Tracking is down to Pro Tools MIX|24; the console is a Brent Averill Neve, equipped with API mic pre's. Monitoring is through an ATC 5.1 system.

PHOTO MARK DIAMOND, PANORAMIC SERVICES
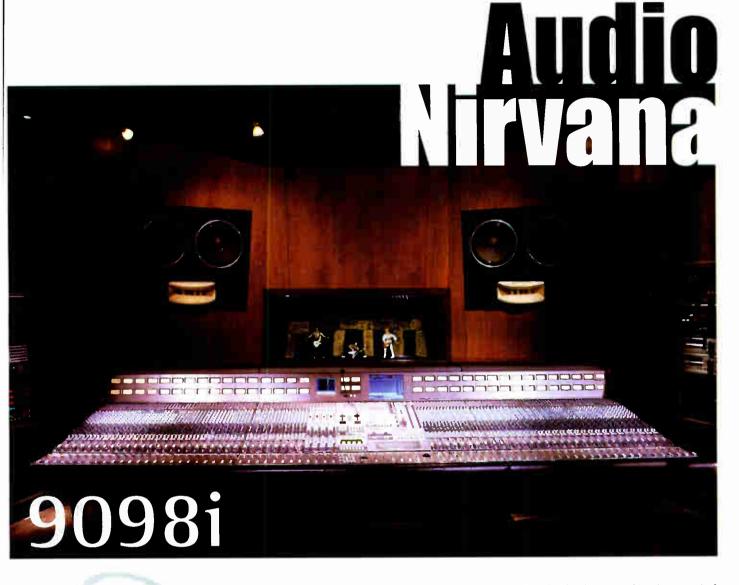
Artisan Recorders Mobile Studio

Back online in late-March 2000, this mobile unit (Ft. Lauderdale, Fla.) was redesigned by John Arthur Design Group to improve the overall aesthetics, acoustics and ergonomic functionality. Features of note include an Amek Hendrix console, Hafler monitors, analog and digital multitrack options, and a generous amount of outboard gear. The truck also features a client area, 5.1-capable mix environment, and isolated machine and tape op area.

PHOTO NEIL WAVING

World Radio History

Audio Nirvana

9098i

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Jim Zumpano, Owner
Stonehenge Recording at ZAC
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The non-linear HDR24/96 vs. linear hard disk recorders.

Ever since the invention of magnetic tape, recording over something means it's

SoundCastle Studio II

This January 2001 redesigned studio (Los Angeles) by Studio 440 houses a surround-capable SSL SL 4000 G+ classic console and custom Augspurger monitors with TAD and JBL components. Recording formats include Studer 827 and 820 24-track recorders and an 820 1/2-inch 2-track, Panasonic SV-3700 DAT and Sony DBU 950 3/4-inch video for sync-to-picture work. The room was originally designed by Augspurger with interior treatments handled by Waterland.

Sand Hills Studios

Catering to both Latin and U.S. artists, this new studio is located on a 40-acre ranch outside of Portales, N.M. Boasting a Neve VR60-FF console with automation, Studer analog, Pro Tools, ADAT recording and a healthy array of outboard gear, the studio also includes main monitors from TAD, Meyer and Yamaha. Designed by chief engineer Rob Russell and owner Rocky Garcia (of Mexican group Los Huracanes Del Norte), the studio opened its doors in March 2000.

Phase One Recording Studio B

This Pilchner Schoustal-redesigned room (Scarborough, Ontario) is centered around an automated API Legacy 64-input console. Recording is done to Studer 827, Pro Tools 24, ADAT, Tascam DA-98 and -38, and an Ampex ATR 100 tape machine. The interior redesign features natural maple floor and wall-paneling and perforated birch ceiling panels. The rear wall also features an RPG Diffusor array. The existing MEG monitor system was also physically and electronically upgraded for the September 2000 opening.

The Post Shop

This Toronto-based studio added two new audio suites in January 2001, a 5.1 room and a mastering suite, both designed by Pilchner Schoustal. The 5.1 room showcases a Pro Tools MIX Plus system on a Mac 500MHz G4 through Digidesign 888 I/O with Pro Control. Monitoring options include Genelec 1032 with a 1092 subwoofer and Auratone 5PSC monitors; in addition to a healthy choice of audio/video recording options, the room hosts a Sony Vega 32-inch XVR video monitor. The mastering suite is running Pro Tools MIX 24 with a Yamaha 03D digital mixing console, while monitoring is done through Genelec 1038s. Mastering formats include Panasonic DAT recorders and an Otari MPR-12 1/4-inch recorder. For Foley work, the room is also equipped with a 42-inch Sony plasma PFM-510 A1WU video monitor.

Masterdisk

Located in New York City, this stereo mastering suite for senior mastering engineer Tony Dawsey was redesigned by Francis Manzella in April 2000. The room was designed around a modified reflection-free zone to enhance the room's imaging. The suite also features a custom analog mastering console, Sony Digital Editor, converters by Prism, DCS, Apogee and Studer, and Griffin mastering loudspeakers.

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World Radio History

MIX'S 2001 GUIDE TO ACOUSTICAL MATERIALS

BY RANDY ALBERTS
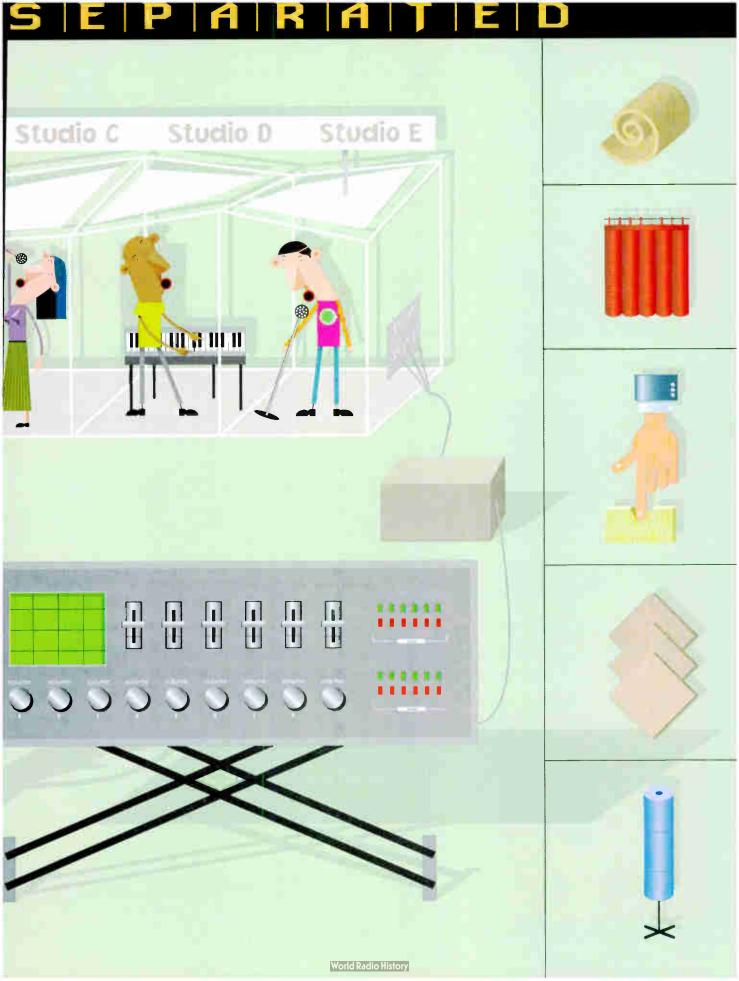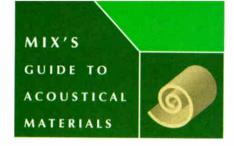
S tudio designers and engineers may quibble over equipment choices, but all must agree that, for best results, a recording space stands or falls on its acoustical characteristics. And, in all but a very few cases, those signature characteristics need to be controlled or modified for each project. Most engineers use a gobo or two for separation during tracking sessions and, even in studios that boast some form of built-in variable acoustics, will occasionally need to create a temporary isolation booth. Similarly, control rooms and mixing suites will only provide an accurate monitoring environment when acoustic anomalies have been identified and corrected.

This article lists a wide array of foam, wall panel, baffle, barrier, ceiling tile and diffusion products to acoustically treat an audio space. The accompanying sidebar [page 46] describes a sampling of vocal booths and all-in-one audio enclosures for amps, computers and even human beings. Be sure to take note of specifications such as the NRC rating (Noise Reduction Co-efficient) and STC rating (Sound Transmission Class) when shopping. The NRC tells you how much sound energy is absorbed (the higher the number, the more absorption), and the STC rates the amount of sound blocked in decibels (again, the higher the number, the greater the sound absorption). For example, a brick wall has an STC in the 50s, whereas a single-plate glass window's rating may be 30. Another figure to be aware of is the product's flame-retardancy rating.

Long the studio favorite and available in just about any form imaginable, foam products are cost-effective, easy to install, and are best suited for attenuating middle to high frequencies and for minimizing reverberation and reflections; foam is not generally very effective at just blocking sound.

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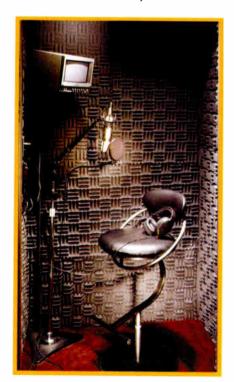
Wall panels, which are more expensive than foam products, are usually constructed of fabric-covered frames filled with Fiberglas panels and can be covered in a wide range of fabrics. Baffles generally provide a combination of absorption and diffusion, and they can be quite flexible. Barriers are formed of layers of dense, limp mass that can make a wall, ceiling or door impervious to sound.

Ceiling tiles affect the largest area in most studios and are a cinch to drop into any tile grid. Fabric wall coverings can strike the perfect balance between audio logic and aesthetic beauty, and even the least expensive diffusion devices can work wonders to widen a sweet spot, increase clarity or reduce standing waves.

Whether your own acoustic challenge is finding stackable gobos and ready-made iso booths for a soundstage or soundproofing a converted single-car garage, you will probably find the solution in this list of acoustical materials manufacturers and their products.

Acoustic Sciences Corp.'s patented Tube Trap, a corner-loaded bass trap, has been around for years. Most re-

Illbruck Sonex

cently, the company has released three new studio configurations based on Tube Trap and Studio Trap, its free-standing acoustic gobo counterpart. The Quick Sound Field ($2,498) is a versatile arrangement of Studio Traps that offers three distinct recording environments at the turn of a few Traps. Rotating each Studio Trap's reflectors outward creates a boom-free dead space; tightening or opening up the spaces between Studio Traps dials in low-level room ambience, and turning the reflectors inward toward the mic creates a bright, transparent sound. The Attack-Wall ($4,998) arranges Tube Traps, Studio Traps and ASC's Monitor Stands to create a completely portable acoustic subspace for mixing.

ASC's MixStation ($1,500) is a new acoustic mixing solution built for project studios and production suites. It comes complete with prefabricated, wall-mounted diffusive panels. Bastone Ceiling Panels ($98 per 2x2-foot panel) provide diffusion and bass trapping and drop right into any standard ceiling opening. The Iso-Wall Construction System (about $3.00 per square foot wall/ceiling area) uses ASC's proprietary WallDamp, a visco-elastic polymer material, to absorb excess low-frequency energy and reduce wall shudders in high-volume music playback environments.

After marketing a line of sound-proofing materials for many years, Systems Development Group recently called it quits. Several of that company's more popular products are now carried on by **Acoustical Interiors** in the Sonora line (call for all pricing). Sonora Panels are high-density Fiberglas wall panels for sound absorption and are available in sizes up to 4x10 feet and from 1/8 inch to 2 inches deep. Sonora Panels come in one of 12 standard fabric coverings, and they feature square, beveled, mitered or rounded edges. Sonora Baffles are placed in or hang from the ceiling of a room. Made of a Fiberglas core housed in a spline-and-groove PVC frame (so that users can later change fabric coverings), Sonora Baffles are also available encased in a sewn fabric shell or encased in a black or white fire-retardant vinyl film cover. Sonora Ceiling tiles are made up of a barrier layer and a unique, soft, Fiberglas absorber assembled into an aluminum frame. Tiles are available for 2x2- and 2x4-foot grid systems in 9/16- or 15/16-inch widths, and they are covered in a wide range of fabrics.

Acoustic Sciences Corp. Iso-Wall Construction System (above) and Quick Sound Field

The **Acoustical Solutions** (formerly Alpha Audio) Website includes applications and products for recording studios, as well as noise-control solutions for animal shelters, marching band practice rooms, gun ranges and houses of worship. AlphaSorb Wall Panels come in standard or custom sizes and with soft or resin-hardened edges, and they sport a sound-absorption rating of NRC .80 to 1.05 and a Class 1 fire rating. Prices range from $39 for a 1-inch-thick, 2x2-foot panel to $280 for a 4x4-foot, 2-inch one. The AlphaSorb Barrier Wall Panels (call for pricing) are combination wall panels that feature AlphaSorb Wall Panels and a strip of Audioseal Sound Barrier, a sound transmission blocker that has an STC rating of 27 and is dense enough to weigh 1 pound per square foot. Price is $472 for a 54x60-inch roll (270 square feet).

Acoustical Solutions' Signature Sound Barrier Ceiling Tiles come in two sizes (2x2 feet and 2x4 feet) and replace standard lay-in ceiling tiles. Prices are from $15.50 to $88 per tile. The company's Alpha Spiral ($72 for a 4-foot trap) and Corner Traps ($22 each for a 4-foot trap) are also available. The Alpha Spiral Trap is designed to fit over a tripod base microphone stand and absorb low frequencies. Each unit is

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easily raised or lowered on the stand to match a room's needs.

Acoustics First Corporation offers a full line of sound solutions, including the Art Diffuser, Sound Cylinder, Com-posite Foam, Double Duty Diffuser and Cutting Wedge. The patented Art Diffuser ($79 for a painted, 15-inch square by 9 ½-inch-deep version) comes in a variety of 2-D, binary-array designs to offer one, four and five-octave diffusion. The Sound Cylinder ($160, two per box) is a freestanding, stand-mounted absorber with a rolling pattern surface that can be used in multiples to form a temporary vocal booth or mixing area. Composite Foam (from $25 to $55 per piece) can be used to reduce machinery noise and to quiet the noise leaking through open filler panels in equipment racks. Available with Tuftane or heat-reflecting Mylar surfaces, this line of foam/barrier combinations is also available with an aluminized Mylar facing. The Double Duty Diffuser Bass Trap (from $160 to $410) is available in a number of sizes, thicknesses, finishes and linings to scatter sound anywhere low-frequency absorption is a must, particularly across corners. Cutting Wedge acoustical foam

ACOUSTIC MAINTENANCE FOR SUBSCRIBER STUDIOS

THE MAN FROM DISC

The music industry has no shortage of consultants who offer, for a fee, to guide the uninitiated and veterans alike through the "business." Over the past decade, any number of marketing services popped up to help studios find new revenue streams. Before that, it was artist/producer managers. But where does a studio owner turn to learn about the performance of their rooms?

Yes, there are a number of acousticians and room tuning specialists, but there's a relatively new program out of England that is gaining popularity. Four years ago, UK-based studio design firm Recording Architecture created DISC, a service that, for a $1,500 annual fee, would bring in acoustician and RA partner Nick Whitaker. He checks the control room and its monitoring system, using TEF software for anomalies and specifies a correction.

Since incorporating DISC three years ago as its own company with Whitaker at the helm (the other RA principal, Roger D'Arcy, chose not to pursue this venture, though both remain main partners in RA, which has built over 400 studio and post facilities in 14 years), 65 facilities have signed on with DISC, most of them Recording Architecture clients. But, says Whitaker, that's been changing.

"It makes perfect sense that we would have marketed this idea to studios with which we already had a relationship," he says. "But the service is far broader than that. Any studio can benefit from regular acoustical and monitoring maintenance. The level of quality of studios and of monitoring

environments out there varies widely and dramatically. Having DISC do its thing on the studios not only re-establishes the integrity of the room, but also lets the world know that you've done so."

DISC facilities include Digital Creation in Cyprus, Studios 301 in Sydney, Spectral Harmony Studio in Bombay and a growing number of U.S. facilities— including Rainmaker post in Richmond, Va., OOrong in Manhattan and Terrarium in Minneapolis—since the company opened an office in Richmond last year. A global directory (DISC stands for Directory of International Studios and Control Rooms) lists them all.

Whitaker works with whatever technology platforms and gear a studio chooses to use. "There are obviously some things we have our own preferences for," he says, "but in terms of recommending or approving particular equipment, the short answer is 'no.' The directory will be able to tell you what other main equipment information the studio has, from consoles to tape machines. The point really is that Studio X has a pair of Y-brand speakers. If the studio has DISC accreditation, those speakers and their monitoring are optimized to an acceptable degree and maintained that way.

"And, in the end, that's really what we're selling—confidence in your monitoring system and control room acoustics," he continues. "It's aftercare, and that's a notion that's been going out of style lately, isn't it? For us, this is a way to offer premium service to design customers and to any facility."

Nick Whitaker

The DISC concept seems to be attractive also because the professional organizations on both sides of the Atlantic have issued little in the way of standards or guidelines for acoustical environments, "which kind of figures, since if the APRS issued guidelines about monitoring, half of its biggest studio members would fall short," Whitaker comments.

"But look," he adds, "the quality of music is definitely slipping, partly because there are so many more facilities and because things like Pro Tools have lowered the price of entry into the business. The horrific idea of some people buying equipment and sticking it in any old room is something that's happening more than ever. Well, I'm not judging the equipment nor am I judging the intent of many people who use it. I'm just saying that whatever you're using and whatever you're doing, you can access an accurate way to listen to it."

Dan Daley is Mix's East Coast editor.

Vintage Blues.

AKG C12

Schoeps 221B

Telefunken
Chrome-Top
U47

Telefunken
U47

Telefunken
U67

Telefunken
U48

Telefunken
M50

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CM51

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M49

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A SAMPLING OF INSTANT AUDIO ENVIRONMENTS

($208 for a 1x1-foot, 2-inch-thick sheet) provides the absorption of traditional polyurethane in standard 2, 3 and 4-inch thicknesses.

Sporting an information-rich Website for sleuthing sound problems, Auralex Acoustics offers a wide line of soundproofing materials and room-in-a-box solutions. StudioFoam Wedge panels (call for pricing) are 2x4-feet each; they come 12 to a box and are primarily intended for wall coverings and ceilings. The company's T'Fusors are made from high-impact thermoplastic that drop easily into ceiling grids. T'Fusors are also wall-mountable—with pushpins, staples, Tubetak glue, nails, Velcro or 2-sided tape—and may be easily brush- or spray-painted. Twelve-inch Venus Bass Traps have an overall NRC rating of .30, absorb all frequencies and are particularly designed to soak up bothersome low-frequency waves. Auralex also makes MAX-Wall, the practical solution for studios and production suites using rented space and/or in need of a portable soundproofing solution. MAX-Wall is available in a variety of absorptive studio wall kits, complete with windows, cable openings and attached vocal mini-booths.
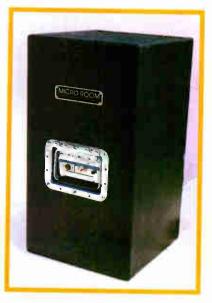
ClearSonic uses the latest in "see-through acoustic panel technology" to create panels that easily tame the loudest drum kit, guitar amp or trumpet section, while still maintaining essential eye contact. The aptly named ClearSonic Panel (call for pricing) can be folded accordion-like for easy transport and storage, yet it sets up with no gaps between panels where sound could escape. Perfect for surrounding a big drum kit, the ¼-inch-thick Panels are available in factory-assembled configurations that stand 24, 48 or 66 inches tall, and either 12 or 24 inches across. ClearSonic's A2-4 ($120 with factory direct discount) is a new 2-foot-high ClearSonic Panel system designed for guitar speaker cabinets, allowing players to drive amps and speakers to preferred levels without causing leakage problems.

ClearSonic's Flector Personal Monitor Discs (starting at $15) are ¹/₁₀-inch-thick, modified-acrylic devices de-
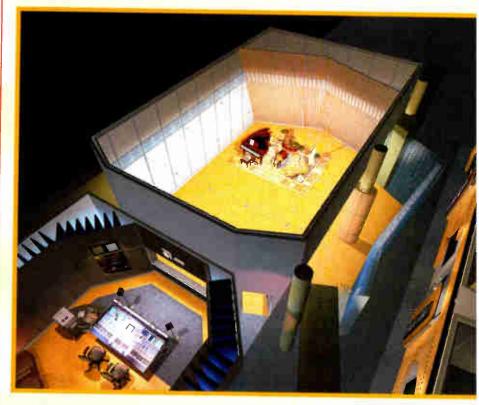
When four walls, a ceiling, a floor and a door just won't do, and those dreams of floating the floors and triple-walling the new studio can't happen yet, it's time to bring in a box. Be it a 12-inch box for muffling your hard drive or a 12x12-foot iso booth big enough for a Bonham-sized kit, fully enclosed isolation devices create sound environments where once there were none. Listed below are but a few of the many firms offering sound iso environments. To find more and surf to more than 500 sites of consultants, manufacturers and distributors of various acoustical products and services, point your browser to http://home.att.net/~rcp-conseaco/links.htm.

In addition to its acoustical materials, **Acoustic Systems** offers a range of sound-isolating rooms designed for recording, medical, industrial and broadcast applications. The company's stock voice-over booths are modular, pre-engineered iso rooms that include options like fully floating floors, silenced ventilation, canted windows and a cable management package. Modular

Folded Space Technology Micro-Room Silent Speaker System

panels can be taken apart and relocated easily, and each room—with STC ratings up to 59 and acoustically certified doors and windows—has a 6½-foot-tall ceiling. Prices start at $4,195.

Acoustic Systems' Studio

Folded Space Technology markets both acoustical materials and a sound isolation solution. The Micro Room Silent Speaker System allows any amplified instrumentalist to crank it beyond "11" without withering everyone else in the room. Lined in 2-inch-thick Auralex StudioFoam, the Micro Room has a built-in Shure SM57 mic, adjustable power attenuator and a "vintage-type" speaker inside; just connect the Micro Room to the speaker output of an amplifier, connect the lo-Z mic output from the Micro Room to a console and turn it up. Also great for reamplifying tracks during mixdown, the Micro Room has a power handling rating of 15- to 100-watts

Sound Construction & Supply Isobox

RMS. Weight is 35 pounds, and the unit is made of $^3/_4$-inch hardwood ply (finished in textured epoxy) and measures 12x12x22 inches.

Two other sound enclosures that use Auralex acoustic foam are Isobox and Isomac from **Sound Construction & Supply**. Isobox ($1,295 for a 12-space unit, $1,395 for a 16-space and $1,695 for the 20-space unit) quiets the noisiest rack gear, and offers a choice of maple or oak door and a left- or right-swinging door at no extra charge. Options include a veneer or varnish finish on the front door, low-profile or huge $4^3/_4$-inch pro caster

wheel sets, a premium surge suppressor, fan and even a Formica counter top with wood-matched edges to match the kitchen decor. As the name suggests, the company's Isomac (starting at $600) is a "micro-computer acoustic containment device" that lets hard drives and vocals live in the same room. Available in Pro and Mastering models, the Isomac has a built-in micro-processor, shock-mounted rails and an electrostatic filter, and it includes safety features like an audible default alarm and thermostatically controlled fans.

VocalBooth.com's name says it all. The company's Calvin Mann Sound Rooms come in a wide variety of configurations, with construction details and features designed for any number of audio applications. Foam core doors with window, cable tubing, barrier walls, ventilation systems, lights, 2-inch-thick acoustic foam and sub floor foam are found in each Sound Room. Pricing starts at $1,999 for the 4x4-foot Sound Booth Standard with one ventilation system and extends up to the $5,875 8x8-foot Sound Room with dual ventilation. Caster wheel base, door, window, ventilation and sub-floored options are available.

A range of Sound-Isolating Rooms from **Wenger Corporation** ($8,500 and up) offer ways to create controlled audio environments in a snap. These modular, pre-engineered rooms are easy to open and install, and they offer optional horizontal and vertical windows and double doors. They range in size from 4'5"x5'8"x8' to a whopping 14'5"x25'x8' enclosure.
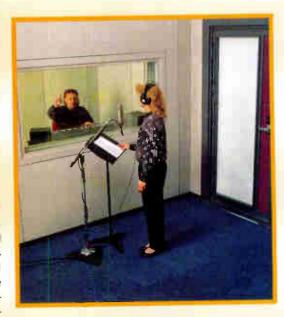
With 15 sizes available that start at $1,520, **WhisperRoom**'s SE Series of sound-isolation enclosures can fit most any sound need. Each component is completely finished and ready to install out of the box, has a three-year warranty, and comes in standard and enhanced sound-

VocalBooth.com Sound Room

isolation versions. (Standard packages can later be upgraded to an enhanced, double-walled system by installing one of WhisperRoom's appropriate Isolation Enhancement Packages.) An 8.5x15.5-foot, preconfigured room with two lights, a door window, 10 cable passages and 15 foam sheets (standard pyramid foam) is $8,495. There are also optional wall windows, caster plates with five wheels, a variety of ventilation packages and upgrade paths for expanding a basic WhisperRoom.

—*Randy Alberts*
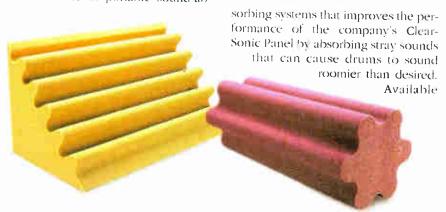

Wenger Corp. Sound-Isolating Room

ClearSonic's ClearSonic Panels

signed to reflect sound back to a wind player or vocalist so that performers can hear themselves better during recording and rehearsal. The Flector discs also serve to diffuse the type of high-energy acoustical energy associated with brass instruments, which is especially helpful for other musicians recording nearby and directly in the "line of fire." SORBER (call for pricing) is a new line of portable sound-absorbing systems that improves the performance of the company's ClearSonic Panel by absorbing stray sounds that can cause drums to sound roomier than desired. Available in 4- and 5½-foot-high models (14 and 19 pounds each, respectively), both SORBER systems are 1½ inches thick, 4 feet wide and fold in half for easy mobility.

Those interested in checking out Folded Space Technologies' baffle systems and sonic enclosures (see sidebar, page 46) can download samples from the Website of an acoustic duo's CD recorded with the company's products, a mini disc recorder and a pair of Shure SM57 mics. The Cloaking Device line of modular acoustic conditioning systems

Acoustical Solutions' Corner Trap (left) and Alpha Spiral

ACOUSTIC MATERIALS MANUFACTURERS

Acoustic Sciences Corp.
www.tubetrap.com
www.asc-soundproof.com
800/ASC-TUBE (272-8823),
541/343-9727

Acoustic Systems
www.acousticsystems.com
512/444-1961, 800/749-1460

Acoustical Interiors
www.acousticalinteriors.com
301/371-7979, 800/221-8975

Acoustical Solutions
(formerly Alpha Audio)
www.acousticalsolutions.com
804/346-8350, 800/782-5742

Acoustics First Corp.
www.acousticsfirst.com
804/342-2900, 888/765-2900

Auralex Acoustics
www.auralex.com
317/842-2600, 800/959-3343

ClearSonic
www.clearsonic.com
330/650-1420

Folded Space Technologies
www.fstechnologies.com
770/427-8761

Illbruck
www.illbruck-sonex.com
612/448-7406, 800/662-0032

Markertek
www.Markertek.com
845/246-3036, 800/522-2025

MBI Products Company
www.mbiproducts.com
216/431-6400, 216/431-9000

NetWell Noise Control
www.controlnoise.com
800/NET-WELL (638-9355)

Primacoustics/CableTek Electronics
www.cabletek.ca
604/942-1001

RPG Diffusor Systems
www.rpginc.com
301/249-0044

Silent Source
www.silentsource.com
413/584-7944, 800/583-7174

Sound Construction & Supply
www.iso-box.com
615/884-8257, 888/580-9188

Taytrix
www.taytrix.com
201/222-2826

Vibrant Technologies
www.vibrantech.com
727/517-0009, 800/449-0845

VocalBooth.com
541/330-6045

Wenger Corp.
www.wengercorp.com
507/455-4100, 800/733-0393

WhisperRoom
www.whisperoom.com
423/585-5827, 800/200-8168

(starting at $144 for a two-piece travel kit system) are swivel stand-mounted baffle systems that can be used to improve overall room acoustics or to create controlled acoustic sub-spaces. Also available in ceiling- and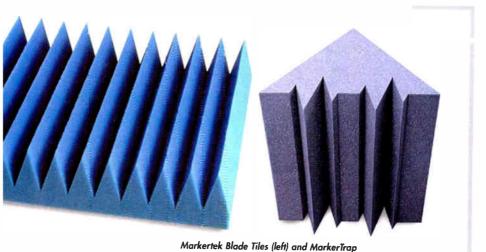 wall-mounted versions, the Cloaking Device series includes Vox Box ($699), a nifty booth-on-the-go for recording vocals or instruments that uses eight Auralex-covered acoustic panels mounted on four 7-foot swivel stands. The Vox Box offers a controlled acoustic space with 64 square feet of absorbent and 64 feet of reflective surface area.

Many acoustical materials dealers sell Sonex-based products, and now all but Sonex One are available online directly from the manufacturer, Illbruck. Sonex One (call for pricing) is the company's most popular product and is suitable for a wide range of uses and environments. Its sculpted surface of open-cell willtec foam is available in natural willtec and painted willtec, and is available in a Hypalon-coated version that can be wiped clean and is protected against dust and dirt. Sonex Classic ($213 for a 2-inch-thick, 24x28-inch roll covering 64 square feet) is a polyurethane foam version of Sonex One in a modified anechoic wedge design, and the Sonex Valueline ($169 for a 64 square foot, 1½-inch-thick roll) is a Class 1 fire-rated, absorptive foam available in painted charcoal, beige, brown, blue and light gray.

Known as a quality audio and video dealer, **Markertek** also markets an offering of affordable soundproofing materials under its own name. The Marker-Trap Low Frequency Sound Trap ($19.99) is a low-frequency sound absorption trap with unique diffuser blades. It mounts easily to walls and room corners for low-end control. Blade Tiles ($5.49 per tile) are 4-inch-thick absorptive polyester foam acoustic tiles that measure 16x16 inches and are available in charcoal or blue finishes.

MBI Products Company offers a range of acoustical control products

Markertek Blade Tiles (left) and MarkerTrap

for rooms ranging from voice booths
to large arenas. Available in a variety
of sizes and finishes, MBI's Colorson-
ix Acoustical Wall Panels are suitable
for most acoustical wall applications,
and use a sound absorbent Fiberglas
core that effectively eliminates reflect-
ed sounds while reducing sound in-
tensity and reverb time.
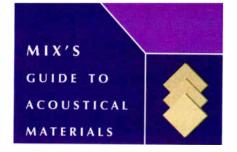
In addition to recommending sound-
proofing products from 60 other com-
panies, NetWell Noise Control offers a
line of its own products. The company's
3-inch Pyramids ($4 per square foot,
available in 2x2-foot squares) are open-

Folded Technologies Vox Box

cell polyurethane acoustic foam panels
with symmetrically identical, beveled
faces to disguise seams between pieces
mounted on a wall. The 4-inch-thick
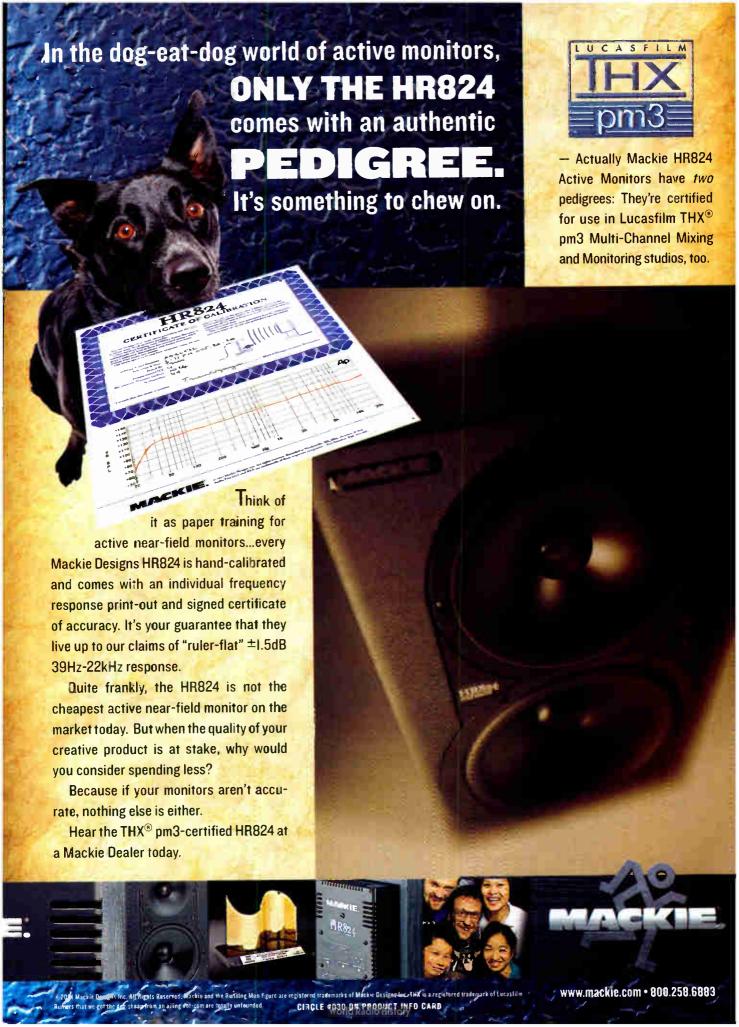panel version has a .39dB frequency
loss at 125 Hz and an NRC rating of
1.05; it is also available in standard 2-
and 3-inch thicknesses and in six dif-
ferent colors. dB Bloc ($495 per roll) is
a flexible barrier PVC vinyl material de-
signed to keep sound from transmitting
through the wall to which it is attached.
Weighing in at a hefty 250 to 300
pounds per roll yet only 1/10-inch thick,
dB Bloc is usually installed behind dry-
wall and provides a 13dB transmission
loss at 125 Hz and a STC rating of 26.
NetWell also markets its Class-A-rated
Fabric Panels at $7 per square foot in
more than 48 colors. In addition, the

World Radio History

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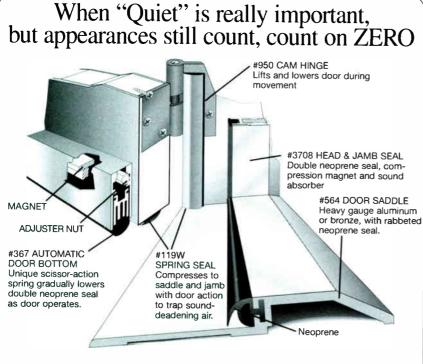
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company offers a thin, ribbed polyester material for light sound absorption called Silence Wall Covering ($2.30 per square foot) that is hung like wallpaper, and 2x2-foot melamine Ceiling Tiles ($5 per square foot) are available in a wide variety of bevel and painting options.

Distributed by CableTek, Primacoustic offers a variety of acoustical materials including diffusers, absorption panels and bass traps, as single items or entire studio room treatment systems. The Primacoustic line of broadband acoustical products are easy to install, affordable and offers the look and performance of an architectually designed studio. The system is based on a modular concept that combines different acoustical absorbers to resolve the four common problems in all square rooms: The Europa Flutter Wall controls front-to-back flutter and works with the Scandia Scatter Blocks to reduce standing waves; the Orientique Washboards reduce side wash and powerful primary reflections; and the

Australis Bass Trap is a corner wedge that tightens bass and brings balance back into your room. More than a dozen standard studio room packages are offered, ranging from a $215 6x4-foot voice-over booth treatment to 12x16-foot studios in the $875 range. Prices even include glue, and panels are also sold individually allowing users to customize their designs.

Another great Website for learning about the fundamentals of acoustic soundproofing is offered by the folks at **RPG Diffusor Systems.** An extensive thumbnail gallery indexes a variety of architectural, home theater and project studio products, each with a close-up JPEG, extensive absorption and diffusion coefficient graphs and downloadable installation PDFs. RPG's Skylines diffuser panel ($284 for box of two) is an art-worthy, 2-D "primitive root diffusor." The Modex Corner ($564 for box of two) is a stackable corner-mounting, pressure zone membrane absorber that stands 25 inches high and extends 17 inches out from a corner

along the mounting walls. The unit can also be used freestanding to deal with excess low frequencies.

RPG's Studio-in-a-Box Silver Package (starting at $499 for Class-B and -C, $935 for white fleck Melaflex Class 1 material) is the company's first in a series of affordable project studio packages. Included are 10 ProFoam wall panels for first reflection control, 32 ProFoam tiles for moderating diffusion and four ProCorners traps for extended low-frequency control. Available as

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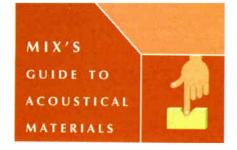
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demo downloads from RPG's Website are Room Optimizer and Room Sizer, Windows 95/98 software packages that offer "automated listener" and "loud-speaker placement" advice, respectively. The programs are $99 each.

Silent Source offers its own line of WhisperWedge foam and Acoustic-Core panels (call for pricing). WhisperWedge is an absorptive urethane foam cut in 2, 3 and 4-inch thickness, the latter costing $300 to cover 64 square feet in a Class 1 melamine; a basic 2-inch foam covering more than 96 square feet costs $175. AcousticCore panels are available in a wide variety of core materials, depending on the panel's intended application and are manufactured with semi-rigid Fiberglas. Any size up to 4x10-foot panels is available in resin-hardened square, radiused, beveled and eased profile edges, as well as in an aluminum-framed version.

The StackIt Gobo System from Taytrix is a portable, lightweight and very stackable gobo system. It's ideal for miking and recording drums, vocals and guitar amps, and it can serve as a stylish way to isolate noise problems in non-recording environments. Walls stand 75 inches and are easily assembled, configured, transported and stored; panels are available in rose, slate, russet red, blue and forest green fabric coverings. Three styles include an absorption gobo for high- and midrange frequency help, a double-layered Plexiglas gobo for maintaining visual contact while sound separating drums and horns, and a combination gobo with features of both. Prices start at $306 for one gobo and run to $3,396 for a three-wall package.

Soundproofing panels from Vibrant Technologies include the DF-24 Diffuser Panel ($79 per panel) and Wave Forms Acoustic Panel ($99 covered, $69 uncovered). The DF-24, which can be dropped into any standard 2x2-foot ceiling grid, is a molded plastic panel designed to diffuse or disperse acoustic energy. Weighing just three pounds each, Wave Forms panels are molded over a lightweight th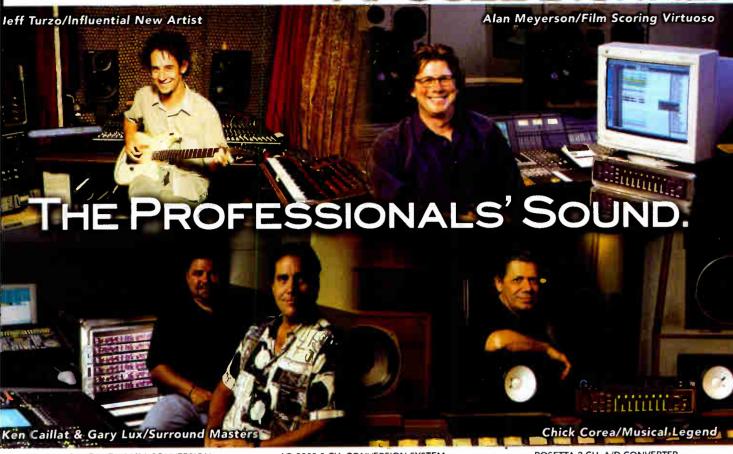ermoplastic panel and help provide damping of higher frequencies and diffusion of middle and lower frequencies. Multiple facets and angles redirect and redistribute sound waves to help eliminate hot spots and dead spots, while they maintain as live a sound as possible. Wave Forms are available in convex and concave versions in 48 colors of fabric; panels are also available without fabric covering for use as diffusers.

Wenger Corporation's lineup of diffuser squares and panels include the company's Ceiling Diffusers (from $91 to $199), Quadratic Diffuser ($457), Trapezoidal Diffusers ($102 to $155 each) and Pyramidal Diffusers (from $58 to $150 each). The Ceiling Diffusers are made of impact-resistant PVC/acrylic plastic, Class-A fire rated and available in sizes from 2x2 feet to 4x4 feet. The 4x4-foot Quadratic Diffuser's design is based on quadratic theory, and the Trapezoidal Diffuser is an offset trapezoid shape made of Fiberglas resin with a white gel-coat finish.

Randy Alberts is a musician, engineer and writer in Pacifica, Calif., who is not coincidentally sound-treating a turn-of-the-last-century artichoke farmhouse and turning it into a modern DAW-based project studio.

World Radio History

STUDIO CONSTRUCTION

TEN QUESTIONS TO ANSWER BEFORE YOU HEAD TO THE BANK

As with any major financial endeavor, a studio construction project requires careful planning and a solid business plan. Here are some points—financial, entrepreneurial and technical—to consider before approaching your lender, brought to you by Dave Malekpour of Professional Audio Design.

1. How do I position my facility to succeed?

Research who is currently serving your targeted customers in your market and at what price points and levels of service. Then figure out what competitive advantage or unserved niche will give you a core clientele. It's generally better to be more focused and less broad in your services.

2. What must I know about the competition?

That it's essentially local. Even if you're a world-class studio in New York or Los Angeles competing for star acts, you're in competition with other New York or L.A. studios for the acts who decide to record or post in those cities. The question remains: Why should they choose you over the studio down the block?

3. What advantage does a commercial studio offer over home and project studios?

The room itself. With so much pro-level gear and software available for home and project studios, the excellent acoustics provided by a well-designed commercial studio are a major draw. And don't forget the amenities that can distinguish the pro studio from non-professional sites.

4. Should I build from the ground up or remodel an existing space?

Everyone's fantasy is building a studio from the ground up, but you are unlikely to do so, especially in a major market where land is at a premium. Besides, remodeling or building out an existing structure has certain advantages: The basic infrastructure (i.e., plumbing and power) will be in place, while zoning issues are typically easier to navigate than with new buildings. Your acoustician or studio designer beforehand can help evaluate proposed sites. Your rental agreement should include up-front provisions for studio operations, such as noise levels, 24-hour operation, etc.

5. How do I pick a designer?

Don't go by reputation alone. Each designer offers different qualities. Visit rooms designed by the people you are considering and pick the one whose taste, as well as acoustic expertise, matches your needs.

6. Should I lease or buy equipment?

Leasing big-ticket gear requires a smaller outlay of money up front; also, the equipment typically pays for itself as it's used, and it's easier to acquire a lease than a loan. Banks will want to see business plans, tax returns and require additional security. Leasing also makes upgrading easier, has tax advantages and is a good way for a new business to establish credit.

7. How do I create a budget for my facility?

Calculate the realistic return. Establish the going day/hour rate in your market for the facility you envision. New studios should calculate income on the basis of 15 rented days per month—a solid figure for entering a market. If the day rate is $1,200, then your monthly income is $18,000. Out of this, you have to cover rent, salaries, utilities and other operating costs, as well as the costs of carrying any capital investment. A typical equipment lease runs 60 months. A ballpark figure is paying $2,500 a month for every $100,000 worth of gear leased. With studio gear, the goal is to pay off the equipment (or amortize it) over five years, just about the time to upgrade. The effective lifespan of computer gear is shorter—about three years. For a $100,000 digital workstation, $33,000 a year represents the cost of operating the equipment (and not profit) for the three-year term it would take to pay it off. If the equations between capital investment, operating expenses and return don't balance, then you need to re-examine your business plan. If you're not a numbers person, hire an accountant.

8. What's the most common budgeting mistake?

Underestimating the cost—and importance—of wiring and installation. Up to 20% of the total equipment budget goes to installation and wiring. Interconnections for a digital work environment are fewer, but cost savings are generally cancelled out by the costs of routers, digital patchbays and more expensive cables. Gear can be fixed, upgraded and enhanced; but once the walls and floors have been sealed up, fixing the wiring comes at a high price—especialy if it means a lost session, lost business and reputation for things not working right.

9. How important is monitoring?

It's the key to a successful recording or mixing room. In a very real sense, that's the product you are selling. Every decision you make about a recording—and every judgment a client forms about your work—is derived from your monitors.

10. What should I do about 5.1?

In today's market, you should build or remodel with the idea that one day your studio will be used for multichannel monitoring. At the very least, make sure there are wiring troughs to freestanding speaker positions for multichannel monitoring. With planning, it's possible to lay out a room and provide treatments that are equally suitable for stereo monitoring today and 5.1 monitoring tomorrow.

Dave Malekpour is the owner and president of Professional Audio Design, a provider of professional consultation, technical services and equipment to the studio market since 1991. He can be reached at DaveM@proaudiodesign.com.
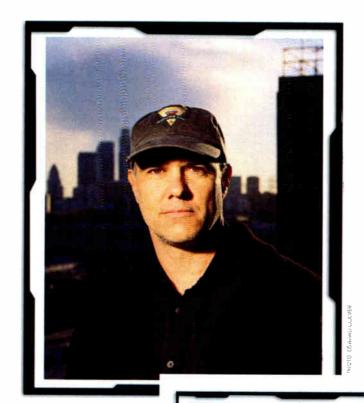
CHRIS PELONIS
STUDIO DESIGN WITH A CALIFORNIA STYLE

It's no stretch to call Chris Pelonis a modern-day Renaissance man. A successful acoustic designer, he's also a musician, songwriter, producer, engineer, record company executive, inventor, surfing maven and martial arts aficionado. Very California, you might say, and you'd be right, but this Santa Barbaran's work as a facility designer holds its own among the best of the rest, and displays an unmistakably individual stamp.

Also unique is Pelonis' personal approach to projects. Work and life are definitely intertwined for him; his clients often become lifelong friends, and sometimes they turn into business partners. It all fits with the designer's holistic life philosophy, a viewpoint based on that classic California concept "going with the flow," and refined through 20 years of experience as a musician and an engineer striving to translate musical ideas into reality.

Although Pelonis originally garnered attention for his talent in creating economical, sonically viable studio environments out of existing spaces, early into his career his business expanded to include numerous facilities designed from the ground up. His credits include projects for Future Disc Mastering, the Walt Disney Co. and George Lucas' Skywalker Ranch, as well as personal studios for singer/songwriter Christopher Cross, actor/musician Jeff Bridges, Toad the Wet Sprocket frontman Glen Phillips, *Terminator 2* music composer Brad Fiedel, *The Matrix* music composer Don Davis, producer David Kershenbaum and many others.

We met for this interview at a restaurant on the Santa Barbara pier, where, as a surfing video played in the background, we watched waves break against the pilings and discussed the art and business of sound.

First and foremost, of course, you're a musician.
I started playing guitar at the age of four and was writing songs by the time I was 10. I played in bands in high school and then went to the Dick Grove School of Music in Los Angeles. I did session work, made a couple of records and started my own label. Then, for six years, I was VP at a music production company called Hollywood Sound. I was running the company, engineering and producing publishing demos, film scores—whatever came down the pike. That's really where I learned the value of being able to do everything—because I had to. I played every instrument if necessary, because the budgets were tight. I'm still in it. I formed a

record label, Ramp Records, with Michael McDonald and Jeff Bridges a couple of years ago, and we've produced a couple of great albums by those two.
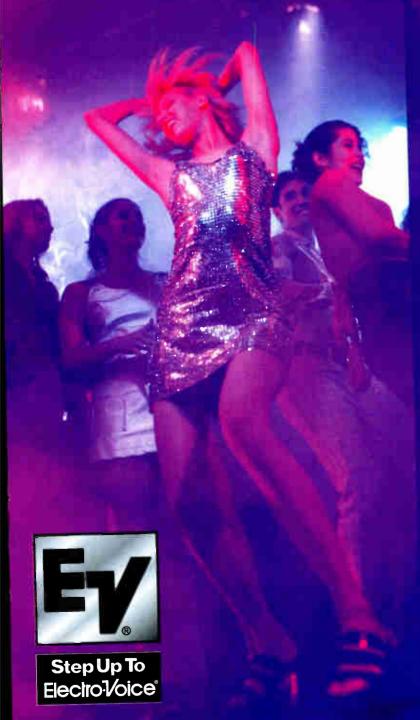*It was those tight budgets that originally led you to designing your own recording studios.*
When I couldn't afford to record in the expensive commercial studios and I wasn't happy with the alternatives, I started designing studios. *And acoustical devices. Wasn't the "Edge" your first invention?*
Yes, and I still build them and put

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them in studios. What I was looking for was a way to get rid of low-frequency problems. I couldn't hear my music played back in the studio the way I wanted to. Nobody really seemed able to help, and I was frustrated, so I decided that I'd have to figure it out for myself. I started studying what was occurring and building these multichambered, wedge-shaped devices that I used in the problematic places. Then, it kind of snowballed from there, because other people wanted them. I mean, I was really destined to become a rock star, and then this whole other thing started happening! [Laughs.]

How do you think you're different from other studio designers?
For one thing, I believe that the performance—the acoustical, ergonomic and overall performance—of a facility needs to dictate the architecture, as opposed to creating architecture for its own sake and then trying to make it perform.

I guess I was born with a musical talent—an ability that's an innate part of you, not something that you can really learn—and that creates a resonance that gives me a different perspective. Also, I have 24 years of studying martial arts, and I've been a surfer for most of

my life. These things have heightened my sensitivity to energy and balance, and have helped me create my own unique philosophy. It may be difficult for people who don't surf to understand how surfing can teach you about these things, but it definitely does.

Also, because of my background as an engineer, a producer and a songwriter, I have thousands of hours of experience working in studios, so I can relate to the client on common ground. It's very natural for me to get where a producer/engineer/artist/composer, etc., is coming from. I look at the recording style of my clients and their concepts, and we develop a plan together.

I don't think there necessarily needs to be any compromise on the aesthetic value of the facility; it just needs to be considerate toward what the facility is meant for. As opposed to trying to create a look and a vibe and an image for the place and discounting its performance. When you do that, you end up with a lot of unhappy, frustrated people who have to work in there every day.

I relate to the engineers because I understand that I'm building something that they need to fly. It's not the guy sitting up in the accounting office who has to live in there 15 hours a day. Now, of course I want that guy in the

accounting office to be happy. I want him to like me, and I want him to pay me, and I want him to feel that he's getting a good deal from me. But he doesn't really know what I do.

To me, that's often a real problem in the industry. The business people can end up shooting themselves in the foot because the productivity of their staff will be cut in half if they're unhappy—if they don't get what they need.

Did you have formal training in acoustics?
If by "formal" you mean sitting in a classroom, then for architecture and acoustics the answer is no. But, if you want to learn how to build a building, what's better than actually doing it? Which is what I've done, a couple of hundred times. I've spent a lot of time doing the actual construction, which, as a designer, helps immensely in communicating my ideas to builders. I still do it. A month-and-a-half ago, I had on a tool belt and was building bass traps and diffusers with the crew at Randall Cunningham's place in Las Vegas. Time was short, and they needed a guy.

Going to school, I learned early that, for me, it was inefficient to sit through 80 percent of what wasn't useful to get to the 20 percent that was. I did go to college, but I really didn't care about grades or competition; I just wanted to learn. And I developed the ability to extract what I need and be on my way. For me, at that point in my life, formal education would have wasted too much time. [Laughs.] And, with all the ambitions that I

Bob Kingsley's Blue Stem Studios

have, time is very critical. I don't have a lot of patience for sitting around.

When I was at Dick Grove [Grove School of Music], my guitar teacher took me aside

Pelonis-designed Vineyard Music Group

and said, "You're already doing sessions; you're being hired! So go out, buy these books, and when you're not working, study." It was a different time, and I wanted to keep the professional opportunities alive. Don't get me wrong, if I wasn't so busy, I'd love to go back to school.

And I'm still studying. I'm like Abe Lincoln that way. I do at least 20 hours a week of research and development. Books, magazines, interviews, the Internet…I'll hire someone to sit down and let me pick their brain if I think they've got something that's valuable for me.

Also, I'm in very close contact with a lot of vendors and manufacturers, not only in pro audio equipment, but also in building and acoustic materials—cutting-edge stuff. I'm also constantly feeding information to those people about what needs to be developed. I'm always learning. Education is everywhere, not just in schools.

Your overall design philosophy has a lot to do with energy flow.
I don't think it's necessarily unique to me, but I find the whole balance perspective very important. I guess you could call it an East meets West philosophy. Feng shui meets science and mechanics and physics. Our whole universe is dominated by polarized energies, like gravity or electricity. Everything, on this planet at least, that has any mass is affected by these energies. Balance of these energies is possibly the most powerful physical law of the universe. It affects every nuance of us.

Or take electronics—say the termi-

nals on an amplifier. If there's some sort of corrosion on either the positive or the negative terminals and you don't have a good balanced connection, that whole signal flow gets corrupted. It's the same with every element in a studio. You've got to make sure that there's consistency and balance and control over the energies to make them work for you, as opposed to fighting against them.

The idea is that a studio is a working, breathing, physical entity, as opposed to just a room with equipment in it. To me, a studio is an instrument,

just like a guitar. Every part of that guitar has an integral function that's very important—right down to the tuning key. If you take the tuning key off, it's just a piece of metal. But on the guitar it has a very important function. And the same is true with a facility: Every square inch of the building is an integral part of its performance. I tend to be reluctant to compromise that performance.

So, would you argue with a client against materials that you think are inappropriate?
There is always a way to balance it out. The aesthetic is also a very important part of the balance. And it depends on the individual. Some people would love what other people would hate. But if there's a vibe that you want, and you need a particular performance out of it, build in the performance first. Then dress it up.

If a visual aesthetic is going to compromise the performance of a studio, the question becomes how much, and is it worth the trade-off? That's the client's call, but I won't let them step off a cliff. I will draw a line at some time, and they're always glad in the end.

It comes down to what you're building. If it's a hotel lobby, the acoustics can take second seat. But a studio is for creating audio/video art, and that must be the focus.

The Chinese art of feng shui is getting a lot of attention recently, but it's something that you've been aware of for a long time. How did you learn about it, and how do you incorporate

Randall Cunningham's Pelonis-designed Studio 7

it into your designs?

I was doing kung fu and learning about Eastern arts when I was very young. Feng shui, acupuncture, chi—all these things have suddenly become very trendy. I used to not even mention these things to anyone because there was no point—no one would even know what I was talking about. But it's been part of my life for a long time. Translated, it means "wind and water," and it's about governing elements that apply. The bottom line is it comes down to allowing something to exist and flow without trying to make something what it isn't.

For example, working with an existing building: It is what it is; I need to respect that. I don't try to make something happen if it doesn't want to. It's better to figure out what direction something is already going in and then use that to your advantage. A good example of that is Alan Kozlowski's home, where he's producing some phenomenal acoustic recordings. We got a natural reverb that you couldn't get for 100,000 bucks, but the house is still a home.

A big lesson of wind and water is that when something is put in a place that it doesn't belong, it's going to erode. Whereas, in the proper place, wind and water can sculpt that thing into a piece of art.

What's a real-world example of how you apply those lessons to a listening environment?

It's really quite practical. If a room is out of balance, the engineer or designer will constantly struggle to compensate. This inevitably turns into a bit of a domino effect. For example, equalizing the speakers to correct an acoustical problem can create a phase and/or distortion problem, which needs another device to mend that problem. Every time you put something artificial in the signal path, there will be a certain amount of corruption.

Carlos Castro-owned, Pelonis-designed Watersound Productions

If a room is not properly designed, it will not translate, and processing is the only way to get it at least closer, but it will never be right. I very rarely need to equalize my rooms; I think I've only done it twice, because the [rooms] translate. I would rather see a bit of a natural curve in the response than to process. Most speaker systems are not ruler-flat, and that's okay. If the room is right and not adding coloration, and the signal path is pure, the subtle curves of the system will have no ill effect on the quality of the product or the ability to make critical decisions. It's when you get those radical peaks or holes that you need a doctor, someone like Bob Hodas, who is good at that kind of work.

So, how do you get that all-important bass energy under control?

By understanding where it wants to go and helping it on its way through the geometry of the architecture. The idea is to not have it come back to disrupt itself. If it does that, it cancels itself, or it becomes additive to itself and it becomes inaccurate. You need to let it go

where it wants to, and once you've got what you want out of it, which is to experience the pure tone of the bass, then, to not have it come back and disturb that.

Absorption must be very strategic. It's a balance between efficiency and absorption. Every time you put something absorptive or diffuse in a room, you mitigate the efficiency of the room slightly.

For example, an echo chamber would be the most efficient room in the world. The loudness of a speaker system in an echo chamber will be far greater than in your living room, because it's got all this reinforcement from the totally reflective surfaces. It's super-efficient but totally unusable for a listening or recording environment.

By the same token, an anechoic chamber is completely controlled but nauseating. Again, the idea is having sensitivity and an understanding of balance to where you absorb just what you need to, where you need to, in order to get it under control—and just enough to where you've tapered the efficiency as minutely as possible.

> If it were just about science, anyone could make a great musical room or a great musical instrument. The artistic side of it is the blending of all of the sciences and philosophies and spiritual and emotional and physical realms to create real magic.

Evolution.
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PM1D General Specifications

Number of Input Channels	48 mono + 4 stereo (DSP1D)
	96 mono + 8 stereo (DSP1D-EX)
Number of Output Channels	48 Mix, Stereo A, Stereo B, 24 Matrix
Number of Scene Memories	999
Sampling Frequency	Internal: 48kHz/44.1kHz
	External: 44.1kHz -10% ~ 48kHz +6%
Fader	67 x 100mm motorized
Total Harmonic Distortion	Less than 0.02% 20Hz ~ 20kHz @
	+24dB into 600Ω
	Less than 0.007% 1kHz @+24dB
	into 600Ω CH IN to STEREO OUT
AD Converter	28bit 128 times over sampling
	(Signal Delay 1.5msec @ Fs = 48kHz)
DA Converter	27bit 128 times over sampling
	(Signal Delay 1.2msec @ Fs = 48kHz)
Frequency Response	+1, -2dB 20Hz ~ 20kHz @ +10dB
	into 600Ω
Dynamic Range	120dB typ. AD+DA
(maximum level to noise level)	("LMY-" AD card to DA card)
Hum & Noise	-128dB typ. Equivalent Input Noise.
(Rs = 150Ω, Input Gain = Max.)	(20Hz ~ 20kHz)

Input Section CH1-96, ST IN1-8

De-emphasis/DC cut	
Phase	Normal/Reverse
Patch	Input Direct Out
	(pre-eq/pre-fader/post-fader/post-on),
	Insert In/Out (pre-eq/post-eq/
	pre-comp/pre-delay/pre-fader)
Attenuation	-96 ~ 0dB (1dB step)
High Pass Filter	20Hz - 600Hz (60 point) slope
	-6dB / -12dB / -18dB/oct
Equalizer	4 band PEQ
	(Low/shelving, Low-mid, High-mid,
	High/shelving/LPF)
	F: 20Hz-20kHz (120 point),
	Gain: + - 18dB (0.5 dB step),
	Q: 0.1-10 (41 point)
Gate	Gate/Ducking selectable 4 key-in bus
Comp	Comp/Expander/Compander
	selectable 4 key-in bus
Delay	Delay time (0 ~ 250 ms, 0.02 msec step)
Fader	100mm motorized, -∞,-90 ~ +10dB
	(128 step/100mm),
	Interpolation 24bit (16,777,216 steps)
On/Off	
Cue/Solo	On/Off (PFL/AFL)
Pan	127 positions (L=1 - 63, center,
	R=1 - 63)
Stereo/Group Assign	STEREO/ MIX 1-48 (FIX/ VARI selectable)
Metering	pre-att peak, comp/gate gain reduction
	pre-att/pre-gate/pre-fader/post-fader/
	post-on selectable with Peak-Hold

Output Section STEREO A, B, MIX 1-48, MATRIX 1-24

Patch	Output, Insert In/Out
Equalizer	6 band PEQ
	(Sub Low/HPF/Shelving, Low,
	Low-mid, Mid, High-mid, High/
	LPF/Shelving) (Bypass switch for each band)
	(Parameters are same as input EQ)
Comp	Comp/Expander/Compander selectable,
	4 key-in bus
Delay	Delay time
	(0 - 1000 ms, 0.02 msec step)

On/Off	
Cue/Solo	On/Off (PFL/AFL)
Balance	Stereo A, B, Paired Mix & Matrix
Mono	Stereo B
To Stereo Assign	from Mix output
To Matrix Assign	from Mix 1-48/stereo A, B
Metering	comp gain reduction, pre-eq/pre-fader/
	post-fader/post-on selectable with Peak-Hold
Dither	On/Off, Word length 16 ~ 24bit (DIO8 only)

Other Mixer Section

Effects	Eight internal patchable multi-effects units
Graphic equalizer	Twenty-four internal patchable 31-band
	graphic equalizers, each with 4 notch filters
Oscillator	sine/pink/burst noise
Talk back	From console 1 & 2
Communication In	Includes ducking control
12 DCA	with DCA mute, DCA cue/solo,
	9-12 are selectable for output
12 Direct Memory Recall/Mute Group	
Monitor A	2Tr In 1, 2, ST A, B, user define
	selectable with delay (max 750msec)
Monitor B	2Tr In, 2, ST A, B, Monitor A,
	user define selectable
2Tr In 1-6	1 & 2: Analog/Coaxial/AES/EBU selectable,
	3-6: AES/EBU (with Sampling Rate
	Converter for digital inputs)

Libraries

PATCH Libraries	Number of user libraries:	99
NAME Libraries	Number of user libraries:	99
INPUT UNIT Libraries	Number of user libraries:	99
OUTPUT UNIT Libraries	Number of user libraries:	99
INPUT EQ Libraries	Number of factory presets:	37
	Number of user libraries:	62
OUTPUT EQ Libraries	Number of factory presets:	3
	Number of user libraries:	96
INPUT GATE Libraries	Number of factory presets:	4
	Number of user libraries:	95
INPUT COMP Libraries	Number of factory presets:	34
	Number of user libraries:	65
OUTPUT COMP Libraries	Number of factory presets:	9
	Number of user libraries:	90
INPUT CH Libraries	Number of user libraries:	99
OUTPUT CH Libraries	Number of user libraries:	99
EFFECT Libraries	Number of factory presets:	70
	Number of user libraries:	129
GEQ Libraries	Number of user libraries:	99

DIO8: Digital I/O Box

Slot	8 mini-YGDAI slots
Digital connector	68-pin digital signal connector
	4 (in A, B, out A, B) Port B
	selector for slots 5-8

Optional Cards: Mini-YGDAI Cards

MY8-TD	TASCAM Format
MY8-AT	ADAT Format
MY8-AE	AES/EBU Format
MY8-AD	ANALOG 8in Format
MY4-AD	ANALOG 4in Format
MY4-DA	ANALOG 4out Format

YAMAHA Commercial Audio

World Radio History

You use words like "sensitivity" and "feel" a lot. Do you rely mostly on you instincts?
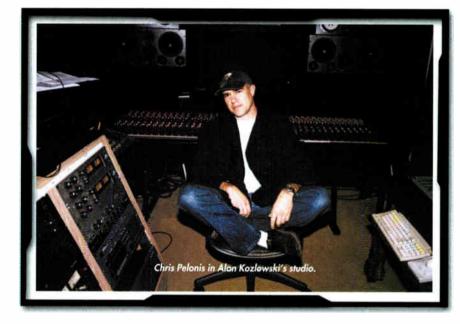
It's not as though I'm at a loss for any of the technical understanding of the physics involved—that's fundamental. But I think that by leaving out the spiritual and emotional side, you are only looking at a portion of it.

If it were just about science, anyone could make a great musical room or a great musical instrument. The artistic side of it is the blending of all of the sciences and philosophies and spiritual and emotional and physical realms to create real magic.

What are some specific techniques you rely on in designing a room?

Again, the low end comes first. I get the maximum amount of support from the room and at the same time eliminate the resonance. Surfaces that are in areas that contribute less to low-frequency resonance or reverberation can be used to support the energy and maintain a reasonable amount of efficiency with the least amount of interference.

There are some fundamentals that must be understood before any technique can be developed. First is wave acoustics. Wave acoustics really dictate how a room resonates to low frequency. The tonic or fundamental frequency of the room will be determined by its largest dimension. And that will also determine the harmonics of that frequency. If you take the axial modal response, which is the height, width and depth, and you determine the root or

Chris Pelonis in Alan Kozlowski's studio.

lowest supported frequency of each of those dimensions and their harmonics, then you'll find particular ratios that give the most even distribution of those harmonics—where there aren't huge gaps between the harmonics, and there aren't a lot of coincidental harmonics landing on top of each other where they double, or cancel.

Next, it's important to understand absorption to use it properly. Absorption is measured in sabines. One sabine per square foot is 100 percent of whatever frequency you are taking out. So, if you have a 10-foot square wall, and you have 10 sabines at 100 Hz, you have 100 percent absorption. If you have a tonic frequency of 100 Hz in a room at the longest dimension, and you absorb 100

percent of the entire surface at the end of that dimension, the effect would be the same as an open window to the particular frequency. That dimension is eliminated from the equation.

The fact is that if you don't get the bottom end right, the room will never perform properly. One of the characteristics that I think is unique to my control room design is that you can sit in the rear corner or against the center of the rear wall and not experience any bass build-up. The mids and highs are quite clear back there, as well, and you don't have the typical comb filtering. Not only does this help to achieve an accurate listening position, but also producers and musicians can hear what is going on without sitting on the engineer's lap.
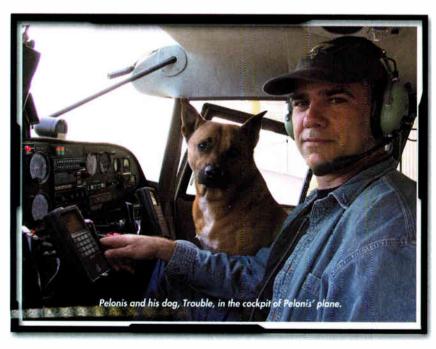
Bass management is, of course, the most difficult. What about the rest of the frequencies?

The mid and highs are really pretty geometrically easy to disperse away from the listening area without killing the efficiency. You do want to make sure you're keeping your equipment racks and the potentially reflective things all strategized, so that, rather than becoming a reflective problem, they can actually become part of the diffusion.
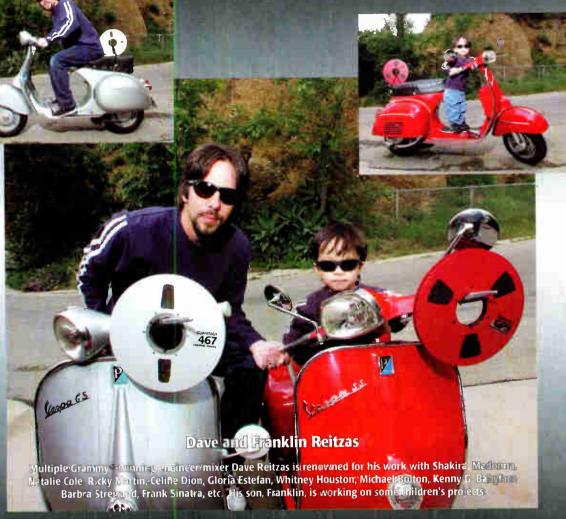
I have a real pet peeve for these big concave metal equipment racks that are set right behind the engineer's head. It may look cool and be convenient to turn around and reach everything, but it's an acoustical disaster. All that stuff needs to be taken into consideration. It only takes one little thing to be wrong to screw up a whole bunch of things that are right.

What about speakers?

I do make a point of understanding

Pelonis and his dog, Trouble, in the cockpit of Pelonis' plane.

Analog or Digital...
Let the good times roll.

Dave and Franklin Reitzas

Multiple Grammy -winning engineer/mixer Dave Reitzas is renowned for his work with Shakira, Madonna, Natalie Cole, Ricky Martin, Celine Dion, Gloria Estefan, Whitney Houston, Michael Bolton, Kenny G, Babyface, Barbra Streisand, Frank Sinatra, etc. His son, Franklin, is working on some children's projects

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the polar response of the speakers that are going in the room. I like people to know what speakers they want so I can build the room for that speaker. Not that there is a huge variation from speaker to speaker, but they will change, so I'll take a look at the polar plot, the phase response, the amplitude response and take all that into consideration in how the room gets built.

Are you still doing work with sonic diffusers and bass traps?

Yes, and, as a matter of fact, I recently designed something for RPG that is a variable acoustic device. I've been working with [RPG's] Peter D'Antonio there, who has really done huge service to the world of acoustics and should get a lot more credit. He's studied and tested and documented, creating an important arsenal for the acoustician from the scientific perspective. Having those tools is like an artist having a rainbow of colors to work with.

What projects are you working on now?

[Laughs.] I'm working on about eight projects at the moment. One is a 10,000-square-foot recording facility in Idaho called Cider Mountain School of Recording. It's in a lodge building on 250 acres, and it's going to be a destination for weekend seminars for the "who's who" of the music business, as well as a commercial resort recording facility. It's got accommodations for about 20 people, a commercial kitchen, a landing strip and a ski slope, all in a beautiful setting.

Peter D'Antonio and I are collaborating on a showroom/performance stage with audio and video production for Taylor Guitars in San Diego. That's really interesting, because there's a 40-foot wall in the rear of the performance area that I'm designing to be similar to my control room rear walls, but on a much larger scale. The shape of the wall will create broadband diffusion and low-frequency absorption. The patented system that I've developed over the last couple of decades has a very gradual transition from low-frequency absorption to diffusion. I feel that this is a much more musical approach than a hard crossover at, say, 400 Hz. My system is 100 percent absorptive in the pressure zones, from 400 Hz down, and becomes slowly diffuse as the frequency rises. At 1 k, it is 50 50, and at 4 k, it's about 20/80, etc. I've been using this kind of geometry for

Chris Pelonis jamming with Jeff Bridges at the Hollister Ranch Hoedown, 2000.

PHOTO: KIM PELONIS

years, and Peter now has a software program that validates this type of application, as well as predicting the optimized geometry for any given space. My system can be applied to any scale, so it can now be applied to any size room.

Smooth gradual transition in materials and the effects of acoustical devices is something I always felt was missing. There was always this great big lump of absorption somewhere, and then this really deep, intense quadratic diffuser, and there never seemed to be that gradual transition. I think that the system that I've developed, patented and am selling is unique to me.

Elloy Productions in Orange County is a fantastic project, a 5.1 recording and mixing studio in about 4,500 square feet. John Zsatai, the owner, is really good at choosing the right team and trusting them.

Another thing I'm working on is an Internet broadcast facility called Media Mentors, up in Vancouver, B.C. What's fascinating to me about that is that it's a real-time streaming broadcast facility just like a radio station, but it's the Internet. It is very much the future.

Also, I've got a speaker line coming up, the Pelonis Signature Series by Tannoy. It's been well over 10 years that I've been collaborating with Tannoy on the concept of a speaker and I'm really excited about it. Now, it may not be the speaker system for everyone—I myself am a big fan of a lot of the other speakers out there. I love the Dynaudio stuff, for example. Their lack of distortion is a joy, and I love the way their tweeters and midrange speakers sound. There are a lot of speakers out there that are great and I do like almost all of them, in one way or another. But I've been really excited

about Tannoy because of their phase idea. Being dual-concentric, all of the signal is coming from one place so that the time arrival is consistent and as you get on- or off-axis, you don't get a huge deviation in the time information.

I believe that the Pelonis Signature Series will be one of the first broadband speakers to hit pro audio. It's got frequency response beyond 50 kHz. These inaudible frequencies are beneficial to the audible range, because they provide enhanced clarity and reduced phase error. The human perception of ultrasound has been documented by Japanese researchers Oohashi and others, by measuring brainwave activity. There is documentation to support this, and it is really quite staggering. And, of course, we know that some musical instruments can have harmonic artifacts far above what is audible.

What are your goals for the future?

I'm into slow growth, and I like to be personally involved in every project that I do. I am the person who is behind my company, and that's who you get when you hire Pelonis Sound and Acoustics. The idea of becoming too large turns me off—for me, it would be artistically devastating. But I would like to get into designing a broader range of facilities. I've already branched out into post-production and the Internet, and now I'm looking at expanding into home entertainment on a professional level, where people can experience sound as the person mixing the film or record experienced it. I want to bring that to the consumer so that they can get that thrill. And beyond that, I guess wherever my understanding and knowledge can be helpful, well, I'd like to be there.

Maureen Droney is Mix's L.A. editor.

17th Annual TEC Awards Nominees

Listed below are the nominees chosen by the Nominating Panel of the 17th Annual Technical Excellence & Creativity Awards. A special TEC Awards nominees supplement and voting ballot will appear in the August issue of *Mix*. Please note that in the Outstanding Creative Achievement category, significant changes have been made to more accurately reflect the contributions to individual projects.

The TEC Awards will be held Saturday, September 22, at the Marriott Marquis in New York City. For more information, contact Karen Dunn at 925/939-6149, KarenTEC@aol.com or www.tecawards.org.

OUTSTANDING TECHNICAL ACHIEVEMENT

ANCILLARY EQUIPMENT
Aguilar DB900 Tube Direct Box
Equi=Tech ET12.5W Balanced Power System
Furman HDS-16/HRM-16 Headphone Cue System
Neutrik Minilyzer ML1 Handheld Analyzer
Omnirax F2 Workstation Furniture
Prism Sound dScope Series III Analyzer

DIGITAL CONVERTERS
Apogee Electronics Trak2
Benchmark Media AD2k+
dB Technologies M•AD-824
Euphonix FC727 Format Converter
Lucid SRC9624 Sample Rate Converter
Prism Sound Dream ADA-8

AMPLIFIER TECHNOLOGY
Apogee Sound CA-1000
Crest LT Series
Crown CE 4000
Hafler GX2600
QSC PowerLight 236a
Stage Accompany ES 40

MIC PREAMPLIFIER TECHNOLOGY
Avalon AD2022
Earthworks 1024
Focusrite ISA 110
Grace Designs Model 101
Millennia Media STT-1 Origin
Oram Octasonic Plus

MICROPHONE TECHNOLOGY/SOUND REINFORCEMENT
AKG Emotion D 880
Audix VX-10
Beyerdynamic Opus 69
Earthworks SR69
Electro-Voice Cobalt Co9
Sennheiser Evolution e865

MICROPHONE TECHNOLOGY/STUDIO
AKG C 2000B
B.L.U.E. Dragonfly
Brauner VM1 Klaus Heyne Edition
Royer Labs SF-1
Sennheiser MKH800
Shure KSM44
Soundelux ELUX 251

WIRELESS TECHNOLOGY
Audio-Technica ATW-7373
Electro-Voice N/DYM SCU w/ClearScan
Samson Airline AX1
Sennheiser Digital 1000
Shure PSM400

SOUND REINFORCEMENT LOUDSPEAKER TECHNOLOGY
BSS Audio FDS-334/-336 Minidrives
Community XLT500
dbx DriveRack 480
JBL VerTec VT4889
Mackie SR1530/SRS1500
Nexo PS8

STUDIO MONITOR TECHNOLOGY
Event Electronics PS6
Hafler M5
KRK Systems V88
Meyer Sound Labs X-10
Quested VS3208
Westlake Audio Lc5.75

MUSICAL INSTRUMENT TECHNOLOGY
E-mu E-IV Platinum
Fender Cyber Twin
Korg CX-3
Kurzweil PC2X
Native Instruments B4
Roland HPD-5

SIGNAL PROCESSING TECHNOLOGY/HARDWARE
Alesis airFX
CEDAR DNS1000
Empirical Labs Model EL8-SX Distressor
Focusrite ISA 430
Lexicon 960L
TC Helicon VoicePrism

SIGNAL PROCESSING TECHNOLOGY/SOFTWARE
Antares Auto-Tune 3
Waves Renaissance Reverb
Kind of Loud SmartCode Pro DTS Encoder
McDSP MC2000 Multiband Compressor V.1.0
Metric Halo Channel Strip MAS
Wave Mechanics Speed

RECORDING DEVICES
Euphonix R-1 Version 3.0
Fairlight Merlin
HHB CDR830 BurnIT
iZ Technology RADAR 24
Mackie HDR 24/96
Tascam MX-2424

WORKSTATION TECHNOLOGY
Digidesign Pro Tools 5.1
Emagic Logic Audio Platinum V.4.7
MOTU Digital Performer 2.7
Steinberg Nuendo 1.5
TC Works Spark 2.0
Yamaha AW4416

SOUND REINFORCEMENT CONSOLE TECHNOLOGY
Allen & Heath ML5000
Crest X-VCA
Midas Heritage 1000
Peavey SRM 2410 HC
Soundcraft Series Four
Yamaha PM-1D

SMALL FORMAT CONSOLE TECHNOLOGY
Digidesign Control I 24
Mackie VLZ Pro 1642
Manley Mastering Console
Shure FP24
Sony DMX-R100
Tascam US-428 USB

LARGE FORMAT CONSOLE TECHNOLOGY
Amek Media 51
Harrison MPC II
Neve 88R
Oram BEQ Pro 24
SSL SL 9000 J Scoring System
Studer D950 M2

OUTSTANDING CREATIVE ACHIEVEMENT

RECORD PRODUCTION/SINGLE
Awards go to all members of the production team, including the Recording Engineer, Mixing Engineer, Producer, Recording Studio, Mastering Engineer and Mastering Studio.

"Music": *Music*. Madonna. Maverick/Warner Bros.
"The Real Slim Shady": *The Marshall Mathers LP*. Ent./Interscope Records
"Bye Bye Bye": *No Strings Attached*. 'N Sync. Zomba Recording Company
"Wonderful": *Songs From an American Movie, Vol. 1*. Everclear. Capitol Records Inc.
"Country Grammar": *Country Grammar*. Nelly. Universal Records, A division of UMG Recordings Inc.

RECORD PRODUCTION/ALBUM
Awards go to all members of the production team, including the Recording Engineer, Mixing Engineer, Producer, Recording Studio, Mastering Engineer and Mastering Studio.

The Marshall Mathers LP. Eminem. Aftermath Ent./Interscope Records
Riding With the King: B.B. King & Eric Clapton. Reprise Records, a Time Warner Company
Music: Madonna. Maverick/Warner Bros.
No Strings Attached: 'N Sync. Zomba Recording Company
Mad Season: Matchbox 20. Atlantic Recording Corporation

TOUR PRODUCTION
Includes Tour Company, FOH Engineer and Monitor Engineer.

Joni Mitchell
'N Sync
Nine Inch Nails
Bruce Springsteen
Steely Dan

REMOTE PRODUCTION/RECORDING OR BROADCAST
Includes Remote Engineer and Remote Facility.

2000 Grammys
Live From Liberty State Park with Lincoln Center Jazz Orchestra
MTV Music Video Awards
'N Sync Live On HBO
Supernatural Live

FILM SOUND PRODUCTION
Includes Production Mixer, Supervising Sound Editor, Re-recording Engineers and Audio Post Facility.

Cast Away
Gladiator
The Patriot
U-571
Unbreakable

TELEVISION SOUND PRODUCTION
Includes Production Mixer, Supervising Sound Editor, Re-recording Engineers and Audio Post Facility.

Ken Burns Jazz
Late Night With David Letterman
Saturday Night Live
The Sopranos
West Wing

HALL OF FAME
Roy Halee

LES PAUL AWARD
Steely Dan

NAB 2001

Embrace the Future

By George Petersen

From April 23 to 26, some 112,000 production pros packed into Las Vegas for the National Association of Broadcasters convention. Even with four days, you'll barely see even half of the 1,700 exhibitors—assuming three minutes at each booth and no stops for breaks, meals, taxi/shuttle bus lines or long jaunts between distant halls. There should be a whole lot of walkin' going on in 2002, when

processing—both hardware and plug-in varieties. This year, the push was on new consoles and workstation developments. Here are a few items that caught our attention.

CONSOLES: BIG NEWS!

Munich-based **Klotz Digital AG**, announced that its U.S. subsidiary, Klotz Digital America Inc. (www. klotzdigital.com), acquired California

16 radio mixer offers voice processing on all mic inputs, SRCs on all digital line inputs, machine control, 12 faders with A/B switching, four faders with analog/digital six-source selectors and configurations that can be saved for each operator. Klotz's Spherion console comes in 12-fader (24-input sources) and 20-fader (40 source) versions. Sources can appear on any fader, with

the Las Vegas Convention Center opens its 918,000-square-foot South Hall, nearly doubling the capacity of the present LVCC. Perhaps that's why NAB chose "Embrace the Future" as the theme for NAB 2001; the most popular item at next year's show might be jetpacks to whisk visitors from hall to hall—a real opportunity for some Vegas entrepreneur.

But we digress. Product debuts tend to run in cycles. Last year, the emphasis was on rackmount 24-track recorders, mics and signal

company **Graham-Patten Systems** (www.grahampatten.com), the manufacturer of the Emmy Award-winning D/ESAM™ digital edit suite audio mixers. The acquisition gives Klotz an edge in the broadcast/post-production market, and adds manufacturing capacity for Klotz products. One of the company's key goals is to get the much-anticipated D/ESAM 8000 flagship digital board to market by Q4, 2001.

Klotz showed a number of digital on-air consoles. The Paradigm

machine control logic following each source. The 20-fader Spherion includes EQ, limiters, gates and compressors, and a fiber-optic network can link multiple units throughout a facility. Klotz's new VADIS 880 platform expands the power of its VADIS systems, adding networking, 24-bit mic preamps, format conversion, etc., as well as Ethernet and MADI options for its VADIS D.C. II mixers.

SSL (www.solid-state-logic.com) added a "plus" to its console line,

showing new, expanded models including the Aysis Air Plus broadcast production board, the Avant Plus post/film mixer and the MT Plus music production console. All "Plus" designations feature INFO faders, TFT LCD display and SSL's HS control processor. The latter offers a powerful (and intuitive) high-speed operating environment (said to be 10 times faster), and adds enhanced features.

The big news at SSL was the unveiling of the MT Production (MTP) digital mixer. Based on the company's latest MT Plus in-line digital console, MTP features snapshot reset, flexible subgroup busing and multiformat surround sound capabilities, but in a compact package for multitrack TV, remote truck and music/entertainment applications. Sharing the MT Series' analog console-style ergonomics, the MTP has one-knob-per-function design, along with the HS control processor, an in-line mixing architecture and simultaneous 5.1 surround sound outs. In TV production applications, MTP offers clean feed buses, mix-minus outs and multitrack backup capability. Its analog side was designed to exceed the performance of SSL's SL 9000 J Series console.

Soundtracs (distributed in the States

Bruce Bavies, product executive at SSL, at the new MT Production (MTP) digital console

by Fairlight, www.fairlightesp.com.au) launched the D4, a major, new large-format digital console available in configurations from 16 to 96 moving fader channels with up to 320 inputs assignable to 128 output buses. It supports stereo/LCRS/5.1/7.1 surround formats at 48 kHz or 96 kHz. Having evolved from the company's successful DPC-II and DS-3 mixers (with more than 400 in use worldwide), the 24-bit D4 is based on that same intuitive, touch-sensitive control surface, with powerful onboard DSP, full networking capability and support of all digital formats, including AES/EBU, TDIF, ADAT and MADI. Eight consoles have already been sold.

Amek (www.amek.com) had two major unveilings at NAB. The 60-channel Media 51 is a new, large-frame version of the mid-price multiformat analog console Amek debuted a year ago at AES Paris. Media 51 is equipped to handle 5.1, 7.1, LCRS, LCRSS and stereo formats, and features Supertrue V4 automation, Virtual Dynamics™,

Recall, Visual FX™, full surround monitoring facilities, encode/decode processor insertion, downmixing/stem monitoring capabilities and PEC/direct switching. An optional motorized joystick panel offers multiple panning modes up to eight channels wide with four switchable divergence settings, and an "expand" feature provides HF image enhancement.

Amek's new Galileo 360V multiformat console offers comprehensive mixing/monitoring facilities for surround formats up to eight channels wide, with a high degree of connectivity and control. Galileo 360V features a microphone amplifier designed by Mr. Rupert Neve, plus the proven musicality of the Amek 4-band fully parametric equalizer.

Long regarded for its live consoles, Midas (www.midasconsoles.com) showed the B2000, the first in a line of analog broadcast mixers. The B2000 supports mono, stereo, LCRS, and 5.1 or 7.1 surround. AES/EBU I/O converters are optional, as is an A/V router interface
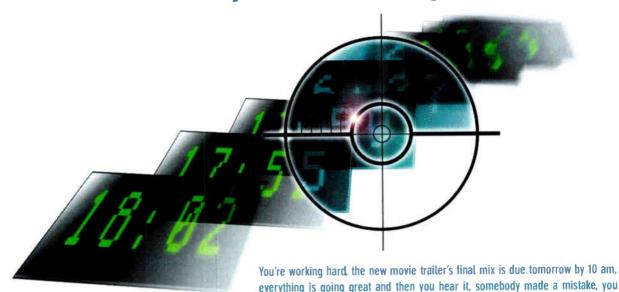

AMS Neve Libra Live Series II digital broadcast mixer

and snapshot automation. The B2000 is available in 24- to 72-channel frame sizes (both mono and stereo input modules are offered), and other features include a limiter per input; the popular Midas EQ; six aux buses (talent monitors); eight mix-minus buses for news talent feeds; eight stereo subgroups (six become 5.1 master outputs in Surround mode); and dual-power supplies.

Euphonix (www.euphonix.com)—no stranger to broadcast desks with its analog consoles—unveiled the System 5-B, an on-air version of its award-winning System 5 digital mixer. The 24/96-capable System 5-B features amenities such as Multi-Format Channels (where a single channel strip can control stereo/LCR/LCRS/5.1/7.1 signals), stereo channel with integral M-S mic decoding, integrated 672x672 I/O router, on-screen diagnostics, optional PEC/direct switching, dual motorized joysticks, and more. We liked the little touches, such as adjustable loudspeaker shelves, rolling script tray and producer's desk with large, 16:9-format TFT display for viewing picture or workstation displays.

NAB 2001

New features for the AMS Neve (www.ams-neve.com) Libra Live Series II digital broadcast mixers include a metering package that displays two layers of inputs simultaneously; a second center-channel strip for easier access to channel controls from either side of a large desk; and Version 2.7 software, which improves mix-minus control, expands Dolby E support and simplifies surround operations.

Harrison (www.harrisonconsoles.com) debuted its TVD on-air digital television

console, based around a compact control surface that can be remotely accessed from up to three locations via the company's Satellite Touchscreen technology. A standard package has 24 mic/line inputs, 18 stereo line inputs, 12 mix-minus feeds, 16 aux sends and 5.1 capability both as inputs and outputs. All signal processing is 40-bit, courtesy of Harrison's proven digital.engine™ technology, and standard amenities include moving faders, snapshot automation and a 2240x2240-capable routing system. Harrison also announced that it was offering its award-winning LPC (Live

Euphonix System 5-B

Performance Console) in a fully digital version, based on the digital.engine and a compact 40-fader control surface, connected via copper or fiber-optic links for up to 768 full channels.

Not all consoles at NAB were BIG. **AETA Audio** (www.aetausa.com) showed a compact (9.5x4.5x1.75-inch), 4-input analog ENG console with remarkable -130dB noise performance, optional AES/EBU interfacing, 46dB input headroom, long battery life and switchable M-S monitoring—all in a rugged aluminum case. Awesome!
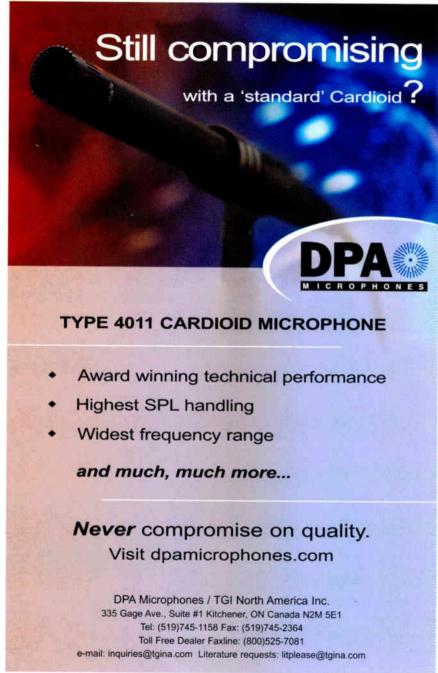
DAW DEVELOPMENTS

SADiE (www.sadie.com) expanded its RADiA line with the Platinum, a 4-in/4-out turnkey system, including rackmount 667MHz Pentium III PC, 128MB RAM, 10GB internal drive, 15-inch LCD screen, breakout cables and removable 9GB SCSI drive. The system has a hardware controller with transport controls, scrub wheel, Edit/Locate/ Function keys, motorized faders and time displays. SADiE also announced that it's the first to market products supporting the AES31 universal file-exchange format. Ratified as an international standard, AES31 is open—not exclusive to any single manufacturer— and supports multichannel files.

Mackie Designs (www.mackie.com) entered into an agreement with **Soundscape Digital Technology,** where Soundscape (www.soundscapedigital .com) will continue to distribute products developed by Sydec under the Soundscape brand name, such as the 32-track R.Ed. DAW and the Mixpander PCI card. Sydec was acquired by Mackie on April 3, 2001.

Previously an adjunct for its Postation II workstation, DSP Media (www.dsp media.com) has packaged its popular VMotion integrated video system into a stand-alone, disk-based video box,

World Radio History

Product Spotlight:
Fostex DV40 Master Recorder

As more projects move toward high bit resolution and high sampling rates—particularly in HDTV and film productions—users need more convenient methods of recording, playing and storing multichannel mixes, location dialog/effects and production elements.

Intended for such applications, the Fostex DV40 is designed to record/playback up to four channels of audio data directly onto a DVD-RAM disc. Resolution is 24-bit, and 44.1/48/88.2/96/176.4/192kHz sampling rates are supported, with 0.1% pull-up/-down at any rate. Synchronization with clock and video signals is included, and the onboard timecode generator handles all frame rates, as well as the 23.97 fps mode used by the new Sony high-definition cameras.
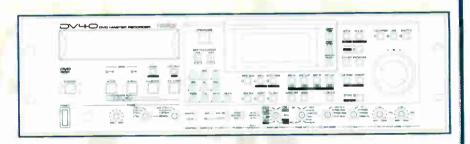
The DV40 stores audio in the UDF file format for compatibility with computer-based DAWs. Users can select either SD2 or BWF (.WAV) at either 24- or 16-bit resolution. A Verify/Write mode—which continuously examines all recording data while in Record mode—ensures reliability.
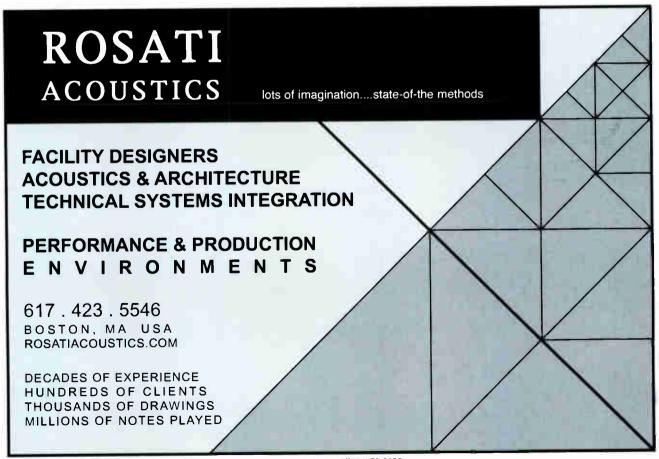
Housed in a three-rackspace chassis—about the size of a studio DAT deck—the DV40 is only slightly more complicated to operate than a DAT machine, with familiar Jog/Shuttle and Transport keys, onscreen metering and a clean layout showing nearly every operation on front panel controls. On the rear panel, a comprehensive selection of I/Os include four analog inputs (balanced XLRs with 24-bit/192kHz ADCs); four analog outputs (on XLRs and ¼-inch jacks, with 24-bit/192kHz DACs); and two AES/EBU. An Ethernet port for file transfer to DAWs or networks is available, as are standard VGA monitor, keyboard and mouse connectors for fast data entry of file names, locate points, etc. A software update adding waveform editing capability is planned, but basic edit functions such as Cut/Copy/Insert/Paste are standard.

The DV40 is expected to retail at $6,999 when it delivers in Q4 2001, but the real fun will come when Fostex debuts a companion 4-channel portable location recorder later this year. For more information, visit www.fostex.com.
—*George Petersen*

BY MARK R. SMITH

Dave Matthews Band

W hat a difference a day makes. Jazz singer Dinah Washington first crooned about those "24 little hours" more than four decades ago; but to the members of the Dave Matthews Band, they sure rang true last fall.

The best-selling quintet's whirlwind fourth quarter began predictably enough, with the initial incarnation of what was to be their latest studio album being recorded in the band's home base of Charlottesville, Va., with veteran producer Steve Lillywhite at the board. It seemed like it was destined to be more of that notoriously successful "same-old, same-old." Lillywhite was also at the helm for the band's previous three studio albums for RCA: *Under the Table and Dreaming* (1994), *Crash* (1996) and *Before These Crowded Streets* (1998). Their fourth musical union was well underway; in fact, a number of songs had not only been recorded, but were also performed during the band's concert tour last fall.

But it now looks like DMB fans will have to wait for the inevitable box set somewhere up the road to hear any of those studio cuts on CD. That's because, mid-production, the band met noted L.A.-based producer and self-described "studio rat" Glen Ballard—known for such smashes as Wilson Phillips' self-titled release, Alanis Morissette's monstrously popular *Jagged Little Pill* and No Doubt's *Return To Saturn*, as well as for penning tunes for the likes of Michael Jackson, Quincy Jones, Brian Setzer and Aerosmith. So, all of a sudden, it was goodbye to Lillywhite and Charlottesville, hello big white bird, Hollywood and Conway Studios. Apparently, the switch happened that fast. But not before Matthews had time to grab his barely used electric guitar.

For the group's latest smash, *Everyday,* Matthews plugged in and teamed up with hitmaker Glen Ballard

PHOTO DAN WINTERS

Given the circumstances—essentially starting the project over from scratch—it may seem like a minor miracle that *Everyday* hit store shelves on schedule at the end of February. Especially considering that the 12 songs on the album are all Ballard-Matthews compositions that weren't started until after that cross-country hop. All told, the album took a scant nine weeks to record from start to finish, which isn't a surprise to observers familiar with Ballard's work. Asked about the torrid pace, he explains, "That's how it should be. If you're trying to capture the spirit of a project, it has to be done in less than a year."

MAKING IT HAPPEN

The original plan was just to rework the songs that had been recorded with Lillywhite. But Matthews bagged that idea, for the time being anyway, and, instead, he and Ballard "wrote a song every day for two weeks and had the album demo'd by the time we went to the studio," Ballard says, with Matthews on guitar and the producer on keyboards. This was a new approach to writing for Matthews, who apparently opted to work with Ballard, because he wanted a collaborator and—*voila!*—there was suddenly a window to work with this particularly successful one who'd sold more than 100 million records during his career.

Though the partnership was new, they clicked immediately and there was little writer's block. "When Dave sits down to write, he writes. We did it like, *bang*," Ballard explains. "We had a natural chemistry for each others' tech-

Dave Matthews and Glen Ballard

nique and style. That's rare, especially when we'd actually known each other for only six months at the time."

Then it was time to record. While Hollywood might seem like a totally different environment to record in than a small southern town, Ballard says it was not so. "Conway is in the heart of Hollywood but offered a serene atmosphere that leant itself to getting more work done. We had a chef on-site and ate dinner at 7 p.m. every night. It was like halftime at a ball game where we'd review what we'd done. It was a healthy cycle that was about creating an environment where we all felt free, but challenged creatively. The fun thing is that we

brought a great discipline and never got out of our comfort zone. When you make the progress we did, the more you hear it work and the more inspired you become. In the studio, we tried to bring our own vibe to it."

When asked if anything went awry in the studio, he laughs softly. "I don't think we failed at anything—we didn't have time to."

KNOBS AND WIRES

Ballard says that the album was finished so quickly, in large part due to the contributions of engineer Karl Derfler. "I think Karl is like a great wine," he says. "He captured the *terroir* of the record. He's a remarkable engineer and artist, himself, and brings one of the most comprehensive skill sets to his craft of anyone I know."

The wine comment might be inter-

> We had a natural chemistry for each others' technique and style. That's rare, especially when we'd actually known each other for only six months at the time.
>
> —Glen Ballard

preted to infer that Derfler's been at it for a while. Like Ballard, he's been plying his wares for more than two decades. An independent engineer since 1977, Derfler has worked with General Public, the Verve Pipe, Rusted Root and No Doubt (with Ballard), among many others, and he has similar words of praise for the producer. "I think the big deal here was that Glen is more of a musician, being a protégé of Quincy Jones, and Dave wanted someone to collaborate with."
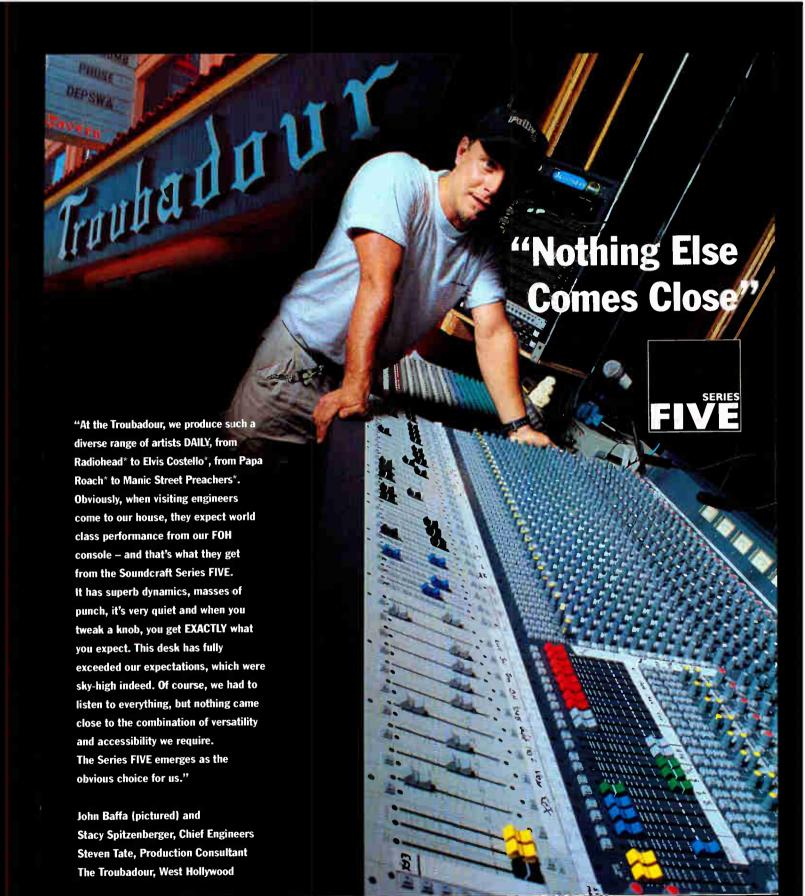
As for the rest of the band, they seemed to love the change of scenery. "Their A&R guy, Bruce Fohlr, told me that that's the best spirits he's seen them in the studio," Derfler notes.

The way the sessions worked was the band would listen to Ballard and Matthews' demos, then expand on them. That meant the chance to try

some new approaches in the studio, aside from Matthews jangling that new electric guitar. "Stefan [Lessard, bassist] used different basses, including one made from wood from the bottom of Lake Superior that was under the silt for 200 years," Derfler says. "That gave it a unique tone that was used for a particularly great effect on 'Sleep to Dream Her,' as well as a variety of sounds that you don't normally hear on a pop or rock record.

"We processed Boyd Tinsley's violin heavily, especially at the end of 'Dreams of Our Fathers,' so it sounded like a string section," he continues. "But the most unusual instrument was the contra-bass clarinet. Leroi Moore played it, notably on 'The Space Between.' It's almost five feet tall and requires a very specific technique. It sounds like a foghorn, with nuances and much clearer harmonic properties."

Still, the big news for DMB fans was Matthews going electric. While it's unlikely to cause a similar stir to what Bob Dylan inspired at the Newport Jazz Festival in 1965, it's still an event, to be sure. Derfler says Matthews used a rare Jerry Jones baritone guitar that was bequeathed to him by Ballard. A Strat owned by Ballard was the other main guitar used during the sessions. This was all to great effect, Ballard chimes in, noting that Matthews isn't a "strummy" player. "Since I love his playing, the electric guitar expressed the notes more clearly and gave them more attitude." Bassist Lessard also plays guitar on the album and mainly used his Modulus six-string. There were also Les Pauls and Telecasters on hand.

BEHIND THE GLASS

From a brief Derfler read before the band showed up in Hollywood, he learned that the DMB has always worked out the songs as a band in the studio. "That's something else new about this experience," he says. "Plus, Glen scored every song, so we had road

maps. For an engineer, that's a dream." Then, using Pro Tools, "we worked out the arrangements in the computer, and each member overdubbed their parts individually. We employed Conway's [SSL] J 9000 console, Neve outboard mic pre's and a variety of vintage gear, which included two Telefunken V72 mic pre's."

The mic setup for Carter Beauford's drums included an AKG D-112 and a Neumann U47 FET for the kick drum, an AKG 451 for the snare and hi-hat, Sennheiser MD-409s or B&K 4011s on the toms, and B&K 4011s and 4012s as overheads. For room sounds, Coles 4038 ribbon mics were used.

For Moore's saxes, they mainly used an RCA 44 and occasionally an RCA 77. Boyd Tinsley's violin was recorded direct using the Telefunken V72 mic pre with various Pro Tools plug-ins. Guitars were recorded through Ballard's Matchless amp, and, occasionally, a Vox AC-30 and Marshall JCM900, combining sounds from the three amps for unusual effects.

"My main thing was to avoid using normal techniques like I would on pop records," Derfler says. "The idea was to make something a little unusual. There are some spots where there is kind of a Pink Floyd vibe, where you subconsciously don't know where things are heading. It affects you spiritually more than mentally."

But that started with what Ballard and Matthews had already created by the time Derfler arrived for the sessions. "The wonderful thing was that the demos were so great, we used them as guides. They didn't play together as a band on this album. It started with Carter's drums, then the usual routine, with Stefen on the bass, Leroi on the horns and Boyd's violin. Then Dave would sing and play his electric guitar."

To borrow a phrase from an old Beatles album title, it sounds like maybe the DMB should have called this project

BUNNY BRUNEL
STILL LEARNING AND TEACHING

Bunny Brunel's reputation as a virtuoso fusion bassist was cemented with the lightning solos and solid timekeeping he laid down for band leaders Chick Corea and Herbie Hancock nearly two decades ago. A native of Nice, France, Brunel has fleshed out his career with session work and teaching, which he conducts in his L.A. studio and through his Cyber Bass lessons program, available online at bunnybrunel.com.

In February, Shrapnel/Tone Center Records released *CAB 2*, a follow-up to the successful initial CD that Brunel wrote and produced with fellow bandmembers Tony MacAlpine (guitars/keys), Brian Auger (B3) and drummer Dennis Chambers. With the exception of the rhythm tracks, which were recorded at Warp Studios, the entire album was tracked, mixed and mastered at Brunel's project studio.

No stranger to project studio recordings, Brunel recorded *Momentum* in 1986 using a Yamaha QX1 sequencer and an Akai 1212 analog 12-track. "The quality of that recording still holds up," says Brunel. Today, Brunel's studio centers around two MOTU 2408 interfaces, running on a Mac G4, and his Mackie D8B console. "I started out with Performer, and after having tried all of the other sequencers, I have stayed with it. Digital Performer has great timing and excellent waveform editing tools, and it interfaces best with the 2408s.

"I've recorded with Pro Tools quite a bit—the basics on *CAB 2* were recorded to Pro Tools and then brought into my computer as SD2 files. If you have 30 grand to spend, you'll get a good, stable system. My experience with more pared-down Pro Tools systems has been less successful. I find the Digital Performer/2408 combination to be extremely powerful and very stable."

Still, running native requires a console, according to Brunel. "You need to have a board, otherwise you'll encounter latency problems when you start getting deep into the track count. The DP/2408/D8B combination is perfect."

CAB 2 was mixed entirely within Brunel's digital system with excellent results. Low-end material, especially Chambers' kick and thundering tom rolls and Brunel's lines, is well rounded. The stereo image is wide, and guitar overtones are nicely captured. When we spoke, Brunel had just installed Mackie's new 3.0 Console software update and several UFX cards, which adds third-party plug-in support. "Version 3.0 is the best," chimes Brunel. "To me, the D8B sounds very much like a Neve console—very warm. Other comparable digital boards tend to have a smaller sound. The first thing I noticed about 3.0 is that Mackie's corrected the problems they had with the gates and compressor. Also, the Drawmer compressor is fantastic, and the Massenburg EQ is outrageous."

Bernie Torelli mixed *CAB 2*, relying heavily on the Waves Renaissance compressor, particularly on the bass and guitar tracks. Another Waves plug-in, Maxxbass, was applied to both the kick drum and bass parts.

Most of the cuts on *CAB 2* required 24 to 32 tracks, which go from his DP, through the 2408s and into the 24 Lightpipe inputs on the board. Torelli and Brunel decide which tracks can most effectively be processed within DP and group these as stereo pairs to the board. The 8-channel Alt I/O card

was used as returns for the DP echo returns. If more returns were required, then Torelli used the analog outs on the 2408 to bus into analog inputs on the D8B. "This combined approach, using plug-ins both in Performer and on the board, works very well."

Completed mixes, living on both the Mac and D8B, are then bused as a stereo mix to two additional DP tracks. Stereo mixes are saved as SD2 files and mastered in Pro Tools. "Bernie likes the compressors in his Pro Tools systems. We pay a lot of attention to getting all of the dBs we can out of tracks before we master. That makes the process easier."

After 30 years in the business, Bunny Brunel is still an eager student of technology. "I'm amazed at some of the gear that's out there today. The Line 6 Prod Bass pod, for example, has the most amazing preamp I've ever tried. You can put all the cheese you want on your bass—distortion, flanger—and the sound stays perfectly clean! We've also recently upgraded our Tannoy monitoring system to the System 800A-powered Dual Concentrics, with a PS350B subwoofer. The fundamentals sound so good! The quality of product you can turn out in project studios just keeps getting better and better."

Gary Eskow is a contributing editor to Mix

Wired for Data

Audio Collaboration in the Network Age
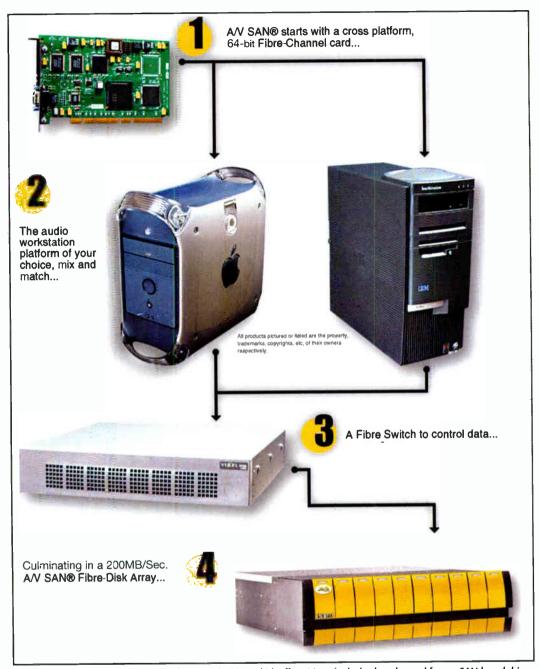
by Philip De Lancie

In the two decades since "PCM" entered the pro audio vocabulary, digitized sound has become integral to nearly every segment of the industry. Initially, the emphasis was on the theoretical quality advantages of digital, a promise that wasn't always realized. As production became increasingly computerized, however, sound became data to be manipulated as freely as the computational power of a digital audio workstation would allow. When the speed of computer processors exploded, traditional approaches to production workflow were supplemented—and frequently supplanted—by computer-centric techniques. Today, you might still make a case for analog based on its sound quality, but

if your business survival depends on how much an engineer can do in a day, then it's hard to compete with the DAW.

With digitally enabled advances in individual productivity

now taken for granted, the frontier in recent years has shifted to group productivity. Particularly in sound-for-picture (film and video), it takes a team effort to move a project to the finish line. And,

L-R: The Village Recorder's CEO Jeff Greenberg, producer/engineer Rich Costey and chief technician Mitch Berger with their new Glyph Coba/SAN system.

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The path data take through Network Solutions' A/V SAN, which offers 64-track playback and record from a SAN-based drive

because time is money, there's a huge incentive to make that effort flow as efficiently as possible. But the number of people and facilities involved in a typical project—plus the incompatibilities between computer platforms, storage media and file formats—make for some pretty significant hurdles.

Everyone agrees that networks are crucial to allowing greater collaboration and more efficient use of resources in multiroom facili-

ties. In the past, questions about reliability and speed have slowed down adoption in the audio industry, but the widespread deployment of networks throughout the economy and the resulting improvements in technology have removed such obstacles. Today, the real question for owners of most multiroom facilities isn't whether a network is needed but what kind of network best suits their needs.

CONSIDERING THE ALTERNATIVES

Historically, there have been two main alternatives to networks for moving digital audio around a facility. One is digital tie-lines; the other is "sneaker-net," the physical transport of removable drives from system to system.

"Comparing sneaker-net to a network is like comparing carrier pigeons to a phone system," says Doug Perkins, VP of sales and

marketing at mSoft in Woodland Hills, Calif. "There may be scenarios where the pigeons are better, but it's hard to think of them." mSoft makes the ServerSound system, which gives multiple workstations access to centrally stored sound libraries through a browser-based interface.

"With sneaker-net," Perkins continues, "someone typically asks for audio files to be copied onto some sort of physical media, which is then copied to another media, with who knows how many people touching it throughout the process. Not only is this not a good use of time for many creative and highly skilled people, but the quality of work ultimately suffers from the delivery delays."

Ed Bacorn, Storage Area Network (SAN) specialist at Glyph Technologies in Ithaca, N.Y., adds that there is an increased risk of damage to a drive—and the data it holds—whenever it is removed for transport to another room or station. "All too many drives are dropped or get bent pins," he says. "Any number of common disasters can happen when drives are physically moved around to several locations."

Another problem with sneaker-net, according to Joe Rorke, VP of sales at Rorke Data in Minneapolis, is the issue of interoperability between different systems. "In many cases, the user can't easily exchange sneaker-net media between OS platforms: Macintosh, Windows NT, etc.," says Rorke. He also notes that a network can make the bridge between applications in heterogeneous configurations, and it offers better time-to-data speeds than sneaker-net.

mSoft's CEO, Amnon Sarig, agrees that networks are superior to sneaker-net on almost every level. However, he says that sneaker-net cannot be pronounced dead yet. "With sneaker-net, you can move a 73GB drive from one side of town to the other faster than you can send even a small fraction of that data over a T1 line," he explains. Within a facility, however, he says that moving files over a network "saves you time, media costs and labor."

As for digital tie-lines, Bacorn points out that, in most cases, patching must be manually reconfigured in each room for each specific operation. "This requires physically plugging and unplugging cables per task," he says. "When your facility is on multiple floors or spread out among multiple departments, this becomes a major problem."

Beyond inconvenience, tie-lines can also be technically unsatisfactory. The Village Recorder, a music and post facility in West Los Angeles, has its four rooms integrated into a single network provided by Glyph. "If we went with digital tie-lines," says chief engineer Mitch Berger, "we would have to be working in real time. And with the tie-lines, in some cases running long distances, that would have created problems with sync."

LAN VS. SAN
The decision to install a network may be easy enough, but there are a lot of variations on the network theme. Variables include the kind of cabling (copper or fiber), the switches, the type of storage and the network protocol. Perhaps most important, however, is the overall system architecture.

Bacorn says the most common configuration in general use is the Local Area Network (LAN). "This is typically Ethernet-based," he explains, "using either 10BaseT, 100-BaseT or Gigabit Ethernet. Ethernet is relatively inexpensive to install and maintain. But a LAN is designed as an interoffice communication network. Its primary use throughout the world is for e-mail, moving spreadsheets around or accessing the Internet. Though it can be used to move large files, it's not recommended."

One problem with Ethernet is that the actual throughput doesn't measure up to the nominal bandwidth. "Ethernet has very high overhead," Bacorn explains. "Rather than doing a simple file copy all at once, an Ethernet must run algorithms, calculate check sum and constantly monitor the transaction of each bit of data. This slows down the transfer enormously. Add in the fact that others are attempting to do the same thing, and you have a bottleneck. All copies slow to a crawl."

Another difficulty, Bacorn points out, is that most DAWs will not work directly with a networked file. And all storage accessed through Ethernet is considered remote rather than local. "This means you have to copy a file to your desktop or local storage in order to use it," Bacorn says. On large projects, allowing different users to download and alter files creates the need for version management, adding another layer of complexity.

For demanding studio applications, the favored alternative to an Ethernet LAN is a Fibre-Channel SAN. "At best, Ethernet is a stop-gap measure before the implementation of a Fibre-Channel network," says Gary Holladay, chief systems engineer at Studio Network Solutions in St. Louis, Mo. The company markets a solution called A/V SAN, which Holladay says offers 64-track playback and record capabilities from a single SAN-based drive.

Chief systems engineer Gary Halladay at Studio Network Solutions, which markets A/V SAN.

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Wired For Data

"Fibre-Channel offers more bandwidth than any other topology, including FireWire," Holladay continues, "and it gives you more throughput than any DAW can handle at this point, 200 MB-per-second in full duplex. If you're going to spend money on networking your facility, spend it on a technology that already has the bandwidth to sustain your studio for years."

"High-end Fibre-Channel storage is ideal for audio post," agrees Rorke, whose company makes the Rorke Data SAN. "Fibre-Channel bandwidth delivers the necessary data rates. It's not just a matter of the overall sustained MB per second per user, but also the often-sporadic burst-rate requirements of multitrack environments."

As described by Glyph, which sells a SAN solution called Coba/SAN, a SAN is a shared, high-speed storage network allowing multiple users to access different types of storage devices through secure management software. Hard disk storage is pooled for use by the entire work group, with each workstation accessing the storage as if the drives were local. That means a file created on one workstation is immediately available—depending on access privileges—to everyone else on the network.

In a typical setup, the SAN hardware and storage devices are located in a machine room, isolating production areas from drive noise. In each of the facility's DAWs (and nonlinear video editing systems), there is a Fibre-Channel host bus adapter (HBA) card. These are linked to the SAN hardware via fiber-optic cable. The SAN hardware is also hooked to SCSI or fiber drives, which may be RAID arrays (Redundant Array of Independent Disks), in which a number of hard disks are linked together as a single volume. The drive volume appears on the desktop as if it were local external storage.

The SAN architecture offers several advantages. "You eliminate the server," Bacorn says. "Your system is working directly off the storage, and it sees the storage as local, which is required by most audio applications. Also, in a SAN the overhead is put directly on the Fibre-Channel adapter card. All checking and error correction is built into the hardware using FC protocol."

Berger says The Village's SAN makes life much easier for multiple users working on the same project. "We have had sessions that used three Pro Tools rigs in separate rooms working on the same movie. Two of them were doing offline editing and capture, and one was being used for mixing. They were able to exchange files and access the arrays very quickly. Another use is that the same client can go from

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room to room without having to transfer any files at all."

THE PRICE OF POWER

As far as cabling between the component parts of a network, the options are pretty straightforward. According to Sarig, it boils down to either CAT-5 wire with 100BaseT or two flavors of fiber-optic cable: 1000BaseT Gigabit Ethernet or Fibre-Channel.

There is a downside to fiber, but it's financial rather than technical. "The major drawback is that each fiber 'seat' costs an arm and a leg," Sarig says. "It's much more expensive because of the need to move light. The switch usually has mechanical mirrors, which makes it very expensive—a typical switch can cost $20,000 to $25,000."

Given the price tag, Perkins believes it's wise to consider a facility's requirements before committing to fiber. "For the average facility with two to 10 audio workstations, if the main thing you are trying to do is move around individual sound effects and music tracks, the money can be better spent [elsewhere]," he says. "But if you are dealing with video or trying to share Pro Tools projects, that might require Fibre-Channel."

Perkins adds that, in addition to file size, the major consideration is how many concurrent users are expected to be moving audio files at a given time. "Even if you have 20 users," he says, "if more than half of them are Avids that will only rarely be pulling audio, you may not need the strength of network required by a facility with seven Pro Tools and Fairlight users cranking continuously."

Actually, the question of which approach to take is not strictly an either/or dilemma, because a Fibre-Channel SAN is generally in addition to, rather than in place of, an Ethernet LAN.

"You usually end up with a concurrent network of at least 100 - BaseT," Sarig says, "because there is no good solution for TCP/IP traffic over a Fibre-Channel network. Especially in large facilities, it's very important that you do not let the e-mail and Internet server share the same LAN as your audio server. Also, in the case of fiber drives, there is the need for communication with the RAID resource allocation server, because the drives need to be 'locked' for write, meaning that many users can read, but usually only one can write at the same time."

Sarig describes the outlines of a "combination network" that he says has worked out many times in the past. "You can have SCSI drives, which are cheap, and a SAN controller with Fibre-Channel connector, which is fast, and you get a sustained 25 MB per second. You can then decide to use it over a fiber switch, which is expensive, or hook it to a server and distribute over Gigabit Ethernet and 100BaseT, which is really cheap compared to a fiber network.

"It's all a question of speed vs. dollars," Sarig continues. "We have found that allocating a fiber RAID over a fiber switch just to push an average 20-second sound effect is not very cost-effective and usually not needed. However, to push 48 channels of full-bandwidth audio plus high-resolution video over 100BaseT is just not a good move."

DRIVING FOR SPEED

Of course, even the fastest network plumbing can't guarantee that a system will perform at its fullest potential. "There are several factors that can affect the operation of a network," Bacorn says. "Many stem from poor network design or running nonsupported applications, such as Beta software or pre-released products."

Bacorn adds, however, that the most common reason for slow network access is simply the lack of enough drives. "If you think of the network as a car," he says, "then the drive arrays are the

"I'm Mac. I'll be Your Server Tonight."

Central Server Systems Make Inroads At Music Recording Studios

by Dan Daley

The concept of a central server system that routes digital audio throughout a multi-room studio facility is not new. In fact, there has been a trend toward central server implementations in audio post for several years. But the concept has only just begun to gain acceptance in multiroom music recording studios, a delay partly attributable to the costs of linking three, four or more rooms to multiple RAID array systems and their attendant controller systems via kilometers of cable.

But the proliferation of hard disk recording, and the use of Pro Tools in particular, has made the adoption of the central server model for music recording an inevitability.

In general, audio post houses manage the distribution of digital audio through a central server in a much different manner. In audio post, the individual music selections tend to be smaller, even if they are bits of a larger enterprise, such as a film score. Post houses routinely deal with packets of audio that are as small as a second or two in length. Even entirely finished projects might be no longer than a 15-second television spot. But audio post houses also deal with an enormous number of discrete musical projects, with literally thousands of elements being shifted from one studio to the next as the assembly progresses. Many

of the musical elements, such as library sounds and sound effects, are frequently re-used, and projects often need to be turned around in a matter of days or hours. Storing, shuttling, retrieving and managing lots of little bits of digital data on a frenetic schedule are exactly the kinds of tasks that server-based networks are designed to handle.

Music facilities, on the other hand, regularly handle longer pieces of audio, for longer periods of time, and producers or production teams may use several rooms in the same facility simultaneously as individuals and teams work on multiple projects in various stages of development.

"In music, it's still sort of a puzzle for which all the pieces don't yet exist, so you have to make them up as you go along," observes John Klett, whose upstate New York-based companies Singularity and

Tech Mecca have designed and installed a number of central server systems in music facilities. Klett's designs are now in use at both of producer Mutt Lange's private studios, one in New York's Adirondacks region, the other in Switzerland.

The first server project Klett designed and installed was at Plantain, a Manhattan music studio connected to a film production company. "It was a pretty simple system," Klett says of the project, completed two years ago. "The goal was to get audio back and forth to the Avid editing rooms and to send compressed video files to the music rooms. I set up a Mac OS-X server connected to one big disk and had them organize the work in file folders, to make tracking projects easier. You can use an assortment of off-the-shelf components to do this. But that basically

sets the tone for what any server in a music application has to be. And you can see that music has different demands from post-production."

As Klett notes, much of the digital audio data management technology on the market has been developed with post in mind; mSoft, for example, is geared toward managing sound effects files. "But the architecture does let you use it for music clips as well," says Klett. "You're still moving data between digital audio workstations on a network. It's a mature technology, but it's also primitive in the sense that there's no specialized structure of server technology that's specific to music production, one that can adapt to the less rigid ways of working you find in music, as opposed to post."

THE VILLAGE EXPERIENCE

That's pretty much what Jeff Greenberg of The Village found when he decided to connect four main rooms with a central server. When Greenberg opens the door on the equivalent of a walk-in closet off of one of the labyrinthine facility's corridors, the rackmounted, Level-3, three RAID array seems unprepossessing, not the sort of thing that that would get the average music client excited. However, Greenberg quickly points out, this $50,000 upgrade to the studio's digital infrastructure is very much client-oriented, and in more ways than one.

"There's hardly a session that goes on anymore that doesn't include Pro Tools or some other hard disk recording system," Greenberg observes. "What we were finding was that, when clients were bringing their own Pro Tools rigs to the studio, it was taking a long time to set them up, and there were interconnect problems, SCSI issues. A server network was the best way to address that, because there's not going to be less Pro Tools work going on—there's going to be more and more."

Mitch Berger, The Village's chief technical officer, elaborates. "SCSI can be problematic when you're dealing with all the IDs that individual systems bring with them and issues of cable lengths," he says. "People work in different ways; we have some sessions come in with 60 tracks on one drive, and you spend a lot of time moving data around to multiple drives. It gets confusing and it takes time."

Working in conjunction with Glyph Technologies, a systems integrator that has been a development

Large studios with larger servers are going to need the equivalent of the office IT guy. It requires a higher level of training.

—David Frangioni, Audio One

partner with Digidesign, Berger designed The Village's system, which was installed last October. Including 52GB disks and a Chaparral dual-RAID controller run from a Mac G4 and connected with full-fabric brocade (which allows constant full bandwidth through all pipes), the design was based, in part, on the personal studio of film composer Hans Zimmer, which Greenberg and Berger were given a chance to examine.

The system uses fiber-optic cable throughout the twists and turns of the former Masonic Temple, which houses the facility. It's a more expensive decision, but one Berger preferred because he was not limited by cable run lengths. "You can run up to nine kilometers with this cable," Berger says.

There is also an emphasis on redundancy in the system design. For instance, the two RAID array controllers operate in what's known as an "active-active" mode, in which they constantly compare control information with each other; if one were to fail, the other would be completely up to date and could take over and run the entire system. Also, the data transfer protocol is arranged so that files for specific sessions are assigned to a single folder, rather than the multiple

folders that individual Pro Tools users are familiar with.
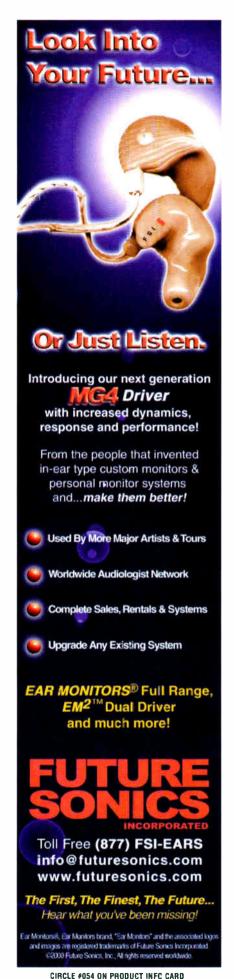
The server system also has a secure access feature, and each client receives a personal password. "Music clients are very much concerned about security—perhaps more than post clients might be—in the age of Napster and other online music issues," says Greenberg. "You need to be able to convey to them that their music is safe on your server."

In fact, the central server concept is as valuable as an insurance strategy for the studio as it is essential for improving client services. Berger and Greenberg both voice the concern of other studio technicians and managers that, at a time when music exists increasingly as data and is handled by people with a wide range of technical skills, the potential for catastrophic loss has increased exponentially. And it is often in the human nature of the client to blame the facility. "It's something that's been the case even back in the analog days," Greenberg says. "If there's a problem with the media in the studio, then regardless of what the deal is, the client's perception is generally that the studio is at fault. It's the same with hard disk recording, only the possibility of data loss is often greater, depending upon who's handling it."

"We've seen clients improperly unmount drives and lose data while in the studio," Berger adds. "So installing a server and bypassing the need to move drives around—to even touch the drives as often—protects the clients' data and in the process protects us, too."

The number of music-based facilities that have implemented central
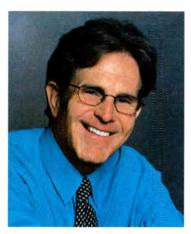
"I'm Mac. I'll be Your Server Tonight"

servers is still small, but awareness of the technology's potential is growing. David Frangioni, president of rental, design and retail company Audio One (one of the largest retailers of Pro Tools systems in the U.S.), says that he has received at least four inquiries from both commercial and private music studios about the possibility of designing and installing a central server.

"The server approach makes sense,

Jeff Greenberg, CEO of The Village.

because using fiber eliminates the limitations of SCSI, which limits cabling to under 10 feet," Frangioni explains. He adds that more server systems are now being marketed to music-oriented users, such as Rorke Data's Studionet FC. Furthermore, he notes, the proliferation of multiple hard drive recording systems in studios implicitly moves the industry toward networking, because the increase in data demands an increase in the ability to move it, store it, retrieve it and manage it. The barrier issues heretofore, he notes, have been low reliability and affordability, both of which are improving.

There is another reason the server approach makes sense, Frangioni asserts. While removable media are still convenient in the long-form music environment, they are prone to any number of problems, from media corruption to viruses to the wear and tear of being repeatedly mounted and unmounted. "There could be a hundred reasons why media causes a crash," he says. "We recently had a situation where a short in a cable blew up the rack three times in a row."

The trend toward servers in music raises another issue, Frangioni points out: "Even if the technology of servers

for music becomes more accessible, it's still going to require someone knowledgeable to run the server system. Large studios with larger servers are going to need the equivalent of the office IT guy. It requires a higher level of training. It's not going to be done by someone who just took Pro Tools 101."

The possibility of a new market niche developing has not escaped the notice of others. Erik Jacobsen, an audio technician at the rental company Toy Specialists' TransferMat division in Manhattan, acknowledges that the company has been considering entering the server design and installation market, targeting music studios. "We've given some thought to becoming a systems integrator," he says. "But we're just watching how that market develops right now. At the moment, people are still tending to use the hot-swappable drives. But I can see a time, maybe in about two or three years, when networking the digital audio through a central server at a music facility will be as common as it is in post. It's not that far off; it makes sense, and the technology is there."

The components are indeed there, with FireWire and USB already available as commodities due to their adoption in the consumer computer markets. And the cost of data storage has continued to plummet. Notes John Klett, "If you shop around, you can find an 18GB drive for $500." The expertise is also already
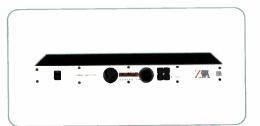
John Klett of Singularity and Tech Mecca

there, with the template already in use in audio post pointing the way, as Hans Zimmer's Media Ventures facility did for The Village. There is even a prime motivating force: the proliferation of hard drive-based multitrack recording. What seems to be lacking is a sense of urgency. That, however, would be the factor in this equation that could change the quickest. All it might take is just a few more workstations. ∎

Dan Daley is Mix's East Coast editor.

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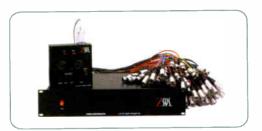
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I'M NETWORKING, BABY

WARPING UP AT GIGABIT SPEED

ILLUSTRATION: MAE LAROKIS

'Twas nigh on a year ago that I spent a bit of time with the subject of networking. A fair amount of progress has been made since then, which is all the better for us techno junkies. This month, I'll mix up some of my typical forward thinking with practical tips for network deployment in your world.

Perhaps the three most important developments in networking circles these days are the rise of DWDM (Dense Wave Division Multiplexing), the computing industry's acceptance of IP as the king of transport protocols and the wholesale deployment of 1000-BaseT by those who hear the siren song of more bandwidth.

Let's start with DWDM, the means by which the Internet will have bandwidth to spare, without breaking the bank. A simple concept, DWDM allows one glass fiber to carry many data streams, instead of one, via frequency-domain multiplexing. In days of yore, a single fiber within a bundle of 100 carried a stream of, say, 10 Gigabits per second of data encoded on a single wavelength or color of light. With a bunch of optical wavelength routing gadgetry, it is currently possible to launch 32 different wavelengths down that same individual fiber and tease them apart at the other end, significantly multiplying the payload capability, without physically changing the cable and with cally changing the cable and with

BY OLIVER MASCIAROTTE

relatively minor changes to the supporting infrastructure. The result: improved service at a reduced cost, a nice combination. That increase in payload capability will, as with all things digital, only accelerate with time, allowing us to de-emphasize sheer bandwidth and maximize efficient topologies in favor of total end-user satisfaction, which is the same as minimal pain and suffering for you, the Little Guy.

On to 1000BaseT, or Gigabit Ethernet. Hell, this year alone, Apple will ship tens of thousands of Gigabit Ethernet-equipped G4s, and that's only in Apple's niche. Prices for Gigabit switches, while not what I'd call affordable for many, are inline with their advertised performance. This may mean that instead

of the five-year ramp-up time typical for a new technology, we may see full-blown acceptance (read: commodity pricing) of GigE in four years.

With GigE, performance is the key. GigE circumnavigates the collision detection jive that slows 10- and 100BaseT protocols, giving you really decent speeds closer to the theoretical maximum than its predecessors do. Hook that into home connectivity via xDSL and broadband alternatives—joining the now venerable cable modem such as satellite and the still shaky wireless protocols such as Bluetooth—and you've got a kickin' combination. Interoperability issues coupled with the naked greed and deep pockets of the old school phone companies, aka Incumbent Local Exchange Carriers, have kept penetration of DSL and cable to only 5% of households through predatory pricing. Take heart, though. A year ago, fiber to the home was, in North America, a Canadian phenomenon. Now, we're seeing the beginnings of optical broadband to the home here in the good ol' U.S. of A. This trend will result, in a few years, in wavelength-on-demand to home and office with the ability to set up and tear down scalable broadband connections as needed.

There are plenty of new technologies to eat up all that newly minted bandwidth: the slow acceptance of xSPs; Application Service Providers like thinkfree.com and Storage Service Providers like xdrive.com; the rise of peer-to-peer (P2P) networking; and the dawning of so called wavelength disk drives or storage via the intrinsically distributed network—both possible only through low-cost access to the Internet. MPEG-4 will take broadband subscribers into a new world as scalable, high-quality rich media delivery. On several fronts, researchers are creating the opposite of hierarchical, server-based storage, what Microsoft's guys describe as "hierarchy-free...server-less file systems." Sounds better than fat-free for sure. A sign that P2P is The Next Big Thing comes from the chief architect of IBM's Lotus Notes suite, who has started offering groove.net, a new buttoned-down mutant of Gnutella.

The improvements in WAN and LAN bandwidth sashay hand in hand with the triumph of Internet Protocol as the reigning champ in transporting data. This will accelerate two trends: one being the blurring of LAN, MAN

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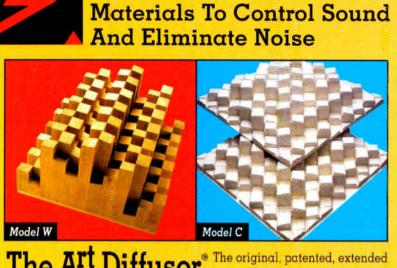
and WAN, and the other being the replacement of niche storage protocols, like SSA and Fibre Channel, with IP. The result: again, lower cost along with better management and interoperability…better management. As with storage, specifying and deploying networks isn't too difficult if you take your time. It's managing and maintaining the system that saps your maintenance dude's will to live. Look for improvements in that area as well.

Now stop your whining. You're saying, "Wait one doggoned minute! I just bought a wickedly expensive Fibre Channel SAN, and now you're telling me it's obsolete!" No, Sherman, I'm not saying that. I'm simply telling you that Fibre Channel isn't forever. So, if you're designing a new install or upgrading an existing one, then here's a piece of free advice: Copper is dead, long live optical. Cat5E will barely cut it for short-haul runs, and if you're going to invest in Cat6 to the desktop or beyond, then consider fiber for your backbone and longer hauls. Also, look for hardware-accelerated HBAs or NICs that perform the IP stack busywork in hardware. This offloads much of the burden from the host CPU, resulting in significantly lower processor utilization and near-wire speeds for the network interface. In other words, your computer isn't busy doing networking stuff, so it can concentrate on getting your vocal parts just right. If you're cheap—er, I mean, price-sensitive—may I suggest a 1394-based network at twice the throughput of 100BaseT at a very low cost. As a bonus, you can push digital audio down that same highway as the IP traffic. One final tidbit: For Ethernet working, hire an experienced installer–it'll save you money in the long run. After all, though we may not see iSCSI support by Digidesign in our lifetime, for the rest of the digital universe, the network, as Scott McNealy used to say, *is* the computer.

When at work, O.Mas keeps his customer's wallets fat and their blood pressure low. At home, he enjoys the new livability afforded by San Francisco's recently deflated dot-bomb economy. This column was created while under the influence of his new TiBook 500 and Bird's Complete Savoy and Dial Studio Recordings. Links and occasional commentary at http://seneschal.net.

YAMAHA mLAN
DIGITAL AUDIO NETWORK

Yamaha wants you to be well-connected. The company is betting that studio and live sound engineers will embrace its new mLAN networking system as the ultimate solution for clearing a jungle of audio and MIDI cables from their recording and stage setups. Introduced last year, the mLAN network allows you to transmit digital audio and MIDI data for each connected device down a single cable and reroute signals throughout the system via software.

WHAT'S IN A NAME?

mLAN is a Local Area Network that was engineered for music applications, hence the "m" in its name. Local Area Networks have been used for decades to link computers and peripherals together in offices and schools for data-sharing purposes within each organization. mLAN uses the same technology to link studio and sound reinforcement gear.

mLAN is based on the IEEE 1394 protocol, an industry-standard specification standardized by the IEEE (Institute of Electrical and Electronics Engineers) to connect consumer audio and video devices to each other and to computers. The FireWire interface on Macintosh G3 or G4 computers utilizes Apple's implementation of IEEE 1394. mLAN's code is a subset, or adaptation, of IEEE 1394 for audio applications.

GOOD TIMING

Yamaha chose IEEE 1394 as the basis for mLAN for good reason. Most of today's data-transfer protocols (Ethernet, SCSI and USB included) implement *asynchronous* transfer modes, where data can only be delivered when the data bus is not busy. And the larger the network, the more likely the bus will be busy when time-sensitive data arrive. Fortunately, IEEE 1394 can utilize *isochronous* transfer modes, which allow data to arrive at a given destination at the required time. This time stamping results in less jitter and latency, which is critical for audio applications. It also prevents data

collisions that would otherwise be caused by data arriving simultaneously from different sources. With data collisions eliminated, transmitting devices don't need to resend data, and more bandwidth becomes available.

IEEE 1394 can transmit data at 100, 200 or 400 Mbps, which is up to 33.33x faster than the 12Mbps crawl that USB (Universal Serial Bus) delivers. mLAN now supports a 200Mbps data-transmission rate, but it's planned to handle blazing 800Mbps to 3.2Gbps speeds in the near future.

What does this mean in practical terms? mLAN's current 200Mbps bus speed would allow approximately 100 mono channels of 24-bit/44.1kHz audio, or up to 4,096 MIDI channels, on the network. (mLAN's MIDI bandwidth is up to 256 times that of your snoozy MIDI cable.) mLAN can transmit and receive audio and MIDI data at the same time, although the above specs for maximum audio and MIDI bandwidth will diminish if you're ferrying both types of data through the network at once. The maximum number of channels that mLAN accommodates also varies according to how connected devices are configured and whether or not video (and other non-audio data) are sharing the network.
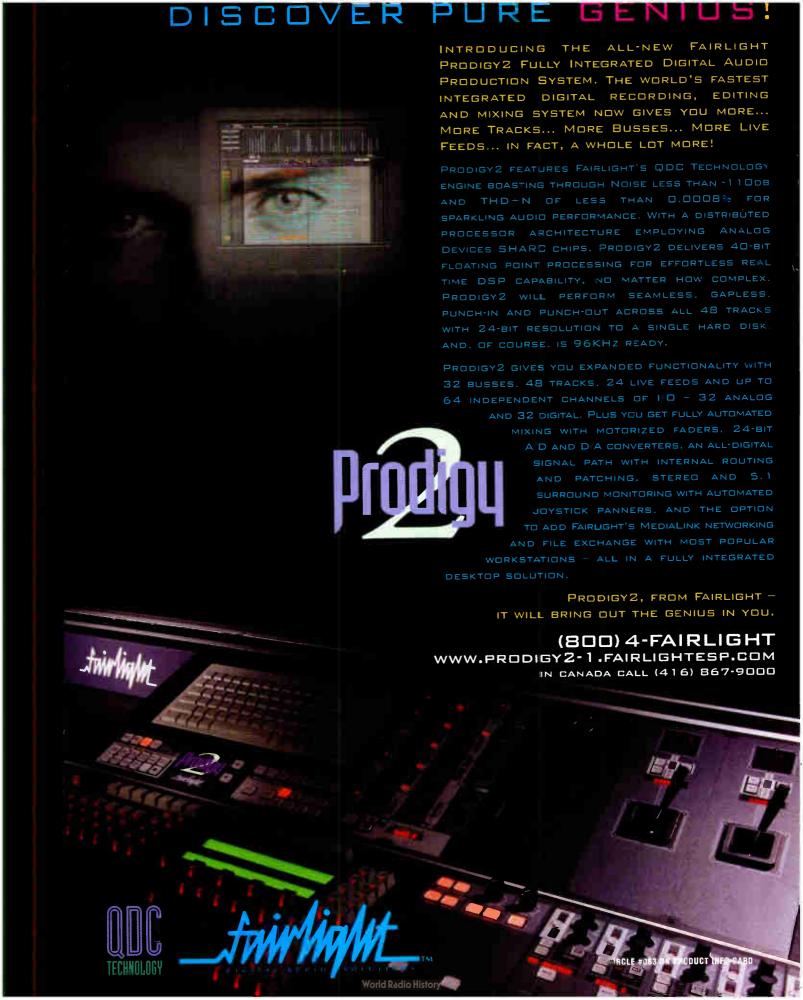
FOR YOUR CONVENIENCE

IEEE 1394 and mLAN are both general-purpose interfaces, so use with a computer is optional. On the other hand, you need a computer to use USB. For studio applications, mLAN-compatible digital mixers, synths and tone modules can be connected to any DAW hosted by a computer with built-in IEEE 1394/FireWire ports. (If your computer lacks these ports, then you can install a standard IEEE 1394/FireWire card to make it mLAN-ready.) On the concert stage, your digital mixer and electronic instruments can talk with one another via IEEE 1394-compatible cabling and connectors, while your computer chills at home.

For reliable performance, you must use standard IEEE 1394 copper wire that is less than 14 feet long. Owners of large studios, sound reinforcement engineers and installation contractors will be happy to know that Yamaha is now working with NEC to provide long-haul adapters for running mLAN signals over long distances. The NEC Info-Launcher uses plastic-optical fiber cable and bi-directional copper-opti-

BY MICHAEL COOPER

Yamaha's mLAN8P converts eight channels of audio I/O and MIDI to mLAN.

cal converters to enable mLAN data transmission over 650-foot distances.

mLAN can accommodate 63 nodes, which means you can connect up to 63 devices to the network. You can hook up your gear in any order in daisychain or branch topologies, or by using virtually any other configuration except for a loop. There's no need to power-down or reset the system when you plug in and unplug gear, because mLAN ports are "hot pluggable." But you won't be pulling cables that often

if you're using a computer with mLAN; all Yamaha mLAN products ship with a software-based patchbay application that allows you to connect, disconnect and reroute all devices in the system without touching a single cable.

PRESENT AND FUTURE

Yamaha intends for mLAN to be a continually evolving specification that will be enhanced as new products are developed. At the time I wrote this article, Yamaha was shipping three products that give various devices the necessary hardware and software drivers to gain access to the mLAN system. These include the $699 mLAN8E option board that plugs into mLAN-compatible Yamaha MIDI synths and tone modules; the $599 CD8-mLAN Interface Card for Yamaha's 02R and 03D digital mixers; and the $1,495 mLAN8P Audio/MIDI Processor, a stand-alone interface that allows users to integrate conventional digital audio and MIDI gear into an mLAN system. Later this year, the release of a mini-YGDAI format mLAN interface card will extend network access to the Yamaha 01V, AW4416, DME32 and PM-1D.

Last December, Yamaha announced

the availability of the mLAN Licensing Program to developers interested in manufacturing mLAN-compatible products. That opens the door to mLAN's migration to non-Yamaha equipment and is a prerequisite to Yamaha's bid to make mLAN a worldwide standard for the music industry.

Is mLAN the wave of the future? Only time will tell. The odds that mLAN will become the industry standard for digital audio and MIDI interconnectivity hinge mainly on other manufacturers adopting the technology for their own products. Nascent networking systems have come and gone, failing to gain broad acceptance. (Readers may remember Lone Wolf's networking system from the early 1990s as an example.) However, Yamaha's adaptation of the widely accepted IEEE 1394 protocol, combined with the company's immense resources and influence, give mLAN a good shot at ubiquity.

Yamaha, 6400 Orangethorpe Ave. Buena Park, CA 90620; 714/522-9011; www.yamaha.com/proaudio.

Michael Cooper is a Mix *contributing editor and owner of Michael Cooper Recording in beautiful Sisters, Ore.*

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Music Production Software

Kipper, keyboardist and producer for Sting, takes a short break to savour Sting's freshly pressed olive oil

Definitely Fresh

It's certainly wonderful to have your own studio in Tuscany. Beyond that though, Sting dedicates himself to the production of fine wine and olives, to the particular delight of his producer Kipper – who appreciates freshly pressed Italian olive oil as much as German software packed with fresh ideas. A long-time Logic Audio advocate, Kipper has high regard for its flexibility and reliability, and especially its innovations. Logic Audio has introduced many fresh ideas that have since become classics – this trend continues with such features as the Unified Classic and Virtual MIDI Engine, hierarchical menus, Surround mixing for TDM, plus many more. Logic Audio – definitely the right choice.

Technology with Soul.

OTARI ND-20
NETWORK AUDIO DISTRIBUTION UNIT

In nearly every sector of professional audio—recording, broadcast, post-production, contracting or sound reinforcement—the benefits of networking and the convenience of sharing/accessing audio files among many users within a facility are obvious. Unfortunately, setting up an audio network can be a daunting task of interconnecting routers, hubs, networking cards, computers and other peripherals. With that in mind, Otari has introduced a simple audio networking solution based on its ND-20, a modular unit that communicates to other ND-20s via an IEEE 1394 (FireWire) derivative called mLAN, where audio signals can be distributed throughout a high-speed network and output in analog or digital signal formats.

Housed in a two-rackspace chassis, each ND-20 offers up to 32-channel capability (or 16 channels at 96 kHz) and has four rear panel slots for I/O modules. Available 8-channel modules include +4dB analog line inputs, +4dB analog line outputs, XLR mic inputs and multichannel AES/EBU digital.

The optional CB-178 remote control unit is a compact tabletop (or console-top) unit that adds real-time control of gain/pad/limiting/phantom power for any mic preamp module in the network, as well as offering remote system configuration. The CB-178 communicates via FireWire and adds the ability to select and monitor any channel with a 20-segment LED level meter and headphone output with level control. The system can be controlled from multiple points by using two or more CB-178s.

The ND-20 can also be used as a stand-alone AD/DA converter with 24-bit resolution. All I/Os are capable of 96, 48, 44.1 and 32kHz sample rates (with ±12% varipitch), plus pull-up/pull-down rates. MADI and TDIF I/O, as well as mLAN (over the IEEE 1394 high-speed serial bus) formats are also available. Sample rate conversion is built into all AES input channels with individual control over each channel.

Other ND-20 features include selectable internal or external clocking (with BNC wordclock I/O provided for the latter) and rear panel switches for routing the signals from each I/O and setting system configurations. The ND-20 can be AC- or DC-powered, and both power inputs can be used simultaneously in broadcast-style installations requiring redundant power supplies for fail-safe operation in the case of blackouts or other AC loss.

Multiple ND-20s can be connected using standard 6-pin IEEE 1394 cable or fiber optics to create an audio network capable of 96 channels (48-, 44.1 kHz) or 64 channels at 96 kHz. Using the 3-port IEEE 1394 interface on the ND-20's rear panel, various network topologies can be created either in a simple "daisychain" arrangement (attaching 16 additional ND-20s in series) or a "multiple-chain" array, which uses several ND-20s in series, each feeding more ND-20s in a tree-style configuration. More complex possibilities are possible by adding a third-party IEEE 1394 hub to create "star" networks.

Because the configuration is IEEE 1394-based, individual units can be hot-swapped without the need to power-down the rest of the network. Likewise, ND-20 networks are subject to the limitations of other IEEE 1394 protocols; for example, a maximum of 63 devices can be connected to a single network, and no more than 16 cables can be used between the most distant devices. Using a wired connection, the maximum distance between two adjacent units is 4.5 meters, although the use of an optical cable extends this distance to 500 meters. Another point to keep in mind is that the ND-20 currently supports a 200MB/second bandwidth. ND-20 support of 400MB/second—via an optional plug-in daughterboard—is planned for later this year, which would increase the maximum number of system channels to 192, depending on the connections and/or sample rate requirements.

The ND-20 is priced from $3,895—additional I/O modules begin at $730. A wide variety of options (including the $1,895 CB-178 remote) are offered, so systems can be tailored to suit individual needs.

Otari Corporation, 8236 Remmet Ave, Canoga Park, CA 91304; 818/598-1256; fax 818/594-7208; www.otari.com.

BY GEORGE PETERSEN

ESSENTIAL READING

Re-recording mixer
Gary Rydstrom

Sound Secrets
of A.I.

Steven Spielberg's Fable of the Future

by Blair Jackson

One of the most highly anticipated films of the summer is Steven Spielberg's *A.I.*, a project that has been shrouded in secrecy worthy of a Stanley Kubrick film—appropriate because it *was* a Kubrick film originally. When the great director died last year, Spielberg, a close friend of Kubrick's, decided to tackle the film himself, working in part from Kubrick's extensive notes and adapting some of the visual look that had already been devised for the project. Though precious little has leaked about the particulars of the film, this much we can say: *A.I.* stands for artificial intelligence, and the story, set in the future, centers around a robot and his interactions with humans. The cast includes Haley Joel Osmont, Jude Law, William Hurt and Frances O'Connor.

"It's a really unique film, different from anything Spielberg has made before," says sound designer and re-recording mixer Gary Rydtsrom on a break from premixing the film at Skywalker Sound in Marin County, Calif. "It has a magical, fable quality to it that's very nice, so even though it takes place in the future and has robots and all the rest of it, it's so subjective—it's seen through the eyes not only of a boy, but a robot boy, so it's his perception of the world. It's really a fable about what it is to be human, so what we're trying to do with the sound is follow along with that quality of a future fairy tale and give it more beautiful and

ethereal sounds, rather than gritty, realistic ones. What's interesting is that Spielberg is making two sci-fi movies in a row, and the next one, *Minority Report*, will have more of that realistic tone."

Working from scratch to invent a sonic world filled with robots and futuristic vehicles posed a fun and fascinating challenge for the sound team. Rydstrom says, "We've created more new material for this movie than we ever have before. We had to do a lot of robot sounds, which means you have to have all of the different mechanized and motorized sounds. The robots go from the highest of high-tech to fairly low-tech, so there's a wide range there, and it was important to give each one its own character. And there are different kinds of vehicles that required their own sounds, too.

"We recorded a lot of new material, and I even tried using non-motor sounds for them, too," he continues. "There are wonderful sounds from animals that can be used for motors if you listen for them. I found bits and pieces of monkeys and koala bears and birds and other things that sound like little ratchets and squeaks and parts of motors, so it's an interesting blend of machines and natural sounds. You take little bits and pieces of them and work with them—sometimes you pitch them down, sometimes you pitch them up. It's amazing how the natural world can sound so unnatural at times."

Over the course of his distinguished career, which includes seven Oscars, Rydstrom has worked on many films set in unusual environments, yet when asked which of those jobs might have influenced his approach to *A.I.*, he has

a surprising answer: "I had just come from doing a feature documentary called *Into the Arms of Strangers* [about children escaping from the Nazis during World War II], which just won an Academy Award, and that was a very strongly emotional film. With the sound for that, I tried to follow along as if we were inside the head of the people telling stories of these horrific events from their childhoods and of the beautiful things, as well. That sense of memory is very similar to the feel of [*A.I.*], so there were tonal sounds and sweeping, magical sounds that were used as atmospheres, as opposed to just gritty, pink noisy kind of washes of reality.

"Also, for *Into the Arms of Strangers*, we were able to match music and sound effects in a real interesting way, because first I did some sound effects work, the composer listened to that and worked around that, and then I got his music and had a chance to work around what he had done. It was a nice way to work. On *A.I.*, one of the most revolutionary things from my standpoint, in terms of the mix, is we had John Williams' music very early on in the process. It's a gorgeous score, and really the heart of the soundtrack is going to be his score; that's where a lot of the themes and emotion are carried.

"Usually, the music doesn't show up until the first day of the final," he explains. "But right now, I have the edited final music for each of the reels as I premix, so I can hear the music and do everything I have to do *underneath* the music to make sure it fits in. It's a radical shift from the way we normally work, where, at its best, we might have a temp score to work to. So not only am I getting the mood of the film as driven

Pearl Harbor

Authenticity in the Air

by Maureen Droney

With a Memorial Day weekend debut, Disney's much-anticipated *Pearl Harbor* seems a shoe-in for success. An epic love story set against the high action and drama of World War II, *Pearl* was produced by Jerry Bruckheimer and directed by Michael Bay, a team whose track record includes *Armageddon, Bad Boys* and *The Rock.*

Touted as the biggest-budgeted movie ever green-lit, *Pearl* reportedly came in at $140 million. On the sound front, battleships, guns, bombs, explosions, an entire arsenal of destruction had to be created—including circa 1940s aircraft.

Given that there are plenty of people still alive with strong memories of the sights and sounds of the second World War, the sound production team felt an enormous responsibility to be true to the era, and through their efforts, an amazing feat of reconstruction was accomplished.

According to supervising sound editors George Watters II, who signed on with Disney just before work commenced on the film, and Chris Boyes, the post-production team was determined, even before the project began, to be as authentic as possible.

"We read the script and looked at as much film as possible while they were shooting," explains Watters on a brief break from dubbing at the Cary Grant Theatre on the Sony Pictures lot in Culver City. "I went through and made notes of every plane that we needed: B25s, German Messerschmitts, English Spitfires, American P40s and, of course, Japanese Zeroes. Every airplane sound in the film is brand-new, using the exact planes with original engines. We went out to the Planes of Fame Air Museum in Chino [Calif.] and several other small airports, and over the course of about three months recorded what we needed."

Working with planes valued in the millions of dollars, Watters and the crew had to ensure that they were totally prepared. To do that, they essentially diagrammed every required shot. Then, working with the pilots who had flown the planes during filming in Hawaii, they attempted to re-create what was needed.

Interiors, fly-bys, dives and maneuvers were all captured by recordists Scott Guitteau and John Fasal, working with both exterior and interior setups. And, acting above and beyond the call of duty, members of the sound crew also went up *in* the aircraft.

"It was an enormous help to us to ride in the planes," Watters continues. "We could put ourselves with the pilots and the gunners and the bombardier, and in the process of cutting, we could remember what we'd heard and observed. It's incredibly loud; we had to wear helmets and earplugs. It's also tremendously claustrophobic inside the plane, and you're very aware that you're in the middle of nowhere. There's nowhere to hide, and it's incredibly scary."

Picture it: the roar of your plane, the whine of the enemy's plane, bullets ricocheting and bombs exploding all around you. Not to mention screaming, with distorted commands coming rapid-fire over the radio. In a

Rear: George Watters, Beau Borders.
Front: Greg Russell and Kevin O' Connell

film this sonically dense, a main goal for the mixing team is to keep the soundtrack from dissolving into a wall of noise. "The visuals are so amazing, and so much information is on the screen at any one time, that our key challenge is to figure out what we want to hear and when," explains lead mixer Kevin O'Connell. "You can't hear it all at one time; it's a difficult balancing act."

"You pick your moments," adds O'Connell's longtime mixing partner Greg Russell. "If we can create a lower dynamic in the times where we can be quiet, the louder moments of the film don't have to be that loud, and they still have strong impact."

Mixed to the 7.1-channel SDDS format, *Pearl Harbor* is a true 8-track mix. "All the predubs were done with the format in mind, which is five across the front instead of three,"

Life Among the Cats and Dogs

Weddington Productions Talks to the Animals

by Blair Jackson

What hath *Babe* wrought? Ever since that cute talking farm pig who thought he was a dog captured the imagination of moviegoers everywhere back in 1995, we've been inundated by a procession of films, commercials and television programs taking advantage of advances in CGI technology to make animals appear as though they're talking. Critters you didn't even think *had* lips are suddenly flapping their computer-enhanced mouths to sync up with witty dialog. It has allowed filmmakers to move into terrain previously occupied primarily by cartoon animators and provided a bonanza for Hollywood's suddenly in-demand animal trainers.

One of the most ambitious films in the genre is the just-released Warner Bros. comedy *Cats and Dogs*, which was shot in Canada by director Larry Guterman (*Antz*) and posted in L.A. at Weddington Productions, with Richard Anderson, Mark Mangini and Elliott Koretz leading the charge. "This is a really fun kids' movie," Mangini says. "It's sort of like *Babe* meets James Bond. It's a zany world, and from a sound perspective, there's a lot of real broad, big, loud, obvious stuff going on." There's an evil, maniacal cat with dreams of world domination, clever and stupid dogs trying to foil him, a Siamese ninja cat and mystified human owners who are largely oblivious to the Ian Fleming-like plot machinations. In short, it's mayhem on a large scale—and exactly what many of us probably believe is really going on with our felines and canines when we're off at work or at home asleep.

Most of the movie takes place in the animals' world, where the cats and dogs speak English and are given voice by the usual mish-mash of celebrities, including Tobey Maguire, *Will & Grace*'s Sean Hays, Alec Baldwin, Charlton Heston and *The Green Mile*'s Michael Clarke Duncan. Their parts were prerecorded cartoon-style and then CGI-animated (at a cost of rough-

ly $40,000 per shot of face/mouth replacement). "There's also been a huge amount of re-voicing and re-performing," Mangini says. "When we thought a joke could be better, we've actually gone back and paid to re-animate, because we've got a better line."

For the portions of the film seen from the human perspective (Jeff Goldblum and Elizabeth Perkins are the befuddled Homo sapien leads), the cats and dogs bark and meow the way we hear them in real life; the comic banter, intrigue and insults elude the hapless people. To capture real animal vocalizations, Mangini and recordist Eric Potter went to the L.A.-area animal ranch that supplied the dogs. "These are dogs that are trained to act, as well as speak, so we got lots of good material," Mangini says. "These dogs were real troopers. They take visual commands as well as verbal commands, and they usually respond really well to the trainers.

"When you do a film like this," Mangini continues, "you're looking for certain vocalizations to match the film. So we spot the movie and go out with a list—'here's the wish list of what we want'—but the animals don't always have that kind of range. You need barks, growls, whimpers, whines, yelps; that's basically the kit that any dog has, and they don't do much more than that.

Except there was also a bloodhound in the film, and there you hope you can get a sort of *Hound of the Baskervilles* howl, but that's really rare. You've got to get them really worked up, and we couldn't get that. As it happened, the bloodhound that's in the movie was

Mark Mangini

having a bad day, and we couldn't even get a bark out of him, so we went down the hill from that ranch to one of their competitors, and they brought in a blue tick bloodhound who was trained to speak, and *he* delivered the goods."

Of course, the Weddington crew *could* take dramatic license and use any dog noises they wanted, but Mangini says this time out they wanted to stick with the actual animals from the film. Besides, if they'd used a beagle yelp on a Chihuahua, then someone would've complained: "You always hear from someone," Mangini says with a laugh. "We always hear from gun owners and car owners—'No way that's a '65 Mustang, man!'"

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The Fast and the Furious

Nitro-Racing Through the Valley

by Maureen Droney

The Fast and the Furious feels like an instant classic: think *Blade Runner* meets *Rebel Without a Cause*. While not exactly a chick flick, this sexy and stylish actioner has something for everyone, including a very hip soundtrack. Described as a "fierce and frenzied look at rival Los Angeles drag racing teams," the Universal Pictures film explores the youthful subculture built around the visceral excitement generated by imported, and highly modified, nitrous-powered race cars.

Directed by Rob Cohen (*Dragon: The Bruce Lee Story*, *The Skulls*, *Dragonheart*) and produced by Neal H. Moritz (*Cruel Intentions*), *The Fast and the Furious* was mixed at Wilshire Stages Stage A by a crack sound team that included Soundstorm's Bruce Stambler as supervising sound editor, Mike Casper as lead dialog and music mixer and Dan Leahy on effects.

Stambler was an inspired choice to take the sound design helm for *Fast and Furious*. An auto aficionado with an in-depth knowledge of race cars, he's spent years perfecting the art of capturing their unique sounds.

"I have a passion for cars that go fast," he admits. "But I wasn't really aware of the import race cars. I hooked up with these kids in companies who were racing them and picked cars to record. Say, for example, a regular Honda Civic has 100 or so horsepower—the Honda Civic four-cylinder cars that we recorded have between 500 and 600 horsepower. That's really high for a four-cylinder motor, so that, along with internal modifications, give it that special sound."
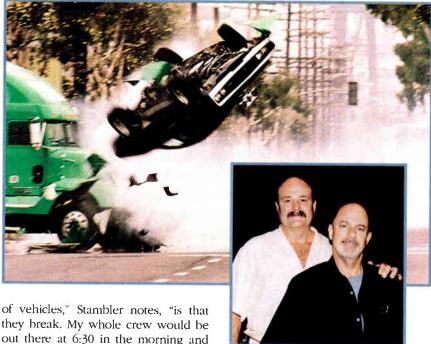
Stambler's recording setup included two Fostex PD2 DAT recorders inside each car along with, usually, Sennheiser 421 mics. "Most of these cars don't have seats," he laughs. "So we'd take a lawn chair and zip-tie it to the roll bars inside the car so one of my guys could sit in there."

Mics were also taped to the car exteriors, one in the engine compartment and one by the exhaust. Then there were two other complete setups

with Neumann RSM191 stereo mics and PD2s outside the cars.

Each take was crucial, as the crew could never be sure of what they'd get. "One of the problems with these types of vehicles," Stambler notes, "is that they break. My whole crew would be out there at 6:30 in the morning and they'd fire up a car. They'd just rebuilt the motor, it would run for about eight minutes and that was it. The drivers are just kids, so they're like, 'Whatever.' We're really lucky that we got as much material as we did.

"It's nasty stuff," he laughs. "Nitrous is a horsepower adder; you gain anywhere from 100 to 300 horsepower just by pressing a button. You can hear it; it makes a very nasty, straining, engine sound. They put a tremendous amount of stress on the motors—that's why they blow up."

A true surround vehicle, *Fast and Furious* will be recognized for its car chases and inviting comparison to classics from the past. "You haven't seen this kind of thing since *Bullitt* and *The French Connection*," asserts lead mixer Mike Casper.

Another hipness quotient of *Fast* is its *Matrix*-style marriage of music and effects, where sometimes the listener

can't tell which is which.

"Sound is a big thing with [director] Rob [Cohen]," Casper continues. "The music composer was BT, a young artist in the same vein as Moby, who did real-

Lead Mixer Mike Casper and Director Rob Cohen

ly interesting things with the score. He even used a lot of car parts in the music.

"But Rob is the type of director who will drop music if he feels it will work. There are two sequences where we did that. One is the first drag race, and there's another eight- or nine-minute big chase sequence with a semi truck and three cars. We pulled it off without any music at all, which is pretty unusual. Then again, there are a couple of sequences without sound effects where we just let the music do its thing, which is a nice change of pace, because this movie is so intense."

Cohen came to rely upon Stage A's acoustics in translating the mix from dub to theatrical release.

"We did the temp dub here, and I found this room to be amazing," he states. "It compresses the sound into a

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Rollerball

Intensity on the Skate Tracks

by David John Farinella

It's the ultimate double-edged sword in the world of audio post-production for films—the eye candy feature, as a remake, to boot. Yet, that's exactly where supervising sound editor Scott A. Hecker found himself when he started to work on MGM's revamp of the 1975 classic *Rollerball*. "It is very stunning, and the bar is high to sonically augment what you see visually," Hecker says. "We had our work cut out for us."

And then some, considering much of the production effects (especially the

Supervising sound editor Scott A. Hecker

crucial skating tracks) were unusable. Well, actually none of it when it came down to the wheel sounds. "Absolutely none," Hecker says. "The director, John McTiernan, wasn't crazy about the sound of the track that they had constructed, so we have approached this completely from scratch."

The film takes place in Russia, circa 2004, and the Rollerball "athletes" are competing on a figure-8 track complete with a bevy of ramps and jumps. During the game, a shotput-like ball is put into play, and the players jockey to put it into a satellite dish-sized goal that is high in the air.

Hecker's first step while thinking

about the film's skate sounds was to look for any and all rolling sounds from Livewire Audio's catalog, his own and those of his colleagues. "No one had that many sounds," he explains. "Maybe just a few isolated roller sounds, but I realized it wasn't going to work, and it wasn't dramatic enough for the intensity of this film. So, we immediately knew that we had to go out and do this from scratch."

The key for director McTiernan was the resonance of the track, Hecker explains, and not just the literal sound of skates rolling on a surface. So they set out to experiment with some different surfaces, finally setting up at an indoor skate park in Simi Valley, Calif. "There was one area that we utilized a lot," he says. "We refer to it as a salad bowl—it's like being inside of a huge wooden salad bowl where, if you stand in the middle of it, the lip is about 12 feet up in the air. Acoustically, it created a very unique, resonating sound, which we were after."

Hecker found former professional skateboarder John Gurule, who brought in five pairs of roller skates with different wheels and bearings, as well as four skateboards. "It brought in a degree of differentiation, where we recorded pretty much all the same moves just using different skateboards and different types of skates and wheel bearings," Hecker says.

The first step was to record Gurule performing a variety of maneuvers on different surfaces. John Fasal, who recorded the skate tracks, used various Neumann microphones for those performances. During the last part of the

day, Fasal attached Audio-Technica omnidirectional lavalier microphones directly to the roller skates—one pointed at the front skate, another pointed at the rear. He recorded the tracks on an HHB Portadat. "It really picked up this very intense resonating sound," Hecker recalls.

Mission nearly accomplished. Hecker and sound editor Eric Norris took the salad bowl dates, dumped them into Pro Tools and got ready for some sweetening. Along with the typical and obvious tools of roller coasters, thunder rolls, jet sounds and animal noises, the team could have been found rolling shotputs, bowling balls and barbell weights in the studio. Within Pro Tools, they mainly used three plug-ins: Serato Audio Research Ltd. Pitch 'n Time, Maxx Bass and Waves Renaissance Compressor. A handful of EQs and harmonizers also came in handy.

The final piece to the skate sounds puzzle came during the Foley sessions for the skate striking tracks, which were performed by Hecker and Matthew Dettman.

The key, in the end, was to bring in some of the old-school roller derby audio buzz without it becoming overwhelming. "I think what we've come up with has a lot of personality," Hecker says. "We wanted to try and make it pretty peaky and specific to the actual movements of each skater on the rink, rather than it being general. When you listen to the skating sounds, you can isolate and hear each individual person's movement very distinctly; it's not just a cacophony of various roller skates rolling on a surface." ∎

The *S*core

Smooth Dialog With Lavs and Boom

by David John Farinella

Surprises are the last things mixer Lee Dichter wants to hear when he sits down to start working on a feature, yet that's just what he got when he started mixing *The Score*. The good news was that it was all good news. "I am very happy with the way the soundtrack ended up," he says from the Sound One dub stage in New York. "There was very little looping, amazingly little. I think the least amount of looping on a film that I've worked on, except for a Woody Allen film, who does no looping."

Dichter credits location sound recorder Glen Gauthier for the stellar production tracks. Gauthier used a Nagra D to record on location.

Of course, that didn't mean that Dichter didn't have his hands full with other sonic issues. The biggest was the fact that he had to mix a combination of lavalier and boom mics, because

the mix. It worked out fine, but it was a challenge."

Dichter made it work by using equalization and what he calls "roomizing" the lavalier tracks. "We did have a distant boom mic, but I usually didn't use that, because the pickup was too far away," he says. "So I ended up going with the lavalier on DeNiro and Norton and putting them through a half-second to a quarter-second Lexicon stereo delay to match the sound of the microphones from Brando. It worked out pretty well. I don't think you'll be able to pick up on where the shifts happen."

One of the most challenging scenes he had to work on was also one of the movie's most important. The scene takes place in the basement of Brando's home. "He's got a swimming pool that's empty because it's under renovation, and he's 20 to 30 feet away from the

ting from a long shot to close-up."

Though much of *The Score* takes place inside, the few street scenes in the film enabled Dichter to enact his dialog cleaning philosophy, which boils down to less is more. "I really hate to use those things," he says of compressors and filters. "Any piece of outboard equipment that you can hear, I hate it. I'd rather you hear the background pulsing than to shut down the sound between words. It just takes me out of it, so I try to minimize when it comes to lowering background tones."

Indeed, the only filtering he uses removes set noise from cameras and equipment buzz. "In most of the dialog scenes I work with in any film, my technique is to use the least amount of filters and background suppressors, because I don't like what it does with the voice. I'd rather live with more of the background, but with a fuller, natural sound to the dialog," he says.

In the final analysis, Dichter adds, these days, films are a sonic smorgasbord. *The Score* was no different. "The film is a great combination of a musical score by Howard Shore, the effects design and mixing, and the dialog mixing," Dichter says. "Each one needs the other for support. The dialog just sits there by itself with nothing else going on. It doesn't come to life until you bring the effects in, and the tension in the scene is increased tremendously when you get the right music score behind it. So it's all a combination." ∎

Supervising sound editor Ron Bochar and mixer Lee Dichter

main character Marlon Brando did not want to be wired. The film's other main characters, Ed Norton and Robert DeNiro, used lavaliers. "So, all of [Brando's] scenes were being picked up by a boom microphone," Dichter explains. "That made it very interesting on my end, because I had to marry the wireless sound with the boom sound. It's a different tonality and equalization curve, and some of the scenes were difficult to make seamless at the end of

camera with a boom picking him up," Dichter explains. "They kept cutting in to close-ups, and eventually DeNiro and him come together. That was a quite interesting use of different microphones and different sound space. Fortunately, I had that distance to work with visually, so you could live with the reverb and the echo. As they got closer, we kept some of that going so you wouldn't be jarred by long shot, medium shot, close-up, even though I'm cut-

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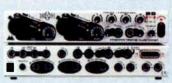
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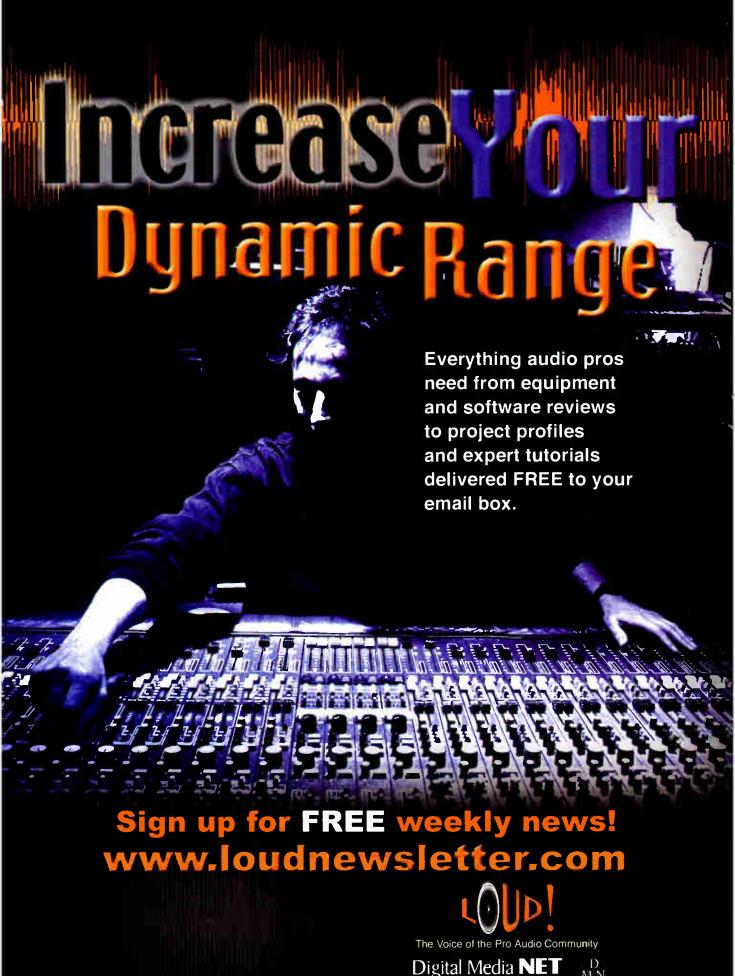
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—From Page 112, A.I.

by the music a lot of times, but I'm literally able to put things in rhythmically and [in consideration of] pitch, so the sound effects weave in and out of the music in a very seamless way. For this movie, I'm not just doing guns and explosions, and the score is not a typical score. We're trying to use sound effects in a more stylized way and having the music to work with has resulted in a more seamless feeling all through the film."

Rydstrom adds, "There were definitely some things that changed on the basis of what the music was doing, both in the quality of the sound—so we don't fight against the mood the music is creating—and pitch-wise, as well. We're creating these electric vehicles, so they have tonalities of their own, and it became important that those tonalities work with the music. It's very exciting to be able to do what I always want to do, which is think of the soundtrack as *a piece*, as opposed to coming at it from three different directions and then colliding in the final mix. It's been ideal." ∎
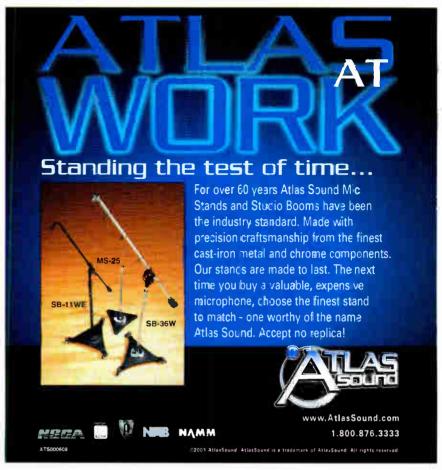
—From Page 113, Pearl Harbor

continues Russell. "That allows us to put different textures in different speakers, giving better clarity and separation, as well as more flexibility."

In an innovative move, to deal with the enormous amount of sound effects, a separate 5.1 sound design room was set up at Bruckheimer Studios with Pro Tools, Pro Control and plenty of plug-ins. The director could then audition scenes in surround ahead of time.

"We were able to preview for Michael," explains sound editor Beau Borders. "Sometimes he would come in and go, 'Great, cool,' and leave, and sometimes he'd come in and just shake his head, and we knew that we had to start from scratch.

"For instance, in the attack on Pearl Harbor, Michael's first comment was, 'I don't like the Zeroes.' Because, as it turns out, these planes really play as a menacing character. You can feel them coming, and when they rip by you they're scary. While they were real recordings, there was a lot of sound design to make certain moments of

these planes especially frightening. It sounded great cut for realism, but after we took it in the direction Michael wanted to, all of a sudden the planes became characters."

All in all, the *Pearl Harbor* sound team is striving to live up to the expectations of those legions of World War II buffs, and especially to the memories of those who lived through it.

"So many of those guys voiced their hope that we were going to make it authentic this time," concludes Watters. "They'd always been disappointed in films before, and they were tremendously concerned. The knowledge that they have is unbelievable and so was the help that they gave us. That's one of the reasons we worked so hard on this film. I don't think they'll be disappointed. ■

—From Page 114, Cats and Dogs

Up at the animal ranch, "Eric Potter did the dog recording using a Sony D-10 Pro, a 16-bit/48k DAT recorder with a JLCooper preamp and the little Colette capsule Neumanns in a Windjammer rig," Mangini notes. "He gets real good sound with that. To do dogs, one of the techniques he's developed is he runs two mics in mono, one with a 20dB pad, because you never know what a dog's going to do—it might whimper one second, which is a real low-level sound, and then it might bark, so you want to be able to get the range of it all."

When we spoke to Mangini in early April, the real cat sounds had yet to be recorded, but he suggested that there would probably be less reliance on the actual animals from the film. "We have a very extensive library of *great* cat recordings, because there are a lot of cat lovers here. We have some really unusual cat sounds that will be perfect for this film."

In his years as an SFX creator and editor, Mangini has worked extensively with animal sounds, so getting to do *Cats and Dogs* was a good fit for him. "Earlier in my career, I more or less created our animal library for the movie *Gremlins.* I just did tons and tons of animals for that—I did every animal under the sun, because I just didn't know what they were going to sound like. So I went out to every ranch and park

and zoo and recorded gibbons and macaques, elephants and badgers, even weasels! I tried everything. Animals are really fun to record. What's interesting, though, is that animals in their natural environments don't make much sound. They don't chatter to each other like human beings, obviously, except for birds. Most of them only make sound when they're in pain or in trouble, so you have to put them in a distressed situation to get sounds. So you would do things like separate mothers from their young for a few minutes." Mangini is quick to add, however, that no animals were unduly distressed to capture sounds for *Cats and Dogs.* "Nobody was prodded or electrified," he says with a laugh. "With the dogs, the trainers are really good at getting them to make noise, and, in general, dogs need less coaxing than a wild animal. Cats can be a little tricky…"

Mangini would probably agree that the toughest to deal with, though, are human actors. After all, they have agents, managers *and* egos. ■

—From Page 116, The Fast and the Furious

very intense package that you have to carve. Then, when you take it to a theatrical speaker system, it works gloriously because it spreads. It not only translates, it actually gains transparency and air.

"The sound element of the picture is critical to me," Cohen continues, "and so much depends on how you mix it. It can be mixed in a way that is thrilling and specific and multi-layered and dimensional, or you can get a hodgepodge of noise that will actually be painful. Especially when you're trying to go to the outer edge of something that hasn't been done before.

"We ended up with a beautiful dub, one that I actually think will affect how other films are done. When we started, almost nobody believed that you could make a dub this in-your-face. But we were always aware of the pain threshold. So when something cuts at a place or puts pressure on the ear, we were clear to counterbalance it very quickly. A high screech would be balanced by a subwoofer sound—all sorts of things like that. Because, in the end, it isn't about the loud, it's about the art of loud." ■

Practical Acoustics

Techniques for Improving the Sound of a Small Concert Venue

by Buck Moore

Many small- to medium-sized concert venues in urban settings started out as something else. For business purposes, almost any room can be converted into a live music/performance club. Some will sound good, some will sound bad, but just about any of these converted places can be treated successfully to sound better.

Some owners and sound engineers seem to think that they can just drop an amazing sound system into any old room and it will sound good. Well, sometimes this is true, but it's not the entire answer. It can be relatively inexpensive to treat a small venue with adjustable acoustics, and it would be downright silly not to explore this option. In this article, I will explain an effective acoustic treatment plan based on one I developed for a small venue in Toronto that has proven to be very successful over the past couple of years since it was

installed. The treatment plan didn't cost a lot to implement, and it looks great, but it did require the investment of some time and energy. The tools I used include ray-tracing diagrams, SPL meter (both "C" and "A" weightings), laser pointer, tape measure, my ears and the ears of many others.

The Royal Canadian Legion Branch #360 is a very nice-looking hall that serves as a clubhouse for vital legion meetings and extravagant dinner parties; at night, it becomes the 360 Club. The hall is located in the fashion district of Toronto (Queen Street West), a tourist trap of gigantic proportions riddled with production offices, wholesalers, retail clothing outlets, record stores and night clubs. Oh, and Steve's Music Store is right across the street, a landmark for professional musicians and sound engineers. So, why is there a Legion hall among the savvy rabble? There's a whole history there, but it has nothing to do with sound.

TREATING THE ROOM

The untreated room had a few acoustic shortcomings, including an inferior dimensional ratio, lots of flutter echoes/delays and plenty of hard surfaces. The distance from the stage to the bar is about 100 feet, and the room is 25 feet across and 12.5 feet in height, a dimensional ratio that pretty much guarantees mode pileups.

The floor of the room is wood, the east wall is heavy drywall and the west wall is solid glass from the ceiling down to shoulder height (7.5-foot-long by 4-foot-wide mirror panels cover almost the entire length of the wall). The ceiling consists of perforated ceiling panels, which might have provided some helpful mid- to high-frequency absorption had somebody not covered the holes with a coat of latex paint. Among the room's positive features are four evenly spaced columns on each side, essentially concrete studs that stick out about seven inches

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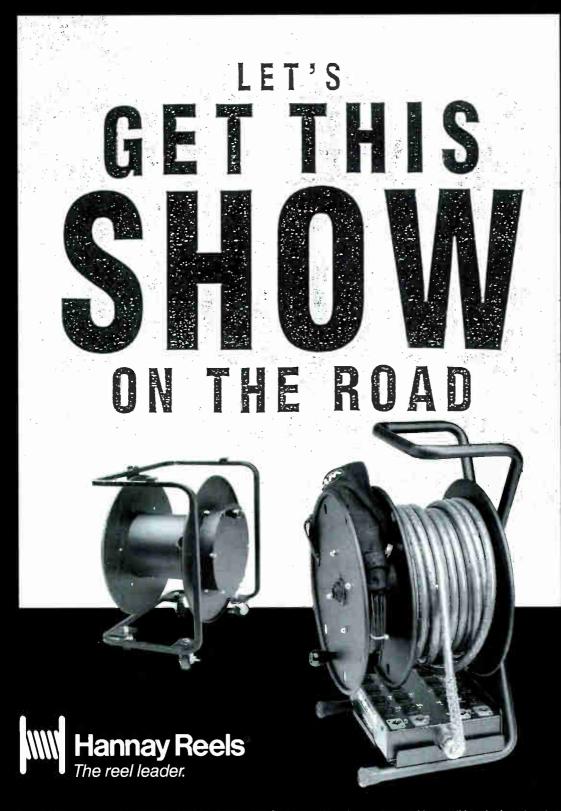
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issue27

Solid State Logic

Solid State Logic
OXFORD · ENGLAND

New MTP digital production console

contents

New MTP

large-scale mixing for television and music!

The MT Production digital console provides the power of SSL's MT Plus in a configuration optimised for general multitrack applications such as large scale television production and music.

The console's in-line multitrack mixing architecture with simultaneous multi-channel surround outputs ensures maximum format flexibility for programme material. In broadcast applications, MTP provides 48 clean feeds/mix minus outputs and full multitrack back-up.

MTP uses an ergonomically optimised and lightweight frame, with a depth 20% smaller than its sister, and is available in both Studio and Mobile versions. Both versions retain the SSL discrete control approach to realtime mixing and present a full set of controls for all channels in each layer simultaneously, complete with parameter displays across the board. Comprehensive project management and full reset capabilities are standard, as are snapshot and dynamic mix automation.

An even more compact version of MTP is also available for mobile production applications in music and television, packing large-scale audio mixing capability within a narrower frame size without compromising functionality. A slender new master section, optimised for realtime mixing, allows 96 dual-path in-line channel strips in two layers to be accommodated in the width of a conventional non-expanding truck, for example. The new-look, high resolution control graphics will drive an SVGA screen integrated within the installation. The master section can be specified centrally or to one side to suit different operating needs.

The 96 channels can control up to 192 simultaneous inputs that can be fed from remote-controlled microphone preamplifiers, or from analogue or digital line inputs, without restriction; a truly remarkable degree of mixing capacity. Stereo channels may be configured anywhere in the console to suit each project. Any bay of channels on either layer may be switched instantly to a 'sweet-spot' bay convenient to the operator for consistent monitoring even in a small space.

MTP extends the superb sonic quality of the SSL A-series range and inherits the A-series range of I/O options and accessories. The SSL NiTech Super-Pre™ provides the ultimate quality with remote-controlled preamplifiers and the option for analogue processor insertion prior to digital conversion. Analogue return feeds are provided for artist foldback capable of the lowest round-trip delay in a digital console. Forty-eight multitrack buses, accessible to both large and small fader paths, may be used for recording or to provide mix minus feeds. Multitrack machines may be connected via SDIF-2, MADI or AES/EBU protocols.

Abbey Road surrounded

Studio Three, Abbey Road

London's famed Abbey Road Studios recently installed an SL 9096 J Series SuperAnalogue™ console in Studio Three. The 96-channel console, the largest J Series in the capital, is fully equipped for 5.1 surround mixing with a custom panel, and replaces a 72-channel SL 8000 G Series console installed six years ago. The newly equipped Studio Three will be open for business in the spring of 2001.

Abbey Road Studios' new SL 9000 J Series console has an 8-channel surround sound master control panel fitted in the centre section, incorporating full 5.1 compression on all outputs. Additionally, a recently introduced optional feature enables the console to be easily switched between stereo and 5.1 modes at the touch of a button.

As Peter Cobbin, Senior Recording Engineer at Abbey Road Studios, explains, "We have traditionally had SSL consoles here since 1984. The SL 9000 J Series delivers outstanding sonic quality and incorporates technologies that make it particularly suitable for surround sound mixing. Having a greater number of channels will give us increased flexibility in the way in which we derive the surround mix. Also, a key advantage of this customised desk is that Studio Three will be able to adapt easily between stereo and surround sound DVD projects."

Digital consoles are now 'A Plus'!

SSL has announced new advanced specifications for its digital console family with effect from June, creating the A Plus versions of the company's A Series digital consoles – Axiom MT, Avant and Aysis Air. A Plus specification consoles benefit from a range of improved hardware and hardware options which include:

New HS Automation Computer

The new HS Automation Computer improves the speed of operation of all A Plus digital consoles in everything from boot time to complex actions such as automation editing.

High resolution graphics

The new HS Computer provides an improved graphical environment, whilst maintaining the familiar operational mode already praised by existing users.

TFT monitor

A modern flat-screen TFT monitor provides the display for all of the new HS Computer control screens.

Flexible I/O resource (RIO Grande)

RIO Grande provides greater flexibility in mixing analogue and digital inputs and outputs, together with a simple and economical expansion path.

INFO faders (option)

SSL's INFO (Intelligent Null Feedback Operation) Digital Linear Motor Faders provide increased accuracy and tactile feedback at null points and level matches for a greater degree of control. Individually hot swappable, the new faders also feature a four-character LED display.

NiTech mic amps (option for MT only)

A new Super-Pre mic amp, from the designer of the celebrated input stage of the SL 9000 J Series, combined with SSL's NiTech (Nearly Instantaneous Technology) digital audio converters enables very fast, high quality transition between analogue and digital domains, plus negligible latency in record and monitoring paths.

Conservatoire de Paris

▲ Conservatoire de Paris, Studio 1

The Conservatoire de Paris has installed two MT digital multitrack consoles and an SL 4000 G+ analogue console for the re-equipping and expansion of its Audiovisual Department.

Established more than 200 years ago, The Conservatoire de Paris is one of the world's most highly regarded schools of music and dance. The Audiovisual Department plays an important and multi-faceted role in the life of the Conservatoire, providing a full range of services from the teaching of sound recording and mixing principles, to the professional recording of individual performances.

According to Catherine de Boishéraud, Director of the Audiovisual Department, the choice of consoles was not an easy one. "Due to the diversity of the subjects taught at the Conservatoire, the recording studios are available to a wide range of users and different types of production. We had a requirement for powerful tools which would cope with such diverse applications, whilst offering a fully featured control surface where all functions are immediately and easily accessible. We also had to consider an 'architecture' which could easily be taught to students and we needed flexibility in console set up and operation. Reliability and track record were also important.

Our quest led us to SSL. We liked the in-line structure of the MT, making its operation by far the best, while its 'knob per function' approach is unarguably an asset in an educational application."

Aysis Airs twice for JC Studios

JC Studios,
Brooklyn, New York

Two 32-channel Solid State Logic Aysis Air Digital Broadcast Consoles grace the newly rejuvenated JC Studios in Brooklyn, New York. Purchased by NBC in the 1950's, the facility was host to a parade of landmark TV shows from the more recent 'The Cosby Show' to the legendary 'Sing Along with Mitch' and Mary Martin's 'Peter Pan'. And like the title character of that famous production, the new owners are keeping the facility forever young with the addition of the Aysis Air consoles.

"JC Studios, in its different incarnations, has made so much of film and NBC-TV history," says Paul Stiegelbauer, Director of Technical Operations for JC Studios. "We acquired the facility last year to produce the daytime drama 'As the World Turns'. We took occupancy in November 1999 and went on air on January 3, 2000 with the two SL 6000's that NBC had used. Once up and running, we decided to go with the new Aysis Air systems as the first step in taking the entire production chain digital."

'As the World Turns' is set up on both stages of the Brooklyn complex so that when one stage is shooting in the morning, the other is being prepped for the afternoon scenes. "There are several situations that led us to the Aysis Air, with networking capabilities at the top of the list," says Stiegelbauer. "There are times when we will use both studios at the same time to complete a segment, so we needed two consoles that would seamlessly and effortlessly work together."

Success for Avant in Japan

◂ Sony PCL

Sony PCL has installed a 112-channel Avant digital film and post-production console at the heart of its new THX-approved mixing theatre in Tokyo. Studio operation commenced in August 2000 and since that time the console has been fully employed by the Sony subsidiary, mixing and sweetening audio for high-profile surround sound projects.

According to Takeo Asano, Managing Director of SSL Japan, "Many of the projects already completed were mixed in 5.1 - including one of the first to be broadcast in HDTV. Everyone has been amazed by the outstanding quality of the sound." The 112-channel Avant console is the largest to have been installed in Japan to date.

Leading Japanese post-production facility Imagica has recently ordered its second 64-channel Avant. Imagica has four facilities in different locations in Tokyo; the Avant-based studios and a second studio complex equipped with two MT digital multitrack consoles. A third studio now has eleven SL 4000 series consoles - following a recent order for an SL 4040 G+.

In addition, NHK, the Japanese national broadcaster, has ordered a third Avant for video post-production. With more than 150 audio engineers, the ease of operation and familiarity of Avant's control surface was a key factor in NHK's decision.

Avant revolutionises
BBC drama production

▲ Dubbing Mixer David Mason works on the Avant at BBC Resources
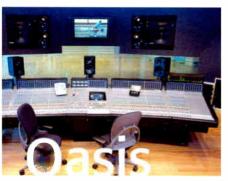
An Avant digital film & post-production console is now installed in Dubbing 1 at Pebble Mill in Birmingham for BBC Resources, part of the largest television facilities company in Europe.

The 24-fader Avant, with 96 inputs, is operational in a completely refurbished studio equipped for Dolby 5.1 mixing. The console is currently employed on a variety of high-end television drama projects, the first of which was the latest series of 'Dalziel & Pascoe' - a BBC Birmingham production for BBC1.

Dubbing 1 will also extend surround-sound mixing and remixing capability - for DVD and other applications. The room has already been used to create the Dolby 5.1 remix for "Doctor Who: Five Doctors," a DVD for the BBC that features extended scenes and untransmitted sequences from the original production broadcast in 1983.

"Our Avant has revolutionised the way in which we produce drama," maintains Dubbing Mixer David Mason. "Increasingly, sound mixing for high quality television productions is resembling the feature film process with ever more tracks to mix. Consequently, the ability to perform virtual pre-mixes - and change setups quickly in front of our clients without the time-consuming constraints of committing to tape - is a great benefit."

BBC Resources in Birmingham offers programme makers a 'one-stop' facility encompassing every aspect of television and radio production through a combination of the latest innovative technologies and a highly skilled and experienced workforce. In addition to its BBC clients, the facility has worked with a growing number of leading production companies and broadcasters including Carlton Television, Bazal, Ecosse Films, GMG Endemol and LWT.

Oasis in Beijing

Oasis Studios of Beijing, equipped with its SL 9080 J Series SuperAnalogue™ console, opened for business in October 2000. A subsidiary of YYYD Productions Co. Ltd, Oasis is an all-new studio complex, set in a lakeside location in the centre of the Chinese capital. With an impressive range of equipment and extensive facilities, Oasis Studios is the premier recording and mixing facility in the country.

Dindae Sheena, Chief Operating Officer of YYYD Productions, explains the reasoning behind the decision to equip the new facility with an SSL console. "We did a market study on the standard that was currently available in other private facilities

◄ The Ocean Room at Oasis Studios

in China - as we wanted to improve on what was available. We decided that the 9K was the way to go and Oasis will be the first private facility in China to own one."

Oasis has two control rooms, one large live room, and five isolation booths. Control room A (The Ocean Room) will house the SL 9080 J console with monitoring by Genelec 1036As. The main 4,000 square-foot studio - with stunning lakeside views - is large enough to house a 60-piece orchestra comfortably. Considerable attention has been paid to acoustics throughout, with design by Sam Toyoshima.

Sheena concludes, "The first large-scale commercial recording facility in China, Oasis Studios will concentrate mostly on working with artists in the Asia-Pacific region, with most of the focus on artists from Mainland China, Hong Kong, Korea, Japan and Taiwan. But, as a 9K equipped facility, our ambition is to join the global club of premier international studios and we look forward to working with artists from all corners of the world."

Cynthia Daniels

Score Productions recently mixed a full orchestral suite based on the ABC World News Tonight Theme in 5.1 surround sound on an MT digital multitrack console at Kampo Studios in New York City. Cynthia Daniels engineered the 80-piece orchestra at Ocean Way in Nashville, TN then mixed the music at Kampo.

SWTV migrates
to digital broadcasting

Sphere Studios, the first large multi-room recording facility to be built in London for many years, is to install a surround sound equipped SL 9000 J Series SuperAnalogue™ console.

Due for completion in the spring of this year, Sphere is located near the Thames by Battersea Bridge and is the joint brainchild of Francesco Cameli and Malcolm Atkin. Malcolm was also involved with the last major such project to be undertaken in the capital, the construction of Sir George Martin's Air Lyndhurst.

Occupying 10,000 square feet with acoustic design from Munro Associates, Sphere Studios will have three main rooms - one for live recording and two mix rooms - built around a centralised machine area for facility-wide resource sharing. Shared access also extends to the six "white rooms," designed to accommodate a broad range of pre-production activities. All three control rooms are to be equipped with 5.1 monitoring from Dynaudio Acoustics.

Connectivity, both within the facility and globally, is recognised as a key factor in the commercial success of the new venture and, consequently, the facility has been wired internally to accommodate both existing and future technologies with extensive use of fibre optics. Sphere will also provide its clients with broadband connectivity to the outside world.

(l-r) SSL's Stuart DeMarais and Mike Banks with Malcolm Atkin and Francesco Cameli

▲ SWTV's Sundance mobile

Sundance, the newest addition to the five-truck hybrid digital fleet of live broadcast expandable production trucks owned by Core Digital Technologies-SWTV (Southwest Television) in Tempe, Arizona, sports a 96-channel Solid State Logic Aysis Air Mobile digital broadcast console, making the entire production chain digital. Servicing mostly live high-end sports and entertainment events, the rock-solid reputation of the Aysis Air convinced SWTV to include the console in this very advanced digital environment.

"We are a production services company, a one-stop shop for remote live television broadcasting," says Shawn O'Shea, director of engineering and operations for SWTV, a division of Core D gital Technologies. "When we were building this new remote truck, we chose the Aysis Air Mobile based on the wonderful experiences that other customers have had with their consoles. We strongly believe that the remote market should quickly migrate to digital audio, and with the Aysis Air, we have a proven, great-sounding and powerful platform to accomplish this changeover."

SWTV sends its remote fleet out to cover events throughout the continental United States, Canada and the Caribbean basin. According to O'Shea, about 75% of the company's business is live network sports for CBS, NBC. FOX, ESPN, Turner and the like.

Sundance is a production truck with digital wiring for 20 cameras, 24 tape machines and the Aysis Air Mobile, all routed through a Kalypso switcher.

"It is very important to build a truck that can handle today's business, while also keeping an eye on the future," explains O'Shea, "The Aysis Air keeps us prepared for any eventuality that may come along, and that is another great benefit of the console."

Recently, SWTV used Sundance with its new console at the NBA All-Star Game, held at the MCI Center in Washington, D.C. SWTV broadcast the live feed for Turner Sports Network.

Soundtrack's a favourite for Andy Wallace

When mixer/producer Andy Wallace (Limp Bizkit, Foo Fighters, Everclear) was contacted by Metallica drummer Lars Ulrich about working on an upcoming project together, he knew exactly where he wanted to work-Soundtrack in New York City.

For this project, Wallace and Ulrich teamed up to mix Systematic, an up and coming band on Ulrich's Elektra laoel due to have their debut album released in May this year.

Wallace has worked at Soundtrack since the 1980's and prefers it as his studio of choice when working in The Big Apple. "I've mixed quite a few albums at Soundtrack and without a doubt it's the place I want to work when I'm in New York," says Wallace.

Since Wallace is used to working with bands such as Limp Bizkit and Foo Fighters, he felt right at home mixing Systematic's heavy guitars and melodic vocals. "Systematic is a new band out of San Francisco and this is their first album," explains Wallace. "Their sound is fairly heavy but they are very song oriented and have very strong performances. Tim is an excellent vocalist and that should allow the group to be radio accessible."

Wallace, now based in New York, began his career as a musician in the 70's in Los Angeles and from those experiences he was able to break into mixing and producing. He has

▲ (r-l) Engineer Andy Wallace, Metallica drummer Lars Ulrich and Systematic guitarist Adam Ruppel of Systematic, at Soundtrack, New York City

primarily worked with rock artists and prior to working with Systematic he mixed Limp Bizkit's latest multi-platinum release, 'Chocolate Starfish and The Hot Dog Flavored Water', also in Studio G.

According to Wallace, Studio G is where he feels most comfortable. "I've mixed a lot of albums in Studio G and I love the sound in there. Studio G has a Solid State Logic 4072 G+ Series console with Ultimation™ – which I really like. Specifically, I like the sound and method of automation because I'm able to move quickly on the console. There are no obstacles with the G+ Series because I have so much experience with it."

techno*file*

AudioBridge

SSL's new AudioBridge interface extends the company's HiWay™ and Freeway™ multi-channel networking technologies by providing full bandwidth digital audio distribution, both locally and globally, without reliance on low quality, unpredictable Internet delivery systems. AudioBridge connectivity is characterised by its dependable, continuous service and low coding delay, making it most appropriate for professional audio applications.
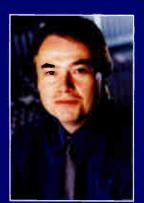
Using standard (Cat 5) computer wiring and wide-area network data protocols to route full bandwidth digital audio over both hardwired and virtual circuits, AudioBridge data is compatible with standard ATM switches and telecoms interfaces, opening up a world of audio distribution possibilities.

Each AudioBridge 1U rackmounted unit provides an 8-channel, two-way audio connection within a standard 25Mb/s data interface. Where more than 8 channels of audio are needed, multiple AudioBridge units may be aggregated via an ATM switch to increase capacity.

Mark Yonge, Market Manager, Broadcast & Post, Solid State Logic

AudioBridge

New MD for SSL

Colin Pringle was appointed as Managing Director of Solid State Logic Group Ltd on 1 January this year, taking over from John Jeffery, who as Managing Director since 1991, had led the company to its current pre-eminent position.

Colin originally joined SSL in 1988 as Marketing Director in which capacity he served for seven years. He rejoined SSL last year after a period as Development Director of the Entertainment Division of United News & Media.

Bob Pridden

DVD 5.1
mix captures
The Who

Classic for SoundCastle

SoundCastle, a leading recording facility specializing in pop, hip-hop, rap and R&B located in Los Angeles, was the first studio to install an 80-channel Solid State Logic SL 4000 G+ Classic console.

The "Classic" designation of the console indicates the latest sonic improvements of the G+ combined with a return to the original appearance of the E Series, with its black 'Raven' finish. The installation reflects SoundCastle's desire to service its long list of clients interested in the classic SSL sound.

"The sonic attributes that our clients have come to expect from the single most successful mixing console in modern recording history, the SL 4000, cannot be achieved by any other console," says Buddy King, owner of SoundCastle. "The G+ Classic we have purchased still offers that great sound quality, while addressing the mixing needs of the future."

Because of the recognised industry-standard sound of the SL 4000 G Series, SoundCastle engineers specified the new SL 4000 G+ Classic in response to client demand. They already have an SL 9000 J Series in Studio A and felt the G+ Classic purchase would balance their sonic offerings.

"Studio 2 was most recently home to an SL 4072 G Series, installed in 1989. A number of our clients like to use both our SL 9000 and SL 4000 consoles at different stages of their production," states King, "and the installation of the new SL 4000 G+ Classic allows us to service all situations."

The first client to use the new G+ Classic console was producer Battlecat who worked with engineer Tim Nitz to mix the soundtrack for John

Following their all-star concert at London's Royal Albert Hall last November in aid of the Teenage Cancer Trust, The Who are to release a DVD of the performance in the Spring of 2001. The concert was mixed in 5.1 surround by The Who's producer/engineer Bob Pridden ably assisted by Will Shapland of Sanctuary Mobiles - known as Manor Mobiles prior to its acquisition by the Sanctuary Group last year.

The three-and-a-half-hour concert, which featured contributions from Bryan Adams, Eddie Vedder, Kennedy, Paul Weller, Noel Gallagher and Kelly Jones was recorded on Sanctuary's SL 4048 E Series console and mixed in 5.1 on their 62-channel MT. For this purpose, the truck was fitted with Quested monitoring.

Sanctuary's recording engineer, Will Shapland, is no stranger to digital mixing as Manor was one of the first to take delivery of SSL's MT digital multitrack console two years ago. In that time he's worked the console hard on a variety of demanding projects including 50 weeks of TFI Friday for Channel 4, a near-live show where he came to appreciate the instant reset capabilities of the console as he was mixing at least four different bands on each programme.

For producer/engineer Bob Pridden though, who has worked with The Who for 34 years, and was an early pioneer in the field of on-stage monitoring, this was to be an introduction to digital mixing and he freely admits to approaching the session to mix 48-tracks for the DVD with a degree of trepidation.

"You could say I'm a bit of a Luddite. This was my first session with 5.1 and we had nearly 50 tracks to mix, so I was naturally apprehensive. Frankly, I've not been too impressed with the sound of some digital boards I've listened to, as I thought they sounded brittle. But I have to say that the MT's been absolutely fantastic. I'm a complete convert - I love it, and I love the sound. The repeatability, where you can just go back and recall all your channel settings is such a timesaver - this job would have taken forever on an analogue console. Also, I really like being able to pull channels across to my listening position - I don't want to move around when I'm mixing - you can lose the plot too easily."

Will Shapland, who also mixed the concert with Bob Pridden in stereo for pay-per-view TV transmission, believes that 5.1 is a great medium for capturing live performances. "You don't move stuff around for the sake of it," he argues," I like to keep the band in front of me and use the rear speakers to spread the room around rather than the band. We'll also use the rear speakers to fill in on the sing-along and clap-along numbers. The Albert Hall has a definite acoustic shape and 5.1 captures the reflection well — it's a lot more difficult with outside events where there's no natural reflection."

Will Shapland identifies an issue with surround mixing in that the final result is heavily reliant on the studio monitoring system. "There's simply not enough reference points at the moment - you need to be able to play your mix at a dozen different places - unlike stereo where you can put it on a cassette and listen in your car!"

Bob Pridden, whose credits include recording and mixing Eric Clapton - as well as bands The LA's and Streetwalkers concludes, "When I started working with The Who we recorded on four tracks, even 'Quadraphenia' got started on an eight-track. It's incredible how far the technology has progressed. It's been a great experience mixing in 5.1 on this console and I'm sure we've managed to capture the excitement and energy of the original performance. I can't overestimate how great a help Will has been."

▲ Pictured at SoundCastle are (l-r) Tim Nitz, Battlecat and Buddy King, studio owner

Singleton's next feature film 'Baby Boy', scheduled for release in June 2001. The pair also worked together at SoundCastle on other recent projects including: Battlecat's upcoming album, the soundtrack for Road Dogs and Dr. Dre's Aftermath artist, Hit Man.

The 80-channel SL 4000 G+ Classic for SoundCastle, in classic 'Raven' black with 48 E Series '242' equalizers, is built with a G Series centre section with G+ modifications. Special-edition features of the Classic include Stereo AFL, True Group Solo, custom 8-way cues modification and extended panning to accommodate today's market requirements.

Aysis Air Mobile gives 100%

Turner Studios' Solid State Logic Aysis Air Mobile digital broadcast console is at the top of the league, following its first months of service for the Atlanta Braves, NBA and NHL games on TBS. Installed in a network production truck, Turner's engineers have grown to appreciate the rock-solid reliability and ease of use offered by the Aysis Air.

"Live remote broadcast situations are always taxing as your systems need to be at 100 percent all the time," says Bob McGee, director of technical operations at Turner Studios Field Operations. "The operation of the Aysis Air Mobile has been perfect. We had absolutely no issues—operational or technical. The engineers turn it on, load a file, successfully mix and it's off to the next event. You can't ask more of a console. All this and it sounds great. We're very happy."

The Turner system's current configuration allows 152 sources to be routed through 96 processing channels to 80 outputs. While it may seem like a daunting task to master a digital console of this size, Turner's experience has been exactly the opposite. "The Aysis Air Mobile is very easy to use," states David O'Connell, audio engineer. "While it is a digital console, it really looks and feels like the very familiar SSL analogue consoles. For us, the Aysis Air sets the standard for digital consoles in the way SSL set the standard for the analogue generation."

The console's total resetability was cited by O'Connell as a key feature for Turner's type of television production. Once the outboard gear, microphones and tape machines are normalled into the console's router, set-up becomes extremely easy. "You just hit a couple of buttons and you have your source. All the source routing is easily attainable, and the destination routing is very flexible. We essentially have a patchless system right now. We can pre-set a show, set all the EQs, compression ratios and all the routing, save it to disk and instantly recall all our settings. We can quickly move from a small-format production to a large production. The Aysis Air saves us time and, in our business, time is money."

The final test of an audio console is its clarity and quality of sound, another area where the Aysis Air Mobile shines for Turner. "The Aysis Air is a high-level digital console and the clarity is outstanding. I can now hear things I wasn't able to hear with an analogue system. The richness of sound is more defined, allowing us to produce a superior television experience for our audience."

▲ Aysis Air Mobile in Turner Studios' network production truck

news bytes

Guillaume Tell hits the mark

Studios Guillaume Tell, one of the most revered recording facilities in Paris, is to replace its existing SL 9080 J Series console with a new 96-channel version, equipped with monitoring for 5.1 surround mixing.

As before, the SL 9000 J Series will be installed in the spacious Tom Hidley designed control room in Studio A, the largest in the complex, with 300 square metres of floor space and a ceiling height of more than 13 metres. With such considerable volume, Studio A can comfortably accommodate 80 musicians. The SL 9096 J is the fourth SSL console to have been installed in the control room since Studios Guillaume Tell opened for business in a converted cinema in 1986.

MT for Germany's first digital surround mobile

B&R Medientechnik of Kürten on the outskirts of Cologne, Germany, has expanded its mobile fleet, equipping an 18-metre remote recording vehicle with a 48-fader, 96-channel MT digital multitrack console, supplied through SSL's alliance partner in Germany, Digital Audio.

The new vehicle cut its teeth when it was used for the surround sound recording of an orchestral concert in Berlin last year, featuring the internationally acclaimed violinist, André Rieu and Orchestra.

According to B&R's owner, Bernd Kugler, "For us, the installation of the MT was a dream come true. We have a very successful mobile recording business but we wanted to be the first in Germany to offer digital surround sound - both for recording and broadcast - to extend our client base. We were extremely impressed with the powerful automation on the console and with the fact that it's readily familiar to our freelance operators."

Two SL 9000 J Series for The Netherlands

This year started well for the Dutch recording industry with two SL 9000 J Series consoles being installed in The Netherlands.

The first, an SL 9048 J Series, went to Zeezicht for their rurally located studios on the outskirts of Haarlem. Zeezicht is located in a refurbished school with the assembly hall, complete with original stage, serving as the recording area. A number of leading Dutch artists record regularly at Zeezicht, including leading Dutch pop group Abel and Candy Dulfer, the internationally acclaimed jazz tenor saxophonist.

Studio Down Under, so called because of its basement location in a large villa in Hilversum, is the recipient of the second SL 9000 J Series console. This prominent Dutch studio, owned by highly successful producer/songwriter John Ewbank, is replacing its 14-year-old SL 4000 console with an SL 9048 J Series.

"Mama's Gun" at Electric Lady Studios

Top R&B artist and Grammy nominee Erykah Badu's, new hit record, "Mama's Gun" was mixed at Electric Lady Studios in New York on a Solid State Logic SL 9000 J Series SuperAnalogueTM Console.

With such diverse-sounding material - covering everything from R&B to Adult Alternative Pop/Rock to Alternative Rap - Badu and her associate producer, James Poyser, chose three different engineers to mix the album, Russell Elevaco, Leslie Brathwaite and Tom Soares.

All three engineers have prior experience, both with the console and with working in the legendary Electric Lady environment. Brathwaite explains, "I normally work on other SSL consoles including the G and E series, but it's always a pleasure to mix at Electric Lady because I have the opportunity to work on the SL 9000. The console is the most user-friendly around."

Delphine extends range of services with MT

Delphine Studios, at the heart of the Parisian music recording and video post-production scene for more than 20 years, is to re-equip its Studio B, installing a 40-fader, 80-channel MT digital multitrack console. In so doing, the studio will extend its range of client services to encompass multi-format surround-sound mixing for post-production, including DVD.

The new digital room will be equipped for 5.1 monitoring and will complement Delphine Studio's analogue suite which houses an SL 4064 G Series console.

The MT for Delphine Studios is the 10th to be installed in France since the console's launch two years ago. SSL Regional Manager, Philippe Guerinet attributes the success of the MT in his region as being due to the French market's readiness to adopt digital technology, the sonic performance of the MT and SSL's strong regional presence to deliver service and support.

New appointments

Solid State Logic has appointed two new product specialists: John Pastore for the East Coast, based in SSL's New York office, and Ryan Hewitt for the West Coast, based in SSL's Los Angeles office. Both will be responsible for product training and demonstration for all SSL consoles.

Prior to joining SSL, Pastore spent two years with Otari's console development group as the lead quality assurance engineer and has an excellent understanding of digital consoles.

Hewitt's background includes several years of experience as a live sound and studio engineer. He has recorded live projects for the Family Values Tour '99, Kenny Loggins and Jimmy Buffett, and he has mixed projects for Ringo Starr, Kenli Mattus and Burt Bacharach.

"We're extremely pleased to have John and Ryan join SSL," says Rick Plushner, president of SSL Inc. "Both have a great deal of expertise with large-format consoles, and each brings a passion for their work to the company."

Historic studios re-equip

Two large Avant digital film consoles are to play an important role in the regeneration of the film industry in Russia. The two 48-fader consoles, each with 192 processing channels are now located in the legendary state-owned studios, Lenfilm and Mosfilm.

Mosfilm has produced more than 3000 films in its 70-year history and the studio's output has garnered more than 400 major international awards. Eisenstein's "Battleship Potemkin," Kurosawa's "Dersu Usula" and Bondarchuk's "War and Peace" are just a few of the classic films from this historically important studio.

Practical Acoustics

from the wall. These serve as natural diffusers.

The front portion of the stage floor is made from plywood risers, while the side walls to the rear of the stage are wood and the stage ceiling is thick plywood. A solid wooden riser—originally the entire stage area—is used as a drum riser (see Fig. 3). The front section of the stage is open.

Because the room still hosts traditional Royal Canadian Legion functions, any acoustic treatment must be easily removable by a single person in a mat-ter of minutes. Also, capacity crowds assembled for a well-known guest speaker would absorb quite a bit of sound, making it difficult for quiet speakers, so there are acoustic reasons for having removed panels.
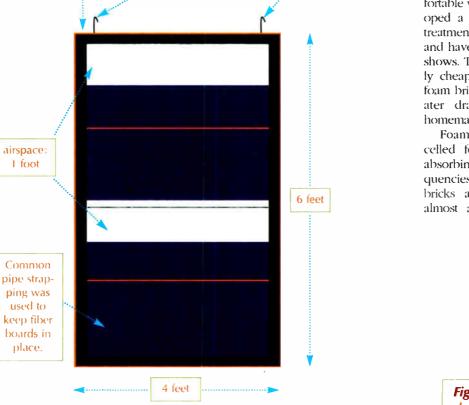
For the room treatment, I began by building hanging absorber panels made of 1x2-inch spruce frames filled with Roxul fiberboard and covered with raw muslin, which is softer and thinner than canvas (see Figs. 1 and 2). The absorbers are hung six inches out from the walls by means of "G" mountings in order to keep an air space between wall and absorber for increased absorption. (Published absorption coefficients show that the fiberboard absorbs 100% at 1 kHz, 2 kHz and 4 kHz, the frequency range I mostly wanted to control.)

Using a laser pointer/mirror setup, I made measurements to trace sound waves in the "ray" category in order to estimate approximately how much sound energy would be absorbed on the underside of the absorber from off-axis reflections. Measurements also ensured that any reflections from the uncovered wall spaces between panels would be absorbed by panels on the opposite wall. The treatment proved very effective at absorbing most early lateral reflections and excess sound energy coming from the stage, resulting in a cleaner FOH mix. Aside from the standing wave anomalies, the room can sound great when treated. Extra panels were later built for the walls near the open front section of the stage.

TREATING THE STAGE

I treated the 360 Club stage as I would a rehearsal room for really loud bands. I have found that the trick to mixing really loud bands in smaller venues is to absorb as much stage sound energy as possible. This not only minimizes microphone feedback problems, early reflections and cymbal bleed, but it also tends to make the musicians more comfortable while performing. I have developed a simple, cost-effective acoustic treatment plan for the 360 Club stage, and have used it successfully for many shows. The components are surprisingly cheap, easy to install, and include foam bricks, a soft fabric (muslin), theater drapes, moving blankets and homemade "ceiling pillows."

Foam bricks are made of open-celled foam, which is excellent for absorbing high and upper-middle frequencies, such as cymbals. Spacing the bricks a few inches apart achieves almost as much total absorption as

Total cost of each panel, $16.00 U.S.
(This does not include the artist's fee, but they also look great with black or purple muslin covering.)

2 inches deep

Mounting hooks for quick installation or removal

airspace: 1 foot

6 feet

Common pipe strapping was used to keep fiber boards in place.

4 feet

Figure 1: *The muslin fabric is used to cover the front and back of the panel, providing an enclosure for the fiber boards and a surface to paint on. The air spaces above the fiber board were left, because it only came in 2-feet widths. Also, there were maximum weight and budget requirements to meet.*

Figure 2: *This is the finished absorber with a lightly painted muslin cover. Acrylic paint was applied very thin, like a watercolor wash, to keep the facing porous. (Too thick a coat of acrylic paint would make it an effective reflector.)*

treating the entire surface, because the exposed sides of the 4-inch-thick bricks absorb a considerable amount of sound energy. The bricks are also hollowed out to half-depth in the middle, which helps absorb even more sound energy. Any remaining unabsorbed sound energy is diffused and returned to the stage in random reflections. After treatment, the vocal mics pick up much less cymbal and snare drum bleed, and the FOH mix is much easier to control.

I loosely covered the foam bricks with black muslin arranged in a convex drooping pattern. In theory, any high frequencies that make it through the muslin on the way up and bounce off the foam bricks, or spaces between them, will be further attenuated on the way back down, once again by the muslin. But the muslin is mainly there for looks. Also, the back wall of the stage is covered with a loose-fitting, heavy, theater-style drape, which I re-hung to create some space between the drapes and the wall.

If you've ever been in an elevator on moving day, then you know just how much quieter it is with heavy moving blankets on the walls; they are an excellent choice for absorbing unnecessarily excessive sound energy on the sides of the stage. Another useful feature of moving blankets is that the material is fire retardant.

Placing a medium-pile carpet under a drum kit will help absorb cymbal and snare drum energy, plus it will help stabilize the drum kit and the bass drum spikes will hold better. Without this damping, excess sound energy from cymbals will be reflected into the off-axis side of the drum microphones, which tend to give the FOH mix a strident quality.

Because of the many different types of performances at the Legion hall—dancers, fire breathers, hardcore bands, etc.—the low-pile carpeting on the front section of the stage is not permanently fixed to the floor and can easily be removed. I like to keep it there when the extra absorption is needed, such as when bands insist on pointing really loud guitar amps toward the audience.

My last sound-absorption device is a pair of "ceiling pillows," which are fixed to the ceiling on either side of the foam brick area. The ceiling pillows are homemade from thick insulation and muslin with a cardboard backing and are placed under the drooping muslin near the corners of the stage ceiling. A small air space above the pillows aids in further absorbing ceiling reflections.

BETTER SOUND LOCALIZATION

The result of treating the stage as I've described it is a rather dead-sounding, echo-less stage area. Musicians report that they can better localize sound sources onstage, and, when the stage treatment is used in conjunction with the aforementioned room treatment, a competent mixer can achieve a great overall sound quality in this otherwise difficult venue. Not bad for a total materials cost of about $400, considering that the present sound system costs at least 30 times more.
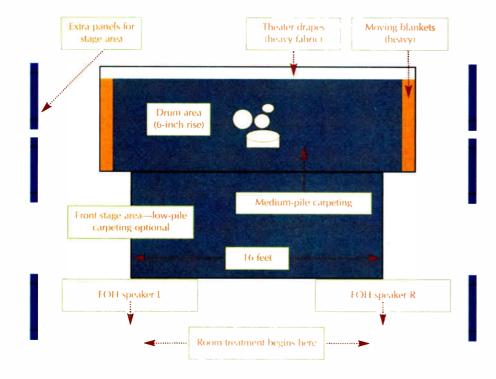
And the overall sound quality is further improved when the band sets up with an ideal stage plot—all onstage speakers pointing in toward the musicians. Add in a great sound system, and the venue has proved itself an excellent choice for CD release parties, the NXNE festival and Canadian Music Week (CMW), events where the majority of the performing musicians felt comfortable, because they could hear themselves and all other instruments onstage. Equally important, the overall audience response has been very positive, and, all technical data and measurements aside, the fact that people enjoy performing at the venue and the audience enjoys what they hear has justified the modest treatment plan.

I would like to thank my silent mentors—sound engineers Ian Carkner, Wayne Green and David Walsh—who have helped me out during the entire process by offering suggestions and/or sharing their wealth of knowledge in live sound applications. Special thanks to Bill Ovenstone for assisting me in building the panels. Thanks guys! ∎

Figure 3: Stage floor plan and treatment plot

Extra panels for stage area

Theater drapes (heavy fabric)

Moving blankets (heavy)

Drum area (6-inch rise)

Medium-pile carpeting

Front stage area—low-pile carpeting optional

16 feet

FOH speaker L

FOH speaker R

Room treatment begins here

TOUR PROFILE

U2's ELEVATION TOUR

A BEAUTIFUL NIGHT WITH ROCK'S REIGNING SUPERSTARS

After picking up three Grammys (Record of the Year, Song of the Year and Best Rock Performance) for their song "Beautiful Day," on the album *All That You Can't Leave Behind*, U2 and support act PJ Harvey embarked on an extensive spring tour. Playing to both the band's humble past and more recent incarnations as a multimedia extravaganza, the show opens with the house lights on, the band casually taking the stage and greeting the audience. The show's visual effects then run the gamut from simple to simply awesome.

Mix caught up with The Elevation Tour at Portland's Rose Garden Arena. Shortly after Bono arrived for soundcheck, he solemnly announced Joey Ramone's passing away in New York City. He then politely asked how much time he had before

BY MARK FRINK

PJ Harvey's check, before leading the group in refinements to the evening's set, which turned out to be a 160-minute, nonstop marathon of two dozen songs, spanning the band's quarter-century repertoire.

FLYING ARRAYS IN THE ROUND

The main P.A. is a fully updated Clair Bros. I-4 line array system flown by engineer Tom "Duds" Ford. The show is sold in the round, and two arrays of six enclosures, arranged in 10° increments, cover the back. Each side of the arena is covered by an eight-deep column, and the main left and right system is a 14-box banana with boxes angled at 2°, 5° and 10° covering the long, medium and short throws. Few actual subwoofers are employed in the rig. Clair Bros.' prototype run of two dozen supplemental I-4B bass cabinets enhance the low end. They are vented, single-18 enclosures that fly immediately adjacent to the array on one side, making it a "chubby banana" and putting all the low end in the air with the rest of the rig. While the rest of the sound system uses Crest Audio 10004 amps, the new I-4Bs are powered with QSC 9.0 amps, which were chosen for their ability to drive multiple low drivers cleanly. The three zones of main I-4 arrays each have their own XTA DP 226 processor, in addition to TC Electronic 1128 programmable EQs, which include the 6032 remote head.

American promoters agreed to this tour's general admission plan

FOH engineer Joe O'Herlihy, left, and crew chief Jo Ravitch at the Midas XL4

for the arena floor with some hesitation. U2 has not played GA shows in the States since their club days in the early '80s, though they regularly do so in other parts of the world. Ramps in the shape of the bottom of a heart descend from the stage wings to meet at the center of the arena floor, creating a club gig in the middle of an arena gig. The first 300 GA fans got wrist bands and were able to enjoy the show from inside the ramps.

The area inside the ramps is covered by P-2 speakers on top of ML18 subs under the front of the stage, in addition to a flown three-box P-4 center cluster that is hung overhead. System engineer Joe Ravitch is assisted at FOH by Jason Kirschnick, whose duties include making five copies of each show with a rack of HHB CD recorders, one for each bandmember and one for veteran FOH mixer Joe O'Herlihy, who raves about the recent enhancements to the Clair Bros P.A. system.

WHERE THE RACKS HAVE NO NAME

O'Herlihy mixes on a Midas XL4. A Yamaha 02R sidecar handles some of the extraneous overflow inputs, such as the Yamaha CP70 electric piano that Bono plays "The Sweetest Thing" on, the audio input for the video of NRA president Charlton Heston that plays before "Bullet" and some of the SPX returns. A double-wide rack houses an armada of outboard processing. Inserts include blue dbx 160SL compressors on vocals, Summit DCL-200 tube compressors for The Edge's guitar inputs, dbx 160XT compressor/limiters for bass inputs and Drawmer DS201 gates across the toms. Vocal effects include two TC 2290 delays for short and long delays, a Lexicon 480L and an Eventide H3000 D/SE. There are also two Lexicon PCM 70s (one for snare and the other for toms), two SPX-990s with chorus and reverb settings for guitars and two more SPX-1000s for special vocal treatments on certain songs. The SPX-1000 was used frequently on the previous tour for its multieffects capabilities, and there are a half-dozen spares in O'Herlihy's FOH work box.

The set is a 5-foot Tait Towers stage, with 7-foot wings and a rear apron that quickly rolls into place and locks together under the lighting and sound rigs. Upstage left, beneath the deck, the monitor mix position is concealed from the audience. There have been some upgrades to the monitor pit since the Pop Mart tour. Twin Paragon monitor consoles are manned by

Monitor engineer Dave Skaff, left, and Don Garber at the Twin Paragon consoles

returning U2 veterans Don Garber and Dave Skaff. Due to their mixing blind beneath the left wing of the stage, each meter bridge supports four video monitors, which are fed a split from the onstage video screens. The Paragons eliminate the need for outboard dynamics processing due to the availability of gating and compression on every input. On this tour, they've swapped chores, with Skaff mixing for Larry Mullen and Adam Clayton, while Garber mixes ears for Bono and The Edge.

Typical for many bass players, Clayton favors wedge-based monitoring, spending much of the night standing "in the pocket" in front of his rig at the corner of the drum riser, where a single Clair Bros. 12-AM wedge sweetens his world. At the front of the stage, there's also a pair of Clair Bros. double-12s for him. The rest of the stage is sparsely populated with monitors: A pair of 12-AMs for Bono, a pair of the newer

Series II wedges in front of The Edge, and behind Mullen a pair of Clair Bros.' ML18 single-18 subs add a little "thump" to his hard-wired ear mix. At each end of the backline, a Clair Bros. P-4 is laid on its side, on top of ML18 subs and angled in as sidefill speakers; these arrays are kept in this upstage position to clean up sight lines. At the front of each wing is another double-12, and at each end of the upstage apron a pair of subs and a wedge fill in the back corners. Though the other three musicians are using in-ear monitors, the wedges and fills are provided to cover the stage should someone pop out their in-ears, or in the off-chance that Clayton leaves his pocket.

All of the IEM rigs include the latest dynamic ear-pieces by Future Sonics—a product that Skaff reports has more output and better low end. The two wireless systems are Sennheiser 3056s, and all the mixes employ Aphex Dominators, with a TC

Finalizer on Mullen's mix.

Supplementing the Paragons, an 02R and a Mackie 1604 were used as sidecar mixers for the extensive talkback inputs, as well as the audience mics. A Sennheiser 416 is used at each side of the downstage edge of the wings, and a Shure VP88 is used at the FOH mix position to catch the rear of the arena.

THERE'S NO SUBSTITUTE FOR MOVING AIR
Most of the microphone selection

Clair Bros. i-4 line array

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Powerflex ™
Six-Channel Power Amplifier

consists of fairly traditional choices. Two of The Edge's well-worn Vox AC-30 amps are miked with Shure SM56s, as is another in an isolation roadcase, dubbed "Vox-in-a-box." Only one direct line was taken from his Line 6 Pod, which was used extensively for effects on the new album's songs. Behind him stood a "rack of the rich and famous," which held a dizzying array of processing, including several TC Electronic 2290 delays. Bono's Line 6 Flextone guitar amp was miked with an SM57, as is another Flextone used on the stage-right wing.

Mullen's kick drum is double-miked with an SM98 and a Beta 52; the snare has a beyerdynamic M 88 on top and a Beta 56 below. Sennheiser MD-421s were employed on the single rack and both floor toms. Audio-Technica 4050s were used as overheads, while AKG 460s were on the hi-hats and beneath the bell of the ride cymbal. A pair of SM57s were Y'ed for the two mounted tambourines, and an SM98 was used for the piccolo snare Mullen plays "Where the Streets Have No Name".

Niall Slevin, whom I recognized from *Mix*'s AC/DC "All Access" (February, 2001), showed me the latest innovation in mic stand hardware. The position of each mic stand was established after the first few shows. With the round base removed, the rest of the Atlas stand screws into adapters that slip into holes drilled in the deck, firmly locking into fittings mounted beneath. Thus, they are almost impossible to knock over. Vocal mics were mostly Shure Beta 58 capsules, with The Edge's being hard-wired and Bono using a handheld Shure UHF system. On the track "New York, New York," he trades his handheld for a headset mic with its transmitter mounted on a hat, allowing him do some the-atrical performing on the ramps.

By the time you leave the show, you realize that one of the last great rock bands of our time has raised the bar once again, perhaps not for the last time. Bono's signature vocal cuts through the complex, full-on, rock 'n' roll mix, leaving the audience with a sense of the spectacle that dominated rock shows of decades past.

The show loads out into 14 semis in just under two hours, with the local crew broken down into teams and organized into groups by colored T-shirts. The U2 crew confirms my impression that, as arenas go, the Rose Garden has above-average catering, acoustics and loading docks. My lasting backstage image is of Dave Skaff trying to sort through the half-dozen identical silver Prevost crew buses to find his home.

Mark Frink is Mix's *sound reinforcement editor.*

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ALL ACCESS

PHOTOS AND TEXT
BY STEVE JENNINGS

Veteran FOH engineer Robert Scovill (Tom Petty & the Heartbreakers, Rush, Def Leppard) initially had vocalist Rob Thomas using a wired Neumann KMS150 with a Manley Vox Box mic pre, but recently moved him to a wireless mic. "It took awhile to find one that suited him," says Scovill. "Rob's got a kind of 'ghostly' characteristic in his midrange and a very pronounced sibilance, just what you don't want when using an RF mic on a vocalist, because the mic usually has both of those characteristics as well. But since we went over to the Sennheiser EW-565, we've been really happy with it."

MATCHBOX

"I use 11 guitars during the show, almost a different one for every song," says Aidan Mullen, guitar tech for Adam Gaynor. "I do all of his preset switching during the set. An interesting feature about the guitar rigs are the Yamaha [O1V] mixers on the top of each of the rigs that are MIDi'd from the Bradshaw switching systems. Every sound during the set, for either guitar player, has its own completely programmable scene on the mixer." (Greg "Crash" Hearn, guitar tech for Kyle Cook and Rob Thomas, is not pictured.)

Monitor engineer Phil "Sidefill" Wilkey, who has worked with Def Leppard for 18 of his 28 years on the road, is mixing on a Midas XL3. "I'm using a total of 62 inputs on the Midas and 18 outputs," he explains. "Everyone is on in-ears except the horn players, who only do a couple of numbers." IEMs are Shure PSM700 models.

Bass tech Doug Reesh, pictured with Brian Yale's basses.

FOH engineer Robert Scovill is mixing on a Midas XL4 outfitted with 16 stereo modules. Scovill is also bringing eight channels of external mic pre's into the console on line-level inputs, for a total of 72 inputs. "My goal was to not have to bring two FOH consoles, like I have in the past," comments Scovill, who is using a Yamaha O1V for supplementary routing and recording purposes.

Robert Scovill

TWENTY

Matchbox Twenty has been on a very long tour. Starting with a club promotional tour in April of last year, the band is now playing in sold-out arenas across the country and will continue touring through the summer. *Mix* caught the show at the San Jose Arena (San Jose, Calif.) at the end of March.

matchbox
T W E N T Y

ALL ACCESS

Scovill's equipment rack at FOH includes TC Electronic M3000s, Yamaha SPX990s and several 1176s. "I'm using some of the Purple Audio 1176s, which are a re-issue of the black face UREI 1176LNs," notes Scovill. Other dynamics control devices include a Manley Opta compressor, HHB Radius Fat Man compressors, and Drawmer gates and compressors. Scovill records every show on CD-R, using Lucid A/D converters and Neumann U87s as room ambience mics.

New Sound Reinforcement Products

MEYER SHIPS M3D

Meyer Sound Labs (www.meyersound.com) is now shipping M3D, a line array system based on a 2-way, self-powered, 20x54x30.5-inch (HxWxD) enclosure. The cabinet face has two 15-inch woofers flanking a CQ horn (fed by two 4-inch diaphragm, 1.5-inch throat compression drivers), with a second pair of rear-firing 15s adding to the LF punch. The onboard amps provide a total of 4,500 watts (1,125 watts RMS/channel) with class AB/H complementary power MOSFET output stages for a maximum peak SPL of 145 dB, and the electronics offer an automatic voltage selection that functions at any voltage from 95 to 125 and 208 to 235 VAC. Specs include a free-field frequency response of 42 Hz to 16 kHz, ±4 dB, with an operating frequency range of 35 Hz to 18 kHz. The 390-pound cabinet is built of multi-ply Finnish birch, with a protective steel grille and QuickFly™ rigging frame with integral CamLinks™, rear connecting bars and captive quick-release pins.

Circle 315 on Product Info Card

A-T UHF WIRELESS

Engineered Sound UHF Wireless Systems from Audio-Technica (www.audio-technica.com) provide high performance, flexibility and simple operation. Two receivers and two transmitters offer true diversity operation, with 100 switch-selectable frequencies in the UHF TV Channel 57-59 bands (728-741 MHz). Transmitters include the ESW-T211 UHF UniPak™ body pack ($450) and the ESW-T214 UHF handheld mic/transmitter ($500). New receivers are the ESW-R220 dual-receiver ($1,450), with two independent receivers, and the rack-mountable ESW-R210 ($875). Up to 12 channels can be used simultaneously in multichannel applications, and receivers include antenna combiner/divider distro systems and XLR balanced and ¼-inch unbalanced audio outputs.

Circle 314 on Product Info Card

TANNOY POWERDUAL™ IQ10

Tannoy (www.tannoy.com) has announced the PowerDual™ iQ10, a dual-concentric mid-/high-drive unit with a 60°x40° dispersion pattern. Developed in conjunction with Funktion-One's Tony Andrews—a leading UK designer—the PowerDual iQ10 is suitable for live and fixed installation applications, where intelligibility of speech and music are of prime importance. Crossover functions and EQ are provided by the Tannoy TDX2 controller, which also provides crossover and EQ functions for other Tannoy speaker combinations, available via presets; the TDX2 can be updated via a PC and its RS-232 interface.

Circle 316 on Product Info Card

SHURE WL50 LAVALIER

Shure (www.shure.com) debuts new subminiature lavalier mics. The WL50 omni condenser has a 20-20k Hz frequency response and is supplied with mesh caps that provide two EQ curves: a mild 4dB boost from 8-18 kHz or +10 dB centered at 12 kHz. The WL50 is available in white, black and beige (the latter two available in a reduced-sensitivity version) and is supplied with a magnet mount, a swiveling lapel clip, dual-tie clip and pin mount. The provided TA4F cable connector is compatible with all Shure wireless transmitters; WL50s may also be ordered with unterminated cables. Price range: $286 to $340.

Circle 317 on Product Info Card

FUTURE SONICS EAR MONITORS UPGRADES

Future Sonics (www.earmonitors.com) has upgraded its Ear Monitors® brand of "in-ear-type" custom earphones with new drivers. The new, full-range MG4™ driver (designed for use with custom ear molds) is engineered for increased output, improved dynamics and outstanding sound quality. The MG4 driver is now standard in new Ear Monitors brand custom earphones and may be used to replace existing drivers. Ear Monitors can also be used to upgrade any existing in-ear monitoring system that uses a standard ⅛-inch stereo plug connection. Price: $798.

Circle 318 on Product Info Card

IMPEDANCE 101: PART TWO
PUMPING UP THE VOLUME ON VECTORS

Research for this two-part series reinforced the value of experience. My math skills might have been better in college, but impedance is one of those multidimensional "concepts" that I organically understand and better appreciate *now* vs. *then*. Using carefully chosen analogies along with three interface examples, I hope to demonstrate the common, everyday effects of impedance.

The term "interface" is equally important, because it implies the interconnection of two devices—a source and a destination—each having defined impedance. Like

Understanding what's good, bad and potentially ugly will help to maximize performance and minimize destruction to your wallet and your sound.

EXAMPLE 1: HAUT-PARLEUR
A loudspeaker is like a drumhead, tuned real low by a soft edge-suspension material made of rubber, foam or paper. The part you can't see is a coil of wire centered in a strongly focused magnetic field. Talk about complex impedance, here you have a mechanical resonator mounted to a resonant chamber (a cabinet) coupled with the voice coil, the inductor known

ance will be a different number. As you can see in Fig. 1, both impedance (the blue arrow) and phase (the red arrow) meander across the frequency spectrum for a *passive*, two-way monitor system. Note that the combined woofer and cabinet resonance raises the impedance to a whopping 25 ohms at about 45 Hz!

TESTS FOR RESONANCE AND DAMPING
To test for woofer resonance, simply insert a 100-ohm resistor in series—between it and the amp—and slowly sweep a sine wave oscillator from lowest frequency
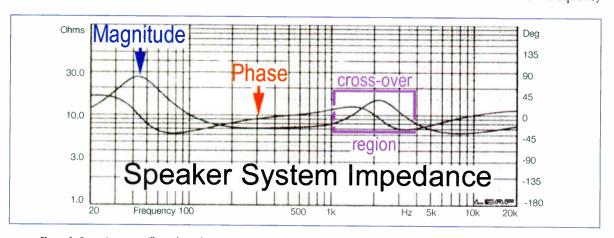
Figure 1: Sweeping an oscillator through a two-way speaker system generates these very typical impedance and phase variations.

the time before the well-tempered clavier—when transposing a song from one key to another was *not* an option—there are interface combinations that beg for a "professional tuner."

As you may recall from the last installment, I pointed out that wire is not a perfect conductor—it has resistance—and two wires translate into a complex assortment of series resistance and inductance, combined with parallel capacitance. The long and short of interfacing is simply this: Well-designed equipment can tolerate wiring variations, while other gear live and die by cable performance.

as "L" in electrical circles. A loudspeaker is technically a "motor," but it can also be used to generate electricity just as a dynamic microphone does. As an electromechanical device, it is the perfect example for making impedance tangible.

Loudspeakers come in various sizes and shapes for their respective purposes. The *published* AC impedance will typically be 4, 8 or 16 ohms, often referred to as "nominal," because the *magnitude* changes with frequency and is therefore averaged. The *DC resist-*

to the midband. You won't need any other test equipment other than ears and eyes to find the resonant "bump."

The next impedance demonstration also requires a speaker and an amp, but *sans* resistor. Assuming the power amp is connected and turned on, tap on the woofer and listen closely to the resonance. Now, disconnect one of the amp wires (or turn the amp off) while tapping and notice the difference. (Allow enough time for the amp to be fully "off.") The transition from a tight, well-damped "tap" on paper to a less-restricted tonal "thud" should be obvious.

BY EDDIE CILETTI

Valve mics?
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NTK

The point at which sound becomes music, is where your art, your dreams and your emotions have become a reality. NTK – when professional performance counts.

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MICROPHONES

The woofer has a natural free-air resonance that changes once installed into a cabinet, either ported (bass reflex) or relatively airtight (air suspension). The speaker's *nominal* electro-mechanical impedance is at least a factor of 10 higher than that of the amplifier's *source* impedance. The ratio of the two is called the Damping Factor (DF), which is responsible for keeping the bump in Fig. 1 under control, unless the cable resistance becomes a contributing factor.

Note: While a power amp's output stage is relatively simple, it can be further reduced to a single component for the purpose of defining its impedance—how the outside world sees it—the result of this reduction process, known as the Thevenin Equivalent, is

cabling between it and the power amp, hence the concept of self-powered monitors (or the use of "monstrously" thick cable).

A car outfitted with a spring-only suspension system would bounce all over the road, a spring being a high-impedance device compared to a shock absorber. The amplifier's extremely low-source impedance appears as a "short circuit" to the woofer's natural mechanical resonance. You could describe both the shock and the amp as "low impedance devices that provide damping and stabilization to what would otherwise be a bouncy ride."

Note: The need for damping is the reason a 600-ohm terminating resistor should be connected to the output of transformer-based gear, such as the venerable UREI LA-3 limiter, when
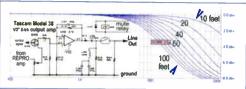
Figure 2: Cable capacitance can load down vulnerable output amplifier designs.

ing on polarity, staying there until the power is removed. Oversimplified, phase is the minute delay of the cone as it attempts to travel to its destination. Once there, the speaker has a strong desire to return from such an exaggerated excursion, acting as a generator when it does. This example should also help to visualize what simple expressions such as "E-L-I the I-C-E Man" did for engineering students. Don't laugh! Type "ELI the ICE Man"
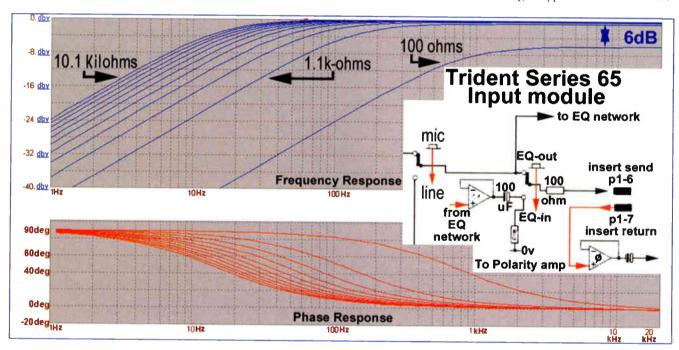
Figure 3: An exaggerated example of how excessive loading can reduce low frequencies.

typically below 1 ohm. Do not confuse this with the recommended "load" or destination impedance found on the back panel of most amplifiers.

MORE SHOCK TREATMENTS
Tapping the woofer with a finger is just the reverse of it reproducing a kick drum; both are impulses that stimulate the woofer and cabinet resonance. Accuracy of reproduction is not always what sounds best to the ear; an under-damped loudspeaker will be the dreaded sonic descriptor, "warmer." The best way to tame the speaker's self-expression is by minimizing the

interfaced with modern gear. A transformer consists of two coils of wire, the electronic equivalent of excitable springs.

NON-PLUSSED
That impedance varies with frequency should be more tangible now, what about phase? The magenta square in Fig. 1 shows how a crossover network—consisting of inductors, capacitors and resistors—affects both impedance and phase response, but to make it more tangible...

Connect a battery to a woofer and watch how it moves in or out depend-

into a search engine, and you'll be surprised as I was. The best link, http://ewhdbks.mugu.navy.mil/elecform.htm, yielded a fabulous collection of electronic formulae, rules of thumb and mnemonics.

E-L-I reminds us that Voltage-*Leads*-Current by 90° (the Phase angle) in an inductor, a coil of wire designated as "L," "E" stands for voltage and "I" for current. I-C-E reminds us that the reverse is true for capacitors, where Current-*Leads*-Voltage by 90°, where "C" stands for capacitor. E-L-I the I-C-E is deep, *man*, but memorable for the purpose of "concept retention."

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GROUND TO LIGHT

Analog audio—in both the mechanical and electronic domains—is slow and easy to understand. The sound of connecting a battery or an amplified kick drum to a loudspeaker emphasizes the keywords *impulse, reaction/response time* and *resonance*—all of which can happen at any or all frequencies, from radio and video all the way to light. Impedance is an equal-opportunity vector, equally popular in the data communications realm. Surely, you've encountered an SCSI terminator?

Walk into Radio Shack for antenna wire, and a knowledgeable salesperson should ask, "300-ohm or 75-ohm?" In this case, the assumed frequency spectrum includes FM radio and broadcast television (88 MHz and beyond). Digital audio's S/PDIF interface is equivalent in bandwidth and impedance to line-level analog video (6 MHz and 75 ohms, respectively).

To further study the effects of impedance requires math. Plotting a graph of impedance and phase requires several formulae plus multiple calculations at as many frequencies as possible (enough to represent the audible spectrum, for example). Fortunately, I found the perfect application ("Micro-Cap" from www.spectrum-soft.com), which was available as a demo as a free download. I'd still be ciphering if it weren't for this handy bit of technology, so I'll spare you the math entirely this time around.

EXAMPLE 2: MAGIC CABLE

One day, long ago, I walked into a control room to align a Tascam Model 38 analog 8-track. While playing the high-frequency section of the alignment tape, I noticed that the machine's VU meters did not agree with the voltmeter connected at the patchbay. Eventually, I determined that the cable capacitance was loading down the machine at high frequencies.

Figure 2 shows the effect of cable capacitance on the frequency response of vulnerable equipment. The "inset," a schematic of the 38's output circuit, includes a very guilty 1-kilohm resistor (R117) following the op amp. The pur-

pose of this resistor is to protect the output amplifier from accidental short circuits, as well as to provide a "bias trap," a filter network designed to stop high-frequency bias leakage that could potentially damage tweeters. (Bias is well beyond hearing range, but a little leakage could potentially become a stealth tweeter eater.)

I didn't carry a capacitance meter on service calls, but this particular customer chose the cheapest possible cable solution, sending me on a minor detour. Back in the lab, several cable tests yielded a typical range of 50 picoFarads per foot (pF/ft) to a low of 20 pF/ft, this being for foil-shielded audio cable and wire-shielded computer video cable, respectively. These are acceptable values.

FEED THE KITTY

I fed the Tascam 38 output circuit values into Micro-Cap, the essence of which is a simple RC (resistor-capacitor) circuit consisting of R117, a 1-kilohm resistor feeding the interconnecting cable as represented by a capacitor to ground (not shown). The starting value of capacitance was based on 100

Load Resistor	Frequency @ -3 dB
100 ohm (see note)	800 Hz
1.1 kilohm	160 Hz
2.1 kilohm	80.5 Hz
3.1 kilohm	52.5 Hz
4.1 kilohm	40.0 Hz
5.1 kilohm	31.5 Hz
6.1 kilohm	26.5 Hz
7.1 kilohm	22.5 Hz
8.1 kilohm	19.5 Hz
9.1 kilohm	17.5 Hz
10.1 kilohm	15.5 Hz

Table 1: Various load resistors interact with the series output capacitor to affect the low-frequency roll-off as shown in Figure 3. At -3 dB, the signal level is reduced to half of the power before the roll-off began.

pF/ft for 10 feet of cable, incremented in 10-foot steps ending at 100 feet of cable. The resulting capacitance ranged from 1,000 pF to 10,000 pF (or 0.01µF), respectively. (The actual circuit includes L102 and a pair of 470pF caps to "trap" the bias signal.)

A simple RC circuit is a first-order lowpass filter (at audio frequencies) with a slope of 6 dB per octave. (A second-order filter has a slope of 12 dB/octave.) An abnormally high capacitance was chosen to simulate what happens when bad cable alone is interfaced with a vulnerable piece of equipment. Note the "box" indicating 10 kHz being 2.5 dB down, the approximate amount noticed during the house call.

I am not suggesting esoteric audiophile cable, only that the results from the "lab test" should serve as your guide when cable shopping; contact the cable manufacturer for such minutiae as cable capacitance. Also, most modern equipment is not sensitive to cable loading, as was the old Model 38. The solution would have been to add one more op amp per channel to isolate the bias trap from the outside world. Collect schematics for your gear and compare output amplifier circuits with your friends. Who knows, it could be like Pokémon for adult geeks.

EXAMPLE 3:
EATING CONSUMERS FOR LUNCH

When I started in this business, interfacing hi-fi to pro was a deadly combination. *Then*, consumer equipment was "hi-Z," slang for high impedance, while console input and output impedance was lo-Z, 600 ohms. *Now*, the interface impedance between consumer and pro gear is more compatible. Operating levels are the primary difference, consumer gear being standardized at -10 dBv, while pro operates 11.78 dB higher at +4 dBm (for vintage 600-ohm gear) or +4 dBu (for modern gear). *Then*, the impedance mismatch dropped the level further and created a highpass (bass roll-off) filter in the process.

Note: The "V" and the "M" designated two references, 1-volt RMS and 1 milliWatt (mW), respectively.

Figure 3 depicts the insert points from a Trident Series 65 console. The "source" could be either the mic preamp or line input amp, pre- or post-equalizer, all determined by switches. In each case, the output op amp feeds

a 100-micro-Farad (µF) capacitor and a 100-ohm resistor, much better choices for the application. (The Tascam circuit example was focused on R117 being too large to tolerate excessive cable capacitance. Note that the series capacitor in that circuit, C106, is 2.2µF.)

Micro-Cap's simulation successfully shows what happens in a worst case scenario, the effect of excessive resistive loading of the 100µF output capacitor, creating a highpass (bass roll-off) filter. The very same filtering effect might occur if the output capacitor deteriorated, a very common ailment that plagues older equipment and discussed in last year's column on "Upgrades and Maintenance Issues."

The "load" ranged from an unlikely 100 ohms to the more typical 10.1 kilohms. Ignoring the 100-ohm load results for a moment, the Table details the frequencies that fall at the "-3dB" (half-power) point for each of the other load values.

Note: The internal 100-ohm resistor combined with the external 100-ohm load creates a 50% voltage divider, dropping the level 6 dB as indicated by the double arrow in Fig. 3.

FINALE

In Fig. 3, the lower graph depicts the simultaneous phase changes as the frequency is swept. Phase is one of the less tangible effects of filtering and equalization. Modern digital filters can be made *sans* phase shift. I have not had the opportunity to make a side-by-side comparison.

Though it has not been stated directly until now, you should walk away from this article knowing that a low-*source* impedance and a high-*destination* impedance are normal for transformerless gear. Even transformerless mic preamps have a 5-kilohm to 10-kilohm input impedance, some are variable. (Microphone impedance is typically 200 ohms.) Meanwhile, when interfacing transformer-based vintage (or retro) gear with modern technology, remember that the output transformer should be terminated, preferably at the destination. Speaking of which, at 2,500 words, I am outta here! ∎

New Software/Hardware for Audio Production
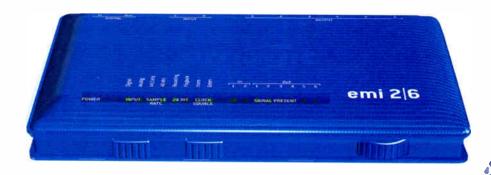
MINNETONKA DTS ENCODER

Minnetonka Audio Software (www.minnetonkaaudio .com) is now shipping SurCode DVD Professional, a DTS Surround Sound encoder for DVD-Video discs. SurCode accepts surround recordings from any source as .WAV or .AIFF sound files, and outputs encoded files that can be used with DVD-Video authoring software. The software is licensed and certified by DTS. SurCode runs on Windows 95, 98, 2000 and NT systems; list price is $1,995.

Circle 337 on Product Info Card

PROPELLERHEADS REWIRE 2.0

Propellerheads Software (www.propellerheads.se) introduces ReWire 2.0, a cross-platform software that transfers MIDI and audio between applications. Version 2.0 integrates MIDI, audio and transport control invisibly by connecting ReWire 2.0-compatible

applications. ReWire can also interrogate parameters in ReWire 2.0 instruments and replace controller numbers with parameter names in the application MIDI editors. Applications are synchronized, and ReWire 2.0 is backward-compatible.

Circle 338 on Product Info Card

STEINBERG VOICE MACHINE

Steinberg's (www.steinberg .net) Voice Machine is a pitch processor that can process files in real time or create new ones; the software offers two effect tools for VST: The VM Generator cre-

ates up to four additional voices by triggering them via MIDI Note On/Off events, so vocal arrangements can be played along with the lead vocal with the keyboard in real time or by drawing MIDI note events in any VST sequencer. The VM Processor changes the pitch of a voice without changing the original character, allowing the user to correct intonation or change the melody. In addition, Steinberg's VST 2.0 enables parameter control via MIDI controller events. Independent pitch shift and character profile controls can be used independently—for natural pitch shifting—or used interactively to create effects, such as simulating other singing voices or imprinting the character of a male voice onto a female voice track. Other features include portamento and tune correction (VD Processor) and LFO for vibrato

simulation. Retail: $149.

Circle 339 on Product Info Card

EMAGIC EMI 2|6

Emagic (www.emagic.de) debuts the EMI 2|6, a multichannel audio interface for USB offering six playback and two recording channels at 24-bit resolution. The compact (1.5x7.5x4.5-inch) EMI 2|6 features proprietary technology for transferring multichannel audio via USB without data reduction. According to Emagic, this lack of perceivable latency allows software instruments (such as Emagic's ES1, EVP88 and EXS24 and VST 2.0-compatible instruments) to be played in real time. Additional EMI 2|6 features include S/PDIF I/O, support for 44.1- and 48k sampling rates and a built-in headphone amp. Status LEDs indicate bit quantization, digital/analog input processing, external/internal sync, sample rate and I/O signal presence. The EMI 2|6 includes EASI and ASIO drivers for MacOS 9.0.4 and up, as well as EASI, ASIO, MME and DirectSound-compatible drivers for Windows Millennium.

Circle 340 on Product Info Card

AARDVARK DIRECTPRO Q10

Aardvark (www.aardvarkpro.com) announces its DirectPro Q10 audio interface, a one-rackspace unit featuring eight discrete mic preamps and two hi-Z inputs, plus headphone and monitor outs and four inserts. I/Os include eight XLR mic and eight ¼-inch line ins, plus S/PDIF I/O and MIDI and WordClock In/Out. Converters are 24-bit, and 32/44.1/48k sampling rates are all supported. The Q10 is $999, including Cakewalk Pro Audio 9 software and a PCI audio interface. AES/EBU I/O is optional.

Circle 341 on Product Info Card

ZEEP LOCALIZERDSP

LocalizerDSP from Zeep Software (www.zeep.com) is a multichannel panner for VST/MAS that simulates the acoustic phenomena of sound moving in a specific environment. The software supports 5.1, 7.1, LCRS and stereo configurations, with cross-mixing capability and a "behavior control system" for defining complex movement paths and relationships. Other features include the zVerb surround space simulator that calculates multiple discrete reflections for each speaker relative to the source position, bass management functions and parameter automation.

Circle 342 on Product Info Card

NI BATTERY AND SPEKTRAL DELAY

New applications from Native Instruments (www.native-instruments.de) include the Battery drum sampler and Spektral Delay. Spektral Delay performs real-time Fourier analysis, splitting each stereo channel into up to 160 modifiable frequency bands (up to 1,024 bands internally), with adjustable level, delay time and feedback of each band and the ability to add modulation effects. All parameters can be freely drawn or modulated with the integrated LFO, MIDI or host-based automation, and real-time sonograms display the spectrum of the audio signal at both

input and output for visual reference. The Battery software drum sampler offers sound parameters for 54 instruments, each with 128 velocity layers, tuning, volume and pitch envelopes, bit reduction, shaper and FX Loop. More than 20 sound sets are included, and Battery can read Akai S1000, SF2, Reaktor Map, LM4, .AIFF and .WAV format samples. Internal resolution is 32-bit. Samples can be played and modulated via MIDI with complete VST automation. Other features include four modulators, a waveform display and a matrix editor for selecting samples across rows, columns or independently.

Circle 343 on Product Info Card

UPGRADES AND UPDATES

The Roland RPC-VM31 Studio Pack digital recording and mixing system for Mac or PC integrates Midiman's RPC-1 R-BUS/PCI Interface Card. Using the RPC-1 card, Studio Pack owners can exchange eight channels of 24-bit audio from the Roland VM-3100 Pro V-Mixing Station to a custom version of Emagic Logic Audio software. Visit www.rolandus.com or www.midiman.com...The

SEK'D MQA Module converts between ADAT and S/PDIF or AES/EBU, and lets you "detangle" or merge the eight channels; The SEK'D MQT offers the same functionality for TDIF. Get details at www.sekd.com...Universal Audio's (www.uaudio.com) Powered Plug-Ins bundle, a family of plug-ins "powered" by the UAD-1 PCI card, includes RealVerb Pro, 1176N Vintage Compressor, LA-2A Vintage Compressor, EQ-1 5-band Parametric Equalizer, CX-1 Compressor, MD-1 Modulation Delay, RS-1 Room Simulator and the UAD-1 DSP Card, all for $995...The SoundDiver 3.03

MIDI editor librarian from Emagic (www.emagic.de) offers new editors, new OEM versions and is now available in French. In other Emagic news, the company has become a licensee for the POW-r Consortium... Xytech's (www.xytechsystems.com) Enterprise Version 4.0 media asset management software offers faster processing, an improved MetaVault Library Manager, a new Job Management module and more...Steinberg released a new series of RADS (Rythmic Architectural Drum Loops) Pocket Fuel Audio Content CDs: Multitrack Drum Loops,

Acoustic HipHop Drum Loops and Techno Rhythms and Loops. Visit www.steinberg.net for more information...NewTech Infosystems Inc. introduced NTI DriveBackup!, which provides backup and recovery using CD-R/RW. Visit www.ntibackupnow.com...Tascam is bundling BIAS Deck LE with its US-428 USB interface controller. For more information, check out www.tascam.com or www.bias-inc.com...Cool Breeze Systems (www.coolbreezesys.com) announces Cool School Interactus Logic Audio 4 and Pro Tools 5 tutorials.■

PREVIEW

TRIDENT SERIES 80-5.1 CONSOLE

The latest console from Trident Audio (www.trident audio.co.uk), the Series 80-5.1, is available in frame sizes from 24- to 72-channel and includes full 5.1 mix and playback facilities. Based on the famous Series 80, the Series 80-5.1 features John Oram-designed EQ and includes a stereo EQ and limiter/compressor for mastering direct from the two-mix bus. Options include a session controller and computer screen built into the console surface; the iZ RADAR™ system may also be integrated. Prices range from £27,000 to £65,000.

Circle 327 on Product Info Card

rackmount unit is available in 16, 24 and 32-input versions, with removable drives offering from 80-120 GB of storage. Fully equipped, the unit is capable of up to 3.9 hours of continuous 32-track recording at 24-bit/96kHz. The integrated studio-quality 36/8 digital mixer provides 3-band EQ and comprehensive dynamic control on all channels and is MIDI-automatable. Features include nondestructive editing and archiving capability to PC-compatible media The unit will chase to SMPTE and includes Varispeed functions. Prices start at $4,000.

Circle 328 on Product Info Card

ranging from 16 motorized faders to 96, the D4 is capable of providing as many as 320 full-audio channels and 124 buses. Soundtracs' NETRACS allows multiple consoles to be linked, and MADI-TRACS provides for audio networking and system security. Featuring an ergonomically enhanced touchscreen worksurface, the D4 can provide simultaneous stereo, LCRS, 5.1 and 7.1 outputs with divergence. Tri-color, 106-segment LED Metering offers selectable ballistic characteristics.

Circle 329 on Product Info Card

NEUMANN M150 TUBE MIC

Neumann (www.neumann .com) is now shipping its M150 tube condenser microphone. Modeled on the vintage M50, the M150 shares its classic predecessor's unique omni-directional characteristic but features lower self-noise (15 dBA), a light-weight titanium membrane and capsule for good transient response and a transformerless tube amplifier based on the award-winning M149 tube mic. The 12mm titanium diaphragm delivers a smooth, extended frequency response, and the traditional capsule (a 40mm sphere) reproduces the M50's pickup pattern—circular at low frequencies and increasingly narrow up

the spectrum. Specs include 119 dB of dynamic range and 134dB maximum SPL. The M150 is supplied with an elastic suspension bracket, power supply, mic cable and aluminum carrying case. Stereo pairs bearing consecutive serial numbers are also available.

Circle 330 on Product Info Card

NEW EUPHONIX SOFTWARE

Euphonix (www.euphonix .com) has released E-deck and Listen-In software applications. E-deck allows mix files to be recorded, encoded and uploaded to a secure server on the Internet. Anyone with the appropriate password can download and play the mix files, including 5.1 DVD-A mixes at full 24-bit/96kHz resolution. Final mixes also can be moved directly to a record label for archiving and manufacturing. The Windows 98/2000-compatible application accommodates a range of connection speeds, including compressed files suitable for transmission over dial-up or DSL lines, or uncompressed files for distribution over T1 or T3 lines. (Lower connection speeds

BERTSCH 32-TRACK DISK RECORDER

Bertsch Electronics (www. bertschelectronics.com) offers the DPR₃₂ 32-track hard disk recorder with built-in digital mixer. The

SOUNDTRACS D4 DIGITAL CONSOLE

Soundtracs (www.soundtracs .co.uk) has announced its new D4 digital console, capable of 48- and 96kHz operation. Available in sizes

PREVIEW

are managed by Windows Media Audio compression.) E-deck also controls the Listen-In function, which allows remote monitoring of a live studio session in progress through password-protected software. E-deck/Listen-In will play all popular audio file formats, including Windows Media Audio, MP3, .WAV and .AIFF.

Circle 331 on Product Info Card

YORKVILLE POWERED STUDIO MONITOR

Yorkville Sound (www. yorkville.com) now offers a self-powered version of its YSM-1 studio monitor. The YSM-1P powered studio monitor uses the same cabinet, 6.5-inch, dual-shielded, 100-watt woofer and 1-inch silk-dome tweeter as the YSM-1, but also incorporates a bi-amped power module that delivers 70 watts to the woofer and 30 watts to the tweeter, with less than 0.05% distortion

at full power. Overall frequency response is 40-20k Hz, and DIP switches on the back allow the monitor to be tuned for use against a flat wall, in corners or centered in the room. The YSM-1P also features ±6dB input trim, a user-selectable high-frequency filter that provides +2dB boost between 10 and 20 kHz, a defeatable limiter and specialized transducer-protection limiting. Front status LEDs indicate power-on and input clip conditions. Inputs are XLR and ¼-inch TRS balanced. Price: $320 each.

Circle 332 on Product Info Card

DENON PRO MINIDISC RECORDER

The DMD-1000P from Denon Electronics (www. del.denon.com) features an enhanced, dual-bit, Delta-Sigma, 20-bit, A/D converter with 64x over-sampling. The rackmount unit offers sample rates of 32, 44.1 and 48 kHz. D/A conversion is via Denon's Advanced Super Linear Converter. Additional features include remote control, quick start and auto-recording level, multiple editing features and a Disc Recovery function that helps restore lost recording time on frequently edited discs. Inputs are mono/stereo-selectable and include S/PDIF (optical and co-ax) and analog

connections; outputs are S/PDIF optical or analog. Price: $599.

Circle 333 on Product Info Card

TL AUDIO FAT 2

TL Audio (www.tlaudio .co.uk) intros the FAT 2 Valve Front End, a combination of a mono version of the FAT 1 valve compressor and a high-quality, onboard, discrete tube mic preamp offering mic, instrument and line inputs. Compression threshold, ratio, attack, release and hard/soft knee controls are all adjustable in Manual mode, and the FAT 2 also offers 15 preset compression settings, including five vocal programs. Additional features

include phantom power, a 90Hz low-cut filter on the mic input and a large back-lit VU meter showing gain reduction or output level. The desktop FAT 2 (half-rack format, 3U) may be rackmounted with the optional FatRack kit.

Circle 334 on Product Info Card

SENNHEISER INTERVIEW MIC

Sennheiser has introduced the MD-46 handheld cardioid interview microphone, a product developed for and tested at the 2000 Sydney Olympics. Features include a traditional long handle, excellent wind attenuation, superior off-axis rejection, extended HF response and a rugged design. An Omni version is under development.

Circle 335 on Product Info Card

PREVIEW

OTARI FORMAT, SAMPLE RATE CONVERTER

Otari Corporation (www.otari.com) has launched the FS-96 format and sample rate converter. Designed to speed and simplify multitrack transfers between different digital audio platforms, the unit supports all of the common formats, including AES3 (AES/EBU), TDIF-1, ADAT (optical) and SDIF-2, with optional MADI and IEEE 1394 connections for future networking capability. The FS-96 converts up to 24 channels of 24-bit audio at sample rates of up to 96 kHz, and multiple units can be linked with sample-accurate synchronization for transfers requiring more than 24 channels. The FS-96 also converts sample rates from 32 to 96k Hz and bit rates from 16 to 24-bit, and vice versa. The FS-96 automatically detects the incoming format and sample rate, while making the output signal available to all supported formats. A built-in digital router makes track assignment easy and offers 10 preset routing maps. Simple arrow keys provide easy access to all functions. Price is $4,995.
Circle 336 on Product Info Card

HOT OFF THE SHELF

Universal Audio has re-created the original 1176SA, an adapter that calibrates two mono UA 1176 Limiting Amplifiers for stereo operation. The small (4.25x2.5x1.75-inch) device is compatible with both new and vintage models and includes a two-year battery. Price is $99. Surf to www.uaudio.com for more details... **Sennheiser's "The Handy Guide to Evolution Wireless Systems"** is a 32-page overview and application primer for Sennheiser's evolution wireless mic systems. Call 860/434-9190 or go to www.evolutionmics.com for a free copy...Transamerica AG now distributes the **Audio Engineering Associates R-44 studio ribbon microphone**, a hand-made "reissue" of the venerated RCA 44. Visit www.transaudiogroup.com or www.aea.com...The 2001 edition of the *Texas Music Industry Directory* lists 11,800 Texas music business contacts and also includes sections on music events, classical music and college courses. The guide is available for $20 from the Texas Music Office. Call 512/463-6666 or visit www.governor.state.tx.us/music...Hollywood Edge has released Lon Bender's Wacky World of Robots, Widgets and Gizmos, a collection of 450 of the Academy Award-winning sound designer's favorite noises. Call 800/292-3755 or visit www.hollywoodedge.com...Hafler has redesigned the TRM 8 and TRM 6 active reference monitors. The new TRM 8.1 and TRM 6.1 models, which are both magnetically shielded, two-way powered systems, sport vinyl clad enclosures for a more professional appearance. Hafler's TRM Series subwoofers have been similarly upgraded; new models are designated the TRM 10.1s and TRM 12.1s... **BGW is seeking AES standardization for its faastLink™** specification, a technology that provides performance monitoring capabilities via a DB15 (standard VGA) female connector, which also serves as a one-piece input connection. Call 310/973-8090 or visit www.bgw.com...Canford has redesigned its full color catalog and has implemented a new computer system to track demand and keep appropriate stock levels.

Neumann has produced 500 limited-edition TLM103 "Monolith" microphones. Finished in a "piano black" glossy lacquer, the mics have been given serial numbers 20001 through 20499 and will only be available through authorized U.S. dealers.

Among the 500 new lines added to "The Source" are the full ASC and EMO ranges, plus Canare's range of co-ax connectors and cables. Visit www.canford.co.uk...Shure Incorporated has purchased the Popper Stopper™ brand of studio pop filters from Middle Atlantic Products Inc., and will offer them as accessories for Shure's KSM studio mics. Retail price for the Shure Popper Stopper is $42. Call 847/866-2200 or visit www.shure.com. ■

TASCAM SX-1

INTEGRATED AUDIO PRODUCTION STATION

T wo weeks ago, at AES Amsterdam, Tascam unveiled the SX-1, a single-box unit designed for pro and project studios, broadcast and film/video post-production. Retailing at $8,999, the 24-bit SX-1 features a 40-channel digital mixer, 16-track disk-based recorder with waveform editing, DSP plug-ins, MIDI sequencing, extensive A/V sync capabilities and multiformat mastering.

There are other stand-alone, no-computer-required DAWs on the market, but according to Tascam's international product development manager, Mike McRoberts, the SX-1 is "an entirely different animal. It's the first affordable, all-in-one solution designed for the demands of pro-quality music and post-production."

The SX-1 offers recording, editing, sequencing, mixing and signal processing without cutting corners. Its 8-bus, 40-input mixer has 16 quality mic preamps with phantom power, long-throw 100mm touch-sensitive faders, dynamic automation with full recall of all console functions, 3-band automated EQ (with each band switchable for true parametric, shelving or high/lowpass filtering) and eight sends—two are dedicated for pre-fader cue functions, the other six for signal processing. Four effects sends route to the onboard DSP (the SX-1 ships with plug-ins from Tascam, TC Electronic and

Antares), and two route to outside devices, but all can be sent externally. if desired. The SX-1 offers comprehensive routing (just about anything can be sent anywhere) with storage of custom user setups, but also includes a number of standard routing presets for typical studio applications to get the user up and working quickly.

The control surface has a familiar look and includes illuminated switches above each fader for Mute/Solo/Automation functions, a weighted jog/shuttle/data wheel, recorder-style transport keys, alphanumeric data entry pad, a "center section" with dedicated keys for frequently used commands, full Studio/Control room/Monitoring/Talkback/Cue functions and a 4x5-inch backlit LCD that shows status and operational information, waveforms, EQ curves, etc. Eight softkeys and four rotary pots surrounding the LCD provide fast DSP, setup and edit control. An SVGA output for an external monitor offers large-scale viewing of tracks, waveforms, onscreen metering, automation, DSP, routing, transport and locator information. Tascam chose the reliable, multimedia-optimized BeOS operating system and a powerful graphics engine for fast "no-wait" redraws.

The internal 24-bit/48kHz recorder is based on Tascam's successful MX-2424 engine and stores 16 tracks to

BY GEORGE PETERSEN

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the internal IDE drive. The SX-1 includes eight additional tracks for mixdown to stereo and/or surround formats, and the unit can also author MP3 files. Two USB jacks, a rear panel SCSI port and front panel SCSI drive bay provide expansion possibilities, while a front panel CD-RW drive is included for printing surround or stereo mixes, data backup/archiving, and importing sounds from audio or data CDs. The onboard ADCs and DACs are all 96 kHz.

The onboard 128-track MIDI sequencer offers standard and step recording, destructive/nondestructive quantization, single-note editing, on-the-fly editing modes, accurate timing derived from the internal sample clock, and the jog/shuttle wheel can simultaneously scrub audio and MIDI data. The SX-1's 64 MIDI outputs can be mapped to console channel strips; the channel strip faders and knobs can then be assigned to output MIDI channel or custom, user-defined MIDI messages. Hardware includes two MIDI inputs (for MIDI controllers and MIDI Time Code) and four MIDI outputs. The sequencer, however, doesn't offer score editing.

Audio interfacing possibilities are extensive, including 16 balanced XLR mic/line inputs, 16 balanced ¼-inch TRS line inputs, TRS inserts on each analog input, eight channels of ADAT Lightpipe I/O and two stereo S/PDIF I/Os (with sample rate conversion). Three expansion slots (using the same card format as Tascam's DM-24 digital mixer) are provided and accommodate additional I/O in TDIF, ADAT, AES/ EBU or analog formats. But beyond simple I/Os, the SX-1's open-card structure means future cards (Tascam or third-party) could possibly include DSP for additional horsepower or effects.

Connections to the outside world are numerous. The SX-1 can cascade to Tascam's DM-24 digital console for more input channels and interfaces; sync support includes LTC SMPTE timecode chase, video sync and Sony P2 serial control; and a 100MB Ethernet jack allows fast transfers to networks and other workstations.

The SX-1 retails at $8,999 and is slated to ship this summer.

Tascam, 7733 Telegraph Road, Montebello, CA 90640; 323/726-0303; www.tascam.com. ■

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LEXICON 960L

MULTICHANNEL DIGITAL EFFECTS SYSTEM

Lexicon's 960L multichannel digital effects system is the long-awaited successor to the flagship of Lexicon's line, the now venerable 480L. The 960L features extensive surround capabilities, up to 96kHz sample rate, a fancy new remote head, digital I/O, and more processing power and growth potential in its thumbnail than an SUV crammed full of Lexicon's old 224s and EMT 250s. The unit also incorporates new algorithms result ing from the latest research of Lexicon chief scientist David Griesinger (inventor and longtime primary architect of Lexicon's reverbs) as implemented and extended by senior software engi neer Michael Carnes.

THE LAYOUT

The 960L ships with a single DSP card filling one of the mainframe chassis' four slots. Since the release of Version 2 software in January 2001, the 960L has been capable of hosting an optional second card, which doubles the available processing and allows cascading of machines between the cards. Software upgrades for the 960L are installed using the CD-ROM drive also found hiding behind the front panel. Accessible on the chassis' front panel (even when closed) are a Standby button and indicator, and a 3.5-inch floppy drive (remember them?) for offloading user presets.

The rear panel is somewhat more populated, being dominated by five module slots. Three slots are used for audio I/O (eight chan nels per card) and one for syn chronization and control There are three audio modules. balanced analog input (eight channels on XLR connectors), balanced analog output (eight channels also on XLR) and AES/EBU (eight chan nels). Each DSP card provides up to eight channels of processing, so the stock 960L supports eight channels of I/O at a time (any

combination of analog and digital), and the optional second DSP card supports another eight Version 2.20 software, which was in my review unit, supports up to 16 chan nels of I/O, but the only way to have 16 discrete channels is to install two AES cards. Fortunately, it is easy to split inputs and com bine outputs between machines.

The control module contains MIDI in, out and thru, wordclock in, out and thru; and two Remote connectors for LARC2 remote heads. Only one head is necessary to control the 960L, but two could be useful in large film mixes, espe cially when there are two cards in the mainframe and four or more machines running. The fifth slot is currently unused and could be employed for either an audio or control card in the future Finally, there is a mysterious, blank Option panel to the right of the slots, behind which lie even more expansion capabilities

The rear panel also holds the IEC power connector and, unfortunate ly, the power switch—not my ideal choice, but the front panel Standby mode helps. This is also Lexicon's first hint that the mainframe is intended to reside in a machine

room. The second hint would be the enclosed 50-foot cable that con nects the mainframe to the LARC2. (The mainframe supports cables up to 100 feet, but use of an external power supply plugged into the back of the LARC2 enables cables up to 1,000 feet to be driven.) The final clue is the rather noisy fan sit uated on the rear panel.

Back in the control room, at the other end of the long cable, is the LARC2 remote. The LARC2 houses eight touch-sensitive, motorized faders, a joystick, and buttons, but tons, buttons: 10-key pad, arrows, increment/decrement, seven mode buttons (Program, Register, Bank, Store, Edit, Control, Machine), Enter button, eight "soft" buttons (known as the "V-Page"), two mutes (Mute Machine and Mute All), two enables (joystick and Fine Adjust) and a big fat Compare but ton bearing the company's name.

Above the row of soft buttons lies the 2 25x6-inch color LCD and, above that, three LEDs per input to show signal present, -6dB below full-scale and overload The LARC2's rear panel sports a contrast knob for the LCD, aux port for a PS2 key board (used for naming and com menting presets), the host port for the control cable going to the mainframe, external power for

BY LARRY THE O
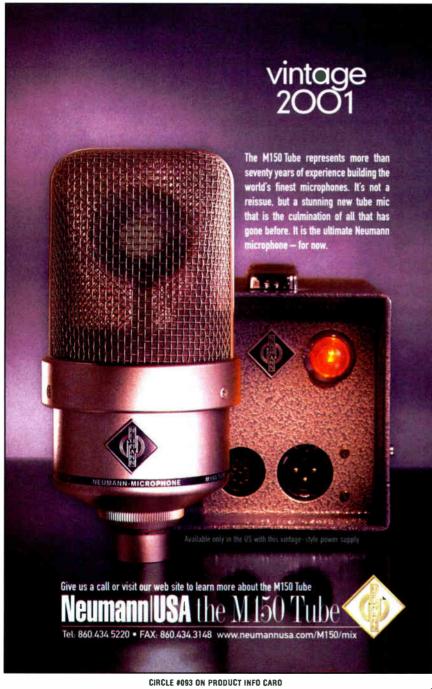
those extended runs, Reset button (resets the LARC2 only) and strain relief for the external power cable.

Roughly half of the display's screen area serves dedicated purposes, while the center area changes according to the operation being performed. The bottom of the display always shows the current functions of the soft buttons, with the parameter names and values for the faders immediately above. The top of the screen shows, on the left, the active mode or parameter and, on the right, the program running on the machine being edited. Color-coding is used extensively to differentiate and highlight.

On the upper right, just below the program name, is a status area with indicators for the system (sample rate, clock source, clock lock), machine (number of the currently selected machine, configuration in effect, global or program-determined mix, and I/O) and joystick. The joystick area features an X/Y field showing the joystick's positions; the joystick must be enabled to have any effect, so both the physical location and the last active position of the joystick are shown. To the left of this are two fields with labels and values for the two parameters assigned to the X and Y axes.

THE SOFTWARE

Because my review unit contained one DSP card, all of my comments will pertain to that configuration, except where noted otherwise.

The 960L can be run at sample rates of 44.1, 48, 88.2 or 96 kHz. As with other digital audio devices, running at the higher sample rates takes twice the processing power, halving the available resources.

As mentioned earlier, the unit operates as two or more machines, depending on which configuration is running. At 44.1 or 48 kHz, there are nine available configurations: four 2-in/2-out reverbs, one 5-in/5-out and one 2-in/5-out, two 2-in/5-out, two 4-in/4-out, Stereo Cascade 1 (four stereo reverbs with reverb 1 feeding reverb 2, while reverbs 3 and 4 remain simple 2-in/2-out), Stereo Cascade 2 (four stereo reverbs with 1 feeding 2, and 3 feeding 4), 5-in Cascade (a 5-in/5-out feeding another 5-in/5-out), a 4-in Cascade (like the 5-in Cascade but with four channel reverbs) and, finally, four 1-in/2-out reverbs. There is also an 8-in/8-out configuration for diagnostic use.

When running at 88.2 or 96 kHz, there are six configurations (plus the diagnostic one) available, essentially one-half of each of the other configs: two 2-in/2-out, one 5-in/5-out, one 2-in/5-out, one 4-in/4-out, a Stereo Cascade (a 2-in/2-out feeding another) and two 1-in/2-out reverbs.

Selecting a configuration is easy: Enter Control mode by pressing that mode button, then press the Configs button on the V-Page. The display shows a list of available configurations on the left and a graphic illustration of the highlighted configuration to its right. A small comments area below the list gives a little extra detail about the highlighted configuration.

With a configuration selected, you'll then want to choose which machine to edit. Naturally, you'll press the Machine button. Unlike the 480L, which only had two machines to toggle between, the 960L's ability to run up to four machines (up to eight with a second DSP card) requires that you step through a list by successive presses of the Machine button, the up and down arrow keys, the increment/decrement buttons or use the shortcut of pressing the machine number; nearly every function has an equivalent shortcut. Just as the top line of the display reflects each mode button you push, the currently selected machine is shown in large letters as you step through the list with the

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program it is running shown to the right. The list shows complete detail for each machine, including the category and name of the program it is running, mix and I/O settings, mute status and reverb configuration.

Having chosen a machine, it is time to pick a preset. The Register button takes you to the 100 internal user preset banks (each bank holds 10 presets) stored on an internal hard disk or the 10 user banks that can be stored on a floppy.

The Program button takes you to the factory presets. There are 12 banks of Programs: two of Halls plus a Stage+Hall, one of Chambers plus a Stage+Chamber, one of Rooms, two of Plates, one Ambience, one Wild Spaces and two of Programs designed for post-production use (mostly small spaces). There are versions of all the Programs for each configuration, and the versions you see are always the appropriate ones for the configuration of the machine you are working with. If you are choosing a preset for a 2-in/2-out machine, then surround versions will not be displayed.

In Register or Program mode, the

Moving a fader activates it and changes the parameter value. When critical adjustment is needed, pressing the Fine Adjust button increases the fader resolution, though it appears not to increase the parameter resolution; the steps between parameter settings remain the same, but it takes more fader motion to traverse them.

With the 224, I liked that the fast motion of the fader scrolled through larger increments of the value, while slow movement kicked it into a high-resolution mode. That feature disappeared with the 480, and I'm still not sure why.

Because you don't want the joystick position to override the program you just loaded, the Joystick button must be pressed to make the joystick active. Aside from obvious panning applications, the joystick affords a host of fascinating algorithm parameter editing possibilities. For instance, many of the Programs assign Lexicon's familiar Shape and Spread parameters to the joystick.

Any algorithm parameter, input level or output level can be assigned to a fader or joystick axis for V-Page access simply by pressing the Edit button and

list on the Control/Config page, each logical input and output to or from each machine can be mapped to any physical input or output. Inputs that are split or outputs that are summed are indicated with an "S" after the input or output number to indicate that it is "shared."

Each input and output can also be individually panned, not through channels but on axes; that is, an output from a 4- or 5-channel surround reverb can be panned along L/R and F/B axes, while a stereo output is panned only along a L/R axis. The panning parameters are reached by pressing the Inputs or Outputs button in the Edit mode. I would prefer if there were a way to reach this feature directly from the input/output assignments on the Config page.

This panning capability essentially creates a very useful separation of physical I/O from logical I/O. In effect, the inputs are no longer L/C/R/LS/RS, but simply five inputs that can be placed anywhere, and similarly with the outputs. Of course, any of these panning functions can be performed with the joystick.

The LED input indicators above the display are useful but could hardly be called informative, so Lexicon has included a Meters page in the Control mode, which provides high-resolution, plasma-style metering for the inputs. The meters can be set to one of three modes: Peak, Peak Hold and Peak Decay. In addition to level, each meter shows the input source and features an overload indicator that actually displays the number of samples exceeding -0.5 dB. There is also a DSP overload indicator on the side. It would be nice to be able to show output levels on the meters and have a shortcut that toggles from any screen to this one and back for quick level checks.

The V-Page lets you edit parameter values.

banks are shown in a list on the left and the contents of the highlighted bank are shown in a list to its right. The left and right arrow keys navigate between the two lists, and each list has a comments field below it. Again, with a shortcut, programs can be loaded 480-style; that is, Bank button, #, Program button, #. For Registers, you can enter comments in either of these fields, which is where the PS2 keyboard port comes in. It is possible to edit names and comments using the LARC2's arrow and increment/decrement keys, but if you've spent $15k for this reverb, you'd be nuts not to spend another $15 for a keyboard.

At last, it is time to edit the parameters of the algorithm. The easiest editing is using the V-Page assignments.

then the V-Page button, which brings up the list of assignments. Touch a fader and its assignment is selected.

Pressing the Algorithm button while in the Edit mode brings up the full parameter matrix. The Surround Hall, as an example, is a surround version of the 480's famous Random Hall and features eight pages of parameters, half of which deal with diffused delay paths that travel between every combination of L, R, LS and RS. As you step from page to page, the faders are reassigned to the parameters of that page. Thus, every parameter can be edited with a fader.

INPUTS/OUTPUTS

Although the signal flow is edited via the choice of a configuration from the

THE REVERB IN USE

For my evaluation of the 960L, I threw a number of sources at it: drums, vocals, guitar and vibes, individually and in a mix.

To get straight to the point, the 960L is the densest, smoothest, most spacious and pleasing-sounding reverb I have ever heard. Lexicon has always excelled with the naturalness of their reverb, and the 960L is certainly a major step further in that direction. Although I turn to other brands of reverb for some of my more "effect-y"

World Radio History

and "pop" reverb needs, I admit to a long-standing partiality toward Lexicon's reverbs for natural sounds.

The 960's literature talks extensively about the new algorithms centering around 3DPM: 3-D perceptual modeling, which is built around the idea that digitally modeling acoustical spaces does not provide the most pleasing aural results or accurately reflect the attributes that make genuine reverberation so immersive. Instead of room simulation, Griesinger concentrated on the perceptual attributes that make up good reverberation and has attempted to simulate and manipulate those.

A key aspect of 3DPM is that the 960L's surround reverb algorithms are highly uncorrelated; that is, there is virtually no material that emanates identically from more than one speaker. Lexicon claims a variety of benefits from this, most especially that moving out of the "sweet spot" does not cause Haas effect to take over, thus causing the whole surround field to essentially collapse into the nearest speaker. To check this, I got up from my chair and moved around within the circle of the

The rear panel, displaying IEC power connector and power switch along with I/Os.

speakers while listening to the 960L. To my ears, there is a great deal of validity in Lexicon's statements, and it seemed to me that the reverberant field maintained an even sense of envelopment until my position became extreme, i.e., I got very close to an individual speaker. The 3DPM did seem to give a more realistic feel and conveyed a greater sense of integrity.

Although it is true that there is still much for me to learn about the use of true multichannel reverb (especially the panned, diffused delays), it is equally true that my first listen to the 960's sur-

round algorithms gave me the same thrill I got when I first heard digital reverberation from the original 224. It's not just the surround algorithms, either. Although the surround reverbs are richer and have a more immersive sense of spatialization, the stereo reverbs are also greatly improved over earlier units.

The drums produced no perceptible flutter until I reached the most extreme of contorted settings. Even Hall algorithms sounded good on the drums (though obviously not as good as Chamber, Room and Plate algorithms). Similarly, the vibes, a source with pretty pure

tone, did not excite any resonant ringing, as they do with many digital reverberators, even in the tail of fairly long decays. The sound was airy and open.

There was one other intriguing discovery worth mention: In pop music uses, especially rock, I frequently need to reduce low-frequency reverb decay a disproportionate amount relative to the HF decay to get rid of muddiness—especially on drums, but also frequently on vocals. This seemed to be the case much less often with the 960's surround algorithms. This might have something to do with the low frequencies emanating from a wider area than the two speakers I'm used to, but, once I noticed it, I focused more on the tricks I usually use to maintain clarity in a mix and felt they were less necessary with the 960L. Whatever the explanation, it left that much less tweaking for me to get the reverb sitting right in a thick mix.

Though the difference between 48 kHz and 96 kHz is subtle, I would be most inclined to run the 960L at 96 kHz with source material at that rate being fed through the reverb digitally. The real benefit of 96 kHz might be more obvious with the delay effects introduced in Version 2.5, which is expected to ship in July.

CONTROL ISSUES

As ecstatic as the sound left me, I do have some issues with the use of the LARC2 and the ways control is achieved on the 960L. Let's start with the display.

Designers are inevitably confronted with the trade-off of power vs. ease of use. In terms of a display, this translates to whether to show more information or keep it simple. Lexicon has chosen the former approach.

When all else is equal, I tend to agree with this approach, but because displays are costly and space-consuming, all else is almost never equal. In the LARC2, the result is that the only way to cram all of the information they wish to show onto the small LCD is to put much of it in a font so tiny that legibility falls off at more than a couple feet. Granted, what Lexicon considers the most important operational information is displayed in bigger fonts, but adjusting the 960L requires that full
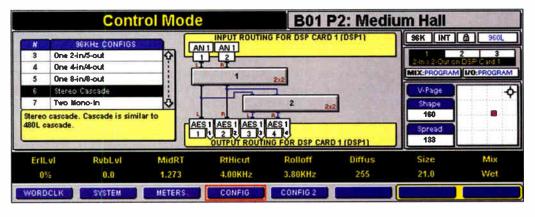
attention be given over to the LARC2, which is less than optimal if you are making a simple tweak during a high-pressure film mix.

Compounding this is the LARC2's sensitivity to viewing angle. No matter how I adjusted the contrast on the display, if I leaned too far in any direction, the display was illegible.

I also can't help feeling that the LARC2 is being hugely underused right now. A joystick and touch-sensitive motorized faders present wonderful capabilities for tactile control and

An example of configuring in the Control menu.

automation, yet there is no automation capability of any sort on the 960L. I thought at first, that given the company's background they might accomplish this through MIDI, but the MIDI implementation is quite minimal.

In fact, the 960's MIDI implementation does exactly one thing: respond to program changes. And it uses or reserves all 16 channels to do that. To be fair, I know Lexicon is aware of the market demand for SMPTE automation, and I would guess, with this unit's built-in "growth potential," that it is now a high priority.

Perhaps Lexicon thinks MIDI is not an in-demand feature for high-end users of the 960L, and that may be right when it comes to post-production houses. However, that may not be the case when it comes to music recording. When a top-shelf, high-priced unit like this includes MIDI connectors, it is reasonable to expect more extensive implementation for those who do want to use it.

IN CONCLUSION

Now that I have gushed over the 960's sound and questioned Lexicon for some aspects of control, I must make a few things clear: First of all, sound is more important, hands down. Although I expect a lot in the way of usability

from the priciest game in town, purchase decisions for a device like this hinge on sound.

Second, the user interface as it exists is generally quite logical and, although it could use a few more shortcuts, is quick to get around after a pretty short period of acclimation.

Third, Lexicon touts the 960L as a growth platform, and that has been demonstrated with the very significant improvements of the Version 2 software. As you read this, Lexicon should be shipping V.2.5, which adds multi-channel delay effects and completes the suite of 96kHz reverbs. I'm sure I'm not the only one calling for automation capabilities, and I am given to understand we are likely to see that added sooner rather than later. With the company's reputation for upgrades, I am confident that these improvements will be forthcoming.

There are many exciting places Lexicon could take the 960L. A number of facilities are being built right now incorporating Fibre Channel and SAN networks. One 960L with a FireWire or Fibre Channel interface could feed a multiroom facility. Just a thought. And with that much DSP power, I could even imagine multiband compression sometime in the future.

Though there are several fine surround reverberators appearing on the market, I do not believe any sound better than the 960L. The possibilities for growth in the 960L are very exciting, and, for the high-end production facility, the 960L is plainly a wise investment that will audibly raise the quality of every project that comes through.

Lexicon, 3 Oak Park, Bedford, MA 01730-1441; 781/280-0300; fax 781/280-0490; www.lexicon.com. ∎

Larry the O is a producer, engineer and sound designer.

RØDE NT1000 AND NTK

LARGE-DIAPHRAGM STUDIO CONDENSER MICS

Anyone who lurks the newsgroups on the Internet knows that I'm highly opinionated when it comes to audio. And, in the years since I reviewed the RØDE Classic mic, the company's president, Peter Freedman, and I have occasionally exchanged e-mails concerning various audio topics. Microphone self-noise and mic-to-mic consistency were frequent topics during those conversations.

After Neumann debuted its TLM103, I remember telling Peter that, not only did the TLM103 have the lowest self-noise I had ever heard (7 dBA), but it also had about a 6dB higher output (sensitivity) than most other mics at that time. Low self-noise is appreciated by those who record digitally, especially if the sound sources are quiet. A mic with higher sensitivity further reduces the audible self-noise of a mic relative to the signal, because as you crank back on preamp gain, the self-noise also recedes. It's a positive double-whammy.

I mention this because, in one of our earlier conversations about another mic, Peter projected self-noise figures for his next mics to be in the low teens. But, given the performance of the TLM103, I felt 12 dBA might be too high, especially if sensitivity was not at least equivalent. As a result, when the RØDE new NT1000 and NTK mics arrived, one of the first things I checked was self-noise.

During my evaluations, I used both GML and Aphex 1100 preamps at my studio and API preamps at Flite Three Studios here in Baltimore. I compared the two mics with each other and with a Neumann TLM103, U87i and U87ai. The U87i is the earlier model with higher self-noise and lower sensitivity than the U87ai. In every situation, both the NT1000 and NTK had lower self-noise than either U87. The solid-state NT1000 exhibited about the same self-noise as the TLM103, and the tube NTK a bit higher. But I'm getting ahead of myself.

ESSENTIALS

The RØDE NT1000 is a 1-inch, externally polarized, cardioid-only, JFET condenser mic with transformerless output and wedge grille. Its output impedance is 100 ohms. Sensitivity is stated at -36 dB ref. 1V/Pa (16 mV @ 94dB SPL) ±1 dB. Equivalent Input Noise (EIN) is 6 dBA weighted ±1 dB. Maximum output is +13 dBu A-weighted. Maximum SPL is greater than 140 dB (1 kHz/1% THD). The NT1000 requires a phantom supply capable of 35 to 53 VDC at 6 mA. The mic comes in a zipper pouch with a sturdy clip.

The RØDE NTK uses the same externally polarized, cardioid capsule with a twin triode Sovtek 6922 tube (with a real socket, not just leads and pins) and a cylindrical grille. Its output impedance is 200 ohms. Sensitivity is stated at -38 dB ref. 1V/Pa (12 mV @ 94dB SPL) ±1 dB. EIN is 12 dBA weighted ±1 dB. Max output is greater than +29 dBu (1 kHz/5% THD). Maximum SPL is greater than 158dB SPL (1 kHz/5% THD). The NTK is powered by a universal 110/120/220/240 VAC, 50/60Hz external power supply and comes with a 30-foot multiconductor cable that connects the mic to the power supply. A shockmount is optional.

UNDER THE GRILLE

To get inside each mic, remove a large, heavy-duty cast circular nut at the base and then unscrew the body shell. Both the NT1000 and NTK use the same sturdy, cast metal, satin nickel body. Although the metal mesh grilles are of different dimensions, they both consist of the same coarse outer mesh and finer inner mesh.

The NT1000

From the inside, it was easy to tell that these mics were definitely not part of the "extended family" of mics made in China that are currently flooding the low end of the market under at least half a dozen different names. The body and frame are of a much higher-grade construction, and machining is more precise. Screw threads are tighter, without binding. Six screws hold the PC boards in place, where others might use only four. Circuit, solder and component work is very clean. In the NTK, two small Phillips screws hold down a "keeper" that holds the vacuum tube firmly in place. Changing tubes is almost as easy as changing flashlight batteries. Neither mic has pad or roll-off EQ.

Four small screws hold the grille in place. Once removed, the grille slips off to reveal the capsule. The brass-rimmed, 1-inch,

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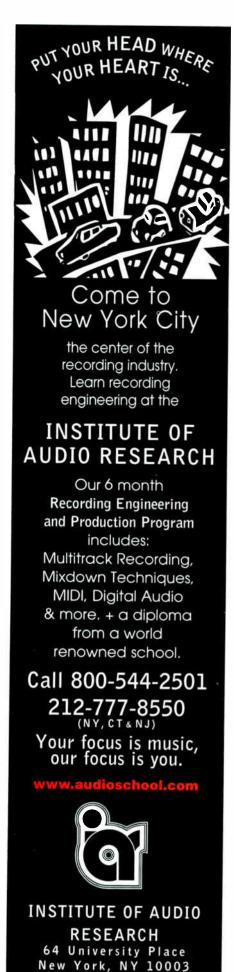
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FIELD TEST

double-diaphragmed capsule is mounted in a plastic housing. The housing attaches to a flexible rubber-like dome that's mounted on the top of the cast frame. A small piece of cylindrical foam—similar in shape to those foam earplugs we've all come to enjoy—sits at the very top of the capsule frame and touches the inner part of the grille, presumably functioning as a resonance damper.

IN THE STUDIO

I first compared the NT1000 with a Neumann TLM103 through two channels of a GML preamp. The TLM103 is about 3 dB more sensitive than the NT1000. When the preamps were adjusted for equal output, the NT1000 had slightly more self-noise; maybe 1 dB more. The TLM103 has more bass proximity effect than the NT1000, but its LF response becomes more similar as the distance between the mic and source exceeds a foot.

The NTK, with power supply.

The NT1000 has a bit higher or broader peak in the 4 to 6kHz range than the TLM103. While that can add a nice zip to a muted or "natural" source, it can also increase the incidence of sibilance. If a singer or V/O artist is already sibilant, then the NT1000 will certainly not mask or mitigate the sibilant energy.

Moving to the Aphex 1100 preamp, the NT1000 performed similarly, with slightly less brightness across the sibilant range. The TLM103 exhibited more bass, low mids and chest tones at distances of a foot or less. At this point, the NT1000 reminded me a bit of my first experiences with the Soundelux U95 with regards to its frequency response and overall sound.

When I brought the NTK into the mix, I found it about 3 dB more sensitive than the NT1000, with a similar frequency response, but not quite the edge of the NT1000. The NT1000, NTK and TLM103 have similar axial responses; losing HF response at about 45° off-axis and rejecting sound similarly from the rear, but the NTK has a slight HF peak at the very center of the back.

At Flite Three Studios, with engineers Louis Mills and Mark Patey lending their ears, we put the NT1000 and NTK up against a Neumann U87i. Listening through API preamps, we determined that both RØDEs were more sensitive than the U87i, with the NTK slightly more sensitive than the NT1000. Again, the NT1000 had the least self-noise, followed quickly by the NTK. Both RØDEs had a bit brighter edge than the U87i, and in Mills' and Patey's own words, made the U87i sound less clean and less crisp.

Mills and Patey found many reasons to prefer their U87i over many mics I have brought through their doors over the years. The unprintable invectives that followed their appraisal of the RØDEs made it clear that they were not pleased by finding they liked the RØDEs as well as they did. In our key jangle test, the NTK absorbed the transients more gracefully, followed closely by the U87i and, more distantly, the NT1000.

Back at my studio, I compared both RØDEs with Flite Three's U87i through my GML and Aphex 1100 preamps to see what difference the preamps made—not much. The U87i was woolier, the NT1000 clearer and slightly brighter. Over time, I became bothered by the self-noise of the U87i, because it veiled the low-level detail that was audible with the NT1000 and NTK.

I began to wonder what the newer

U87ai would sound like and subsequently borrowed one from Bob Bragg at Producers Video. The newer U87ai was about 8dB louder than the U87i, and had noticeably less self-noise when adjusted for equal output. The older U87i had a slightly peakier presence range, but they were very similar otherwise.
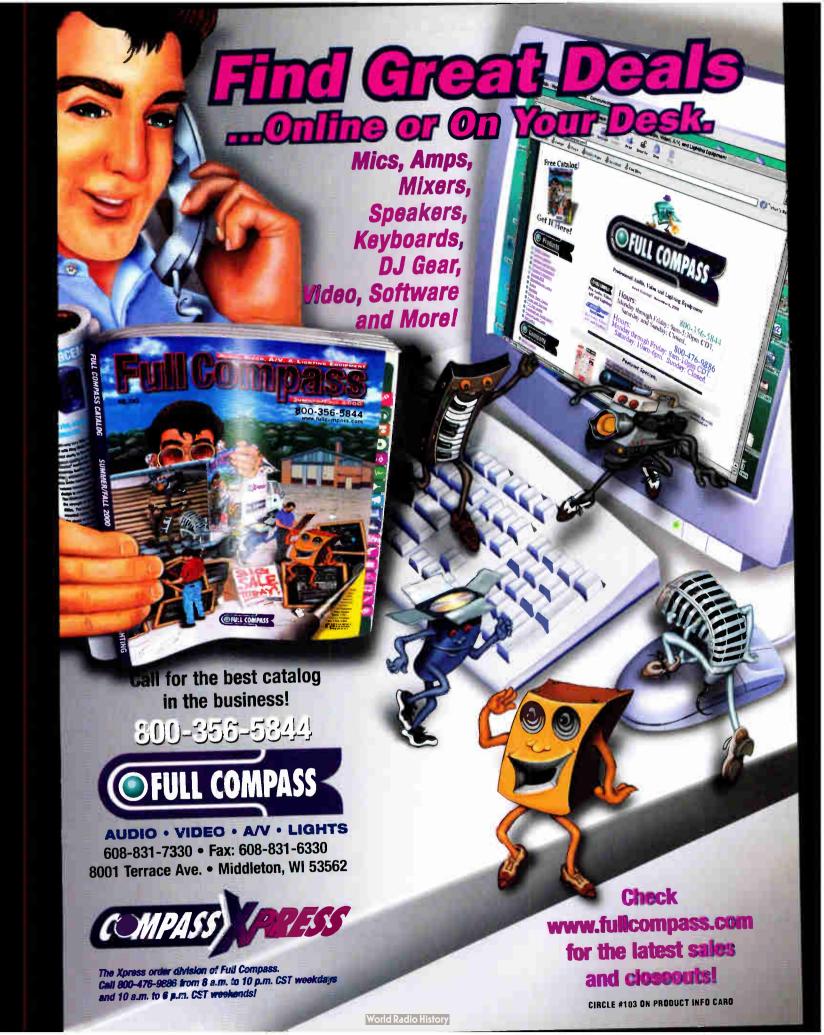
Through the GMLs, the NTK was 3 to 4dB less sensitive than the U87ai, but when adjusted for equal level, the U87ai still had slightly more self-noise. It also had that same upper-bass, lower-mid presence of the older version. The NTK retained that 5kHz edge that Mills and Patey liked. The performance through the Aphex 1100 was very similar.

For day-to-day use, both RØDEs should do quite well, as long as you don't put them up for sources that are too bright and edgy already. Even with the reduction in LF proximity effect relative to the TLM103, the LF response of both mics is not puny. In one appraisal a few years back, I remember having to pull 200 Hz down by 4 dB to slim the bottom of a TLM103 down to that of a U87. During my evaluation, someone mentioned that using the same mic on all instruments in a multitrack production often resulted in an unwanted build-up of "signature frequencies" of the mic itself. To that end, given their differences, the RØDEs should do well in any session with U87s.

Both the $599 NT1000 and $999 NTK are examples of excellent efforts from RØDE. Based on specs and clearly audible quality of sound in the studio, these mics cannot be ignored. Besides their mutual Australian heritage, these mics seem to have a lot in common with Russell Crowe's character in *Gladiator*. He was a clear and easy winner in the small towns, but found the ante a lot higher in Rome. He learned to win the crowd and, in doing so, gained an advantage and power. With these mics, RØDE has beaten the low-cost, Sino-capsule market at their own game. To stay in the "Big Ring," RØDE needs to hammer the market with mic-to-mic consistency and quality service, as well as price. If they can maintain the product, then it's only a matter of time.

RØDE Microphones, Box 3279, Torrance, CA 90510-3279; 310/328-7456; fax 310/328-7180; www.rode microphones.com.

Ty Ford can be reached at www. jagunet.com/~tford.

FIREHOUSE PRODUCTIONS 6500
IN-EAR MONITORS

Known for its custom stage monitors, Bryan Olson's New York sound hire company, Firehouse Productions, quietly introduced their Firehouse 6500 two-way in-ear monitors (IEMs) last year. Like most two-way IEMs, the 6500s use two different-sized, Knowles-balanced armature drivers with a passive crossover network to deliver highs and lows. As I already had favorite models for different applications, it was with some hesitation that I used a pair on tour.

Custom ear molds are the most frustrating professional sound products to buy, as they are impossible to audition before buying. Yet, musicians who rely on them hear their entire performance through the transducers. An investment in the right pair of IEMs is one of the most important equipment decisions that affects the performers' satisfaction with live sound. Few engineers enjoy the unique privilege of unpressured comparison and critical listening to a variety of IEMs in a controlled environment.

Like Firehouse's highly regarded monitors, objectives for the 6500s included a neutral sound that wouldn't require EQ and a robust tour-worthy design. The twisted-pair cables are typical, except they're permanently attached, avoiding one of the greatest points of failure: the tiny 2-prong connectors that typically plug into the molds. The parts inside are encased in silicon that shock-mounts them, helps with isolation from outside sound, keeps the molds from drying out over time and prevents the accumulation of excess moisture.

The other design goal was to maximize comfort, as most users are put off by the strange sensation of plugging up their ears in order to perform music. Not just the tips, but the entire shell is made of a soft acrylic that is bonded to a hard polyvinyl backshell, providing a degree of comfort when the molds are worn for hours at a time, day after day.

Though the comfort was readily apparent, I did not appreciate their sound until I used them for a long duration, because I was accustomed to the contoured response of other models, which, though pleasant at first, can grate over time.

Individual ear geometry is only one consideration that affects how a particular model of IEM sounds

from one person to the next. A variety of subjective factors affect preferences: the kind of music, the content of each mix, the hearing of that individual and, of course, personal taste in monitoring. While no single product will satisfy all users, the 6500s' even response provides a neutral starting point for the engineer.

The 6500s have a natural sound, with smooth highs and an even midrange. IEMs with balanced armature drivers yield more response above 4 kHz than those with dynamic drivers. Many users find these high frequencies promote ear fatigue after several hours, yet there is important musical information in the last two octaves for voices and instruments. The 6500s strike a balance in the highs between the sibilance

of typically balanced armature drivers and the attenuated highs found in dynamic models. While most IEM engineers apply mix EQ to tailor response to individual users, the 6500s succeed by presenting the engineer with a neutral palette upon which to paint a mix.

Like all IEMs using Knowles drivers, the 6500s have a peak in the upper midrange at 3.5 kHz, but it is wider and stronger than most. Their lack of color in the lows offers a natural sound, and the smooth high end avoids sibilance that can tire an ear over time.

The 6500s offer more than 20 dB of isolation, which allows monitoring at lower levels in high-SPL environments. Their low impedance and high sensitivity provides 3 to 6 dB more output than similar products, allowing them to get louder without distortion from the chip amps in most packs.

Experienced performers looking for a new set of molds will find the 6500s offer a nonfatiguing, smooth high end, while providing a comfort that allows users to almost forget that they are wearing them. Engineers looking to equip an entire band can choose the 6500s with confidence that they will provide a neutral, uncolored sound. Recording artists planning to tour could even use these to prevent headphone bleed while cutting vocals; write them off against the recording budget and, in the process, get used to IEMs before hitting the road. With a price of $750, they are competitively priced with other professional products in this category, and you can't get a quality custom mold for less money.

Firehouse Productions, 1470 Route 199, Milan, NY 12571; 845/758-9898; www.firehouseproductions.com. ∎

Mark Frink is Mix's *sound reinforcement editor.*
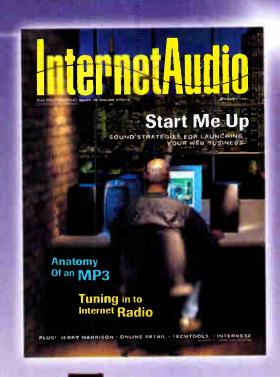
BY MARK FRINK

BY BLAIR JACKSON

RECORDING·NOTES

MARK ISHAM IN TWO WORLDS
FILM COMPOSER AND JAZZ LEADER

by Bryan Reesman

Whether he's performing with a jazz combo, writing orchestral or electronic scores for films, or playing trumpet on rock albums, Mark Isham makes music that can be sensual and alluring, ominous and suspenseful, or grandiose and compelling. His chameleon-like ability to move between genres has made him an increasingly valuable commodity in the close-knit community of Hollywood composers. He has amassed an impressive body of work in film scoring since 1983, including *Blade*, *Men of Honor*, *Quiz Show*, the Oscar-nominated *A River Runs Through It*, the recent hit *Save the Last Dance* and numerous other major studio and independent films. Isham also

has a unique relationship with acclaimed art-house filmmaker Alan Rudolph—he's scored all but one of Rudolph's films over the past 15 years, including *Trouble In Mind*, *The Moderns* and *Afterglow*. (You can even spot Isham as a band leader and trumpet player, respectively, in Rudolph's *Love at Large* and *Made In Heaven*.)

As a sideman, he has appeared on albums by Van Morrison, the Rolling Stones, Robbie Robertson, Bruce Springsteen, David Sylvian, Joni Mitchell, Patrick O'Hearn, and many, many others. He has scored music for the Rabbit Ears Storybook Classics Series, which featured children's classic stories narrated by top actors. He has written the themes for the TV series *Chicago Hope*, *Nothing Sacred* and *EZ Streets* (for which he won an Emmy) and composed the theme for, and the first season of, *Family Law*. Isham won a New Age Grammy in 1990 for a self-titled solo album, and he also won a CLIO for composing the commercial for Saturn's electric car in the mid-'90s.

Fans of Isham's jazz work will be pleased to know that he is working on a new solo album with his L.A.-based quintet; that CD should be out later this year. Further, Isham's two albums with the early-'80s combo Group 87—the first of which featured guitarist Peter Maunu, bassist Patrick O'Hearn and drummer Terry Bozzio—have finally been reissued via One

Way Records after languishing in the Sony vaults for years. To learn more about Isham's full discography and studio setup, log on to www.isham.com.

Your signature style is mixing acoustic and electronic instruments together in a very organic way. Were you ever very conscious of doing that?
I felt that one of the choices that I would make as a programmer early on was to move a sound into an organic direction or move a sound into an electronic direction. In other words, you could make something sound like it wouldn't necessarily come from nature, or you could make a sound that felt like you're hitting a couple of pieces of wood together, but something is wrong with the second piece. Consequently, I would work in one or the other direction—the sounds would either go toward one side of that spectrum or toward the other.

Then it became of great interest to blend the organic type of programming with the real stuff. Especially in
—CONTINUED ON PAGE 182

POWERMAN 5000
STILL REVOLTING!

by Elianne Halbersberg

Following up Platinum success always brings its share of challenges, but for Powerman 5000, creating the follow-up to 1999's *Tonight the Stars Revolt!* required a combination of checks and balances. "There is a lot of pressure, and it's usually from outside sources," says the group's frontman, lyricist and savvy businessman, Spider One. "The first step is to nod politely and smile when our manager and A&R people say, 'Do this and this.' Then we forget about it and do what we do. I have no idea what the 'right lyrics' and

Powerman 5000 in the studio, from left: Spider One, producer Terry Date, Al 3, Adam 12, M. 33 and Dorian 27

'right songs' are, or I would have written them 10 years ago and sold 10 million albums. Whatever people liked about your band last time, do it louder and faster, but if you think about that too much.

you overthink your band and record, and it ends up a mess. Do what you do, realize your limitations and do the best you can with the style you've created."

P5k's music is steeped in

modern technology and current sounds, but the band pays its respects to artists who preceded and inspired them. The combined efforts of Spider, guitarists Adam 12

JAMES CARTER
RECORDING "LAYIN' IN THE CUT"

by Robin Tolleson

The first all-electric outing by acclaimed multi-reedman James Carter is a brilliant, earthy modern jazz recording of integrity and substance, by a cast of veterans versed in the freedom of Ornette Coleman's harmolodics, as well as modern street funk. Carter has been hailed as one of the brightest young musicians in jazz, a player equally conversant in the bop masters and the avant-garde, while carving out what is unmistakably his own niche. He has worked with engineer Danny Kopelson and producer Yves Beauvais on several other occasions over the last three years,

including the saxman's *In a Carterian Fashion, Chasin' the Gypsy* and Ginger Baker's *Coward of the County. Layin' in the Cut* was tracked direct-to-24-bit/96kHz stereo over two days at the Magic Shop in New York, with guitarists Marc Ribot and Jef Lee Johnson, bassist Jamaaladeen Tacuma and drummer G. Calvin Weston joining Carter. The direct-to-2-track recording has amazing presence and punch.

Danny Kopelson admits that part of the reason for recording the CD that way was financial. "Based on the players you have and the type of music at hand, things like direct-to-2 offer good budget constraints," he says. "It eliminates the mixing process, therefore studio time and materials required to do

PRINCE'S "KISS"
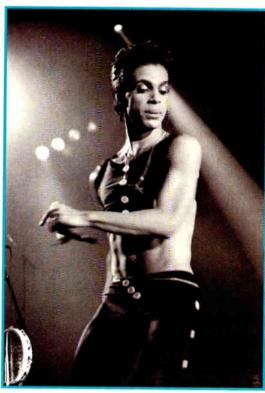
by Dan Daley

By 1986, when Prince recorded this month's Classic Track, "Kiss," he was among the most popular and critically lauded artists in America. He hadn't confused and outraged the press and public with the infamous name change yet, and his career arc had been, first, a slow, steady rise, and then, following the film and album *Purple Rain*, a rocket shot to the top. The Minneapolis-based singer/songwriter/multi-instrumentalist/producer was a true crossover artist, blending rock and R&B in bold, inventive ways and attracting both black and white audiences in nearly equal numbers; no easy feat. Though he was influenced by everyone from Marvin Gaye to Stevie Wonder to Jimi Hendrix to The Beatles, his style was utterly original and distinctive—even before he became massively popular through hits such as "Little Red Corvette" and "1999" (in 1983), his music was starting to influence other musicians; he was certainly among the most imitated artists of the '80s. Then and now, Prince was unpredictable and eclectic, with soft gospel touches on one song, followed by another dominated by the hardest dance grooves imaginable. His first Number One hit, the moody "When Doves Cry" (from *Purple Rain* in 1984), couldn't have been more different from his follow-up Number One (also from *Purple Rain*), the rockin' "Let's Go Crazy." Then there was the psychedelic pop of "Raspberry Beret" in 1985. He's always confounded expectations by juxtaposing acoustic tracks with electronic tracks and mixing styles in unusual ways; everything was (and is) fair game for him. He's never been successfully pigeonholed as anything, except perhaps eccentric.

"Kiss" was part of the stylistically diverse, art-rock album *Parade*, which also served as the soundtrack to Prince's second film *Under a Cherry Moon*. And, while the album as a whole sprawls in a multitude of directions, "Kiss" is firmly rooted in the funk milieu that Prince used as a foundation to launch himself out of the anonymity of the back streets of North Minneapolis in the mid- to late '70s. And speaking of foundations, "Kiss" managed to achieve radio hit status and dance club immortality without benefit of a bass part! More on that in a minute.

In 1986, Prince was working at Sunset Sound in Los Angeles. Engineer David Z, a staffer at Prince's Paisley Park Studios in Minneapolis, remembers getting a call from Prince, asking him to come out for a weekend of work. "I packed three days' worth of clothes and went," recalls Z. "When I got there, I

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went in and saw Prince in Studio C, and he told me I would be working in Studio B to produce a new group he had signed [to his Paisley Park label] called Maserati. Then he says, 'You'll probably be here about a month.' So I went out and bought more clothes."

"Kiss" was originally intended for Maserati and came into the studio in the form of one verse and a chorus, on a cassette tape, written, sung and played on an acoustic guitar by Prince, who assured Z that the rest of the song would be forthcoming. It wasn't an auspicious start. "The song sounded like a folk song that Stephen Stills might have done," Z recalls. "I didn't quite know what to do with it and neither did the group."

Z began in his usual manner by creating a beat on a Linn 9000 drum machine. "The groove began to get complex, especially the hi-hat pattern," he says. "I ran the hat through a delay unit, set about 150 milliseconds, printed that to tape and printed the original hat to another track and then alternated between 'source' and 'blend' on the delay unit, recording those passes. It created a pretty cool rhythm that was constantly changing in tone and complexity but was still steady. Then I played some guitar chords and gated them through a Kepex unit and used that to trigger various combinations of the hi-hat tracks. That gave us the basic rhythm groove for the song."

Session bassist Mark Brown laid down a bass part, and one of the members of Maserati recorded a piano part that Z says he copped from an old Bo Diddley song called "Hey, Man." The group's singer put down a lead vocal track an octave lower than Prince's original tenor, and some background vocal parts were invented, based on some ideas Z says he remembered from Brenda Lee's "Sweet Nothings." "This is what we had at the end of the first couple of days," Z says with a sigh. "We were trying to build a song out of nothing, piece by piece. It was just a collection of ideas built around the idea of a song that wasn't finished yet. We didn't know where it was going. We were getting a little frustrated, we were exhausted, so we all went home for the night."

That, however, would prove to be enough. At least for Prince. When Z returned to the studio the next day, he found Prince waiting for him. Sometime that morning, The Artist had apparently come into the studio, asked an assistant to put the track up and then recorded his own vocal and electric guitar part. Z was stunned.

"I asked him what was going on. He said to me, 'This is too good for you guys. I'm taking it back.'" From that moment on, "Kiss" became a Prince record. Z remained with him in the studio as Prince took what sparse elements there already were on the track and made it even more minimalist. "He said, 'We don't need this,' and pulled the bass off," Z says. The low end was filled up instead by using a classic Prince trick: running the kick drum through an AMS 16 reverb unit's reverse tube program. "It fills up the bottom so much you really don't miss the bass part, especially if you only use it on the first downbeat," says Z. The hi-hat track was similarly dispatched, leaving only nine tracks of instruments and vocals on the record, which certainly made it easier to mix. Z recalls, only half jokingly, that the mix, which was done on an API console, took about five minutes.
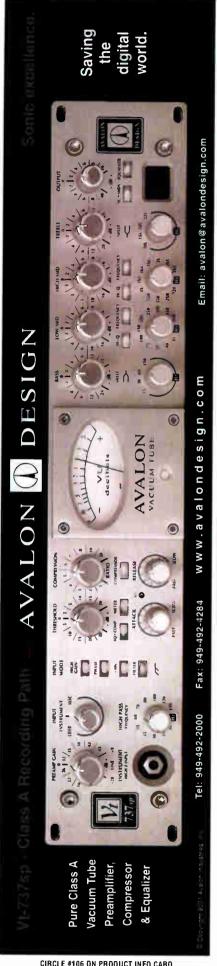
Prince's vocals had been recorded using a Sennheiser 441 microphone. According to Z, Prince's preference for that particular mic stems from a conversation he had with singer Stevie Nicks, who had suggested it to him. "There's a roll-off on that microphone that actually ends up boosting the high end, spiking it around 3 kHz," Z explains. "It also has good directionality; Prince liked to sing in the control room, so he would set it up on a stand right by the console.

When he wanted to sing, he would just put on headphones. He also liked doing his own punches, too."

The track was left as ambiently dry as it was elementally sparse. In the mix, Z says the starkness of the track actually made him a little uneasy. "I reached over and snuck in a little bit of the piano back in," he says. A small amount of tape delay was also put on the guitar track. "Otherwise, the mix was just a matter of Prince pulling back and turn-

Cool Spins

The Mix Staff Members Pick Their Current Favorites

Shaver: *The Earth Rolls On*
(New West Records)

Last New Year's Eve, Billie Joe Shaver lost his son. But before that wild, guitar-slinging Eddy Shaver passed on, he recorded some screaming electric solos and some fine acoustic work for Shaver's new album. This infectious assortment of Billie Joe originals includes some surprisingly upbeat songs, such as the shimmering grunge/country "Love Is So Sweet" and "New York City Girl," which borrows its bounce from Roy Acuff's "Wabash Cannonball." However, there's also naked feeling in plain songs like "Star of My Heart" and the title track, which Billie Joe wrote for his wife, who also passed away in 1999. And there's nothing

sadder than a lonely waltz like "Heart's a Bustin'." The Shavers and their band are enhanced by some first-rate guest musicians: E-Street Band bassist Gary Tallent, and Ken Coomer (drums) and Jay Bennett (B-3) of Wilco. With his tube mics and analog machines, Ray Kennedy has captured the essence, and maybe the last, of Shaver.

Producer/engineer: Ray Kennedy. Studio: Room & Board (Nashville). Mastering: Hank Williams/Mastermix (Nashville).
—Barbara Schultz

Gwenmars: *Driving a Million*
(SeeThru Broadcasting)
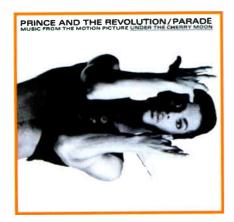
It would be really easy to take one look at The Gwenmars and dismiss them as yet another SoCal, pop/punk, Blink 182 derivative. However, this isn't the case. On the band's third release, *Driving a Million*, The Gwenmars in no way allude to their L.A. origins and deliver track after track of glammy, hook-laden pop

songs that don't feel at all forced or loyal to any specific genre. It seems that these kids listen to everything from Suede and Blur to Minor Threat and Sonic Youth. A couple of the stand-out tracks include "Venus" and "Electro." "Venus" opens with a particularly cool, processed guitar line, and the song, like the others on the album, is over and done long before the hook even begins to wear thin. Vocalist/guitarist Michael Thrasher, the primary songwriter, could have easily opted to go the Top 40 route and carried this album pretty much on his own. But, luckily, this feels like a band effort, and their time spent on the club circuit seems well-spent and shines through brilliantly; these guys can actually play.

Producer/engineer/mixer: John Fryer. Producer: Richard Podolor. Engineer/mixer: Bill Cooper. Mastering: Stephen Marcussen.   —Robert Hanson

ing off faders. It's more than the bass that you're not hearing on that track."

Z says he recalls being alternately fascinated and excited by this turn of events. Maserati was to be his first full production for Prince's company. (Z had recorded parts of records for Prince in the past, as well as having recorded his original demos in Minneapolis and being the engineer at the live benefit recording that ultimately became *Purple Rain*.) In the course of an evening, while he had been sleeping, he was now Prince's co-producer for at least one track. In addition, the deletion of the bass was stirring. It added an element of danger, a *frisson* to the record-making process.

In fact, it did produce some drama before it was released. Z says the feedback that came to him from Prince's record label, Warners, was palpably negative. "The A&R guy said it sounded like a demo," Z remembers. "No bass, no reverb. I was devastated. But Prince had been selling big numbers, and he had a kind of power that few artists at that time did, probably more than any artist ever will again. He told Warners that that's the single they were getting, that that's the one they were putting out. He basically forced Warners to put it out." Lucky Warners. The record went to Number One in the spring of 1986, and solidified Prince's stature as The Artist To Be Reckoned With.

The beauty of "Kiss" is not just in what's not heard, but what's simply implied. "The power of that track is its ability to pull people in," observes David Z. "The listener has to provide a lot of what's missing. You have to use imagination to listen to that record. It really makes the listener part of the process."

Prince had experimented with pulling the bass on other songs, such as "When Doves Cry" from the *Purple Rain* album. As Z suggests, removing the bass and leaving the lyrics naked with percussion and a few other instruments transforms the song into what he likens to Beat poetry. It also provides a new perspective

on the role of bass in contemporary music, by not allowing its presence to be taken for granted.

But most telling of all the aesthetic confrontations that "Kiss" provoked was how it functioned as a point of contention between an artist and a corporate entity. "You could really see the resistance of the corporate power of a major record label to something that was so different from what they were expecting," says Z. "That record was up against the paranoia of radio and the power of corporate record labels. That time, the record and the artist won. These days, neither one would have had a chance in hell." ∎

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the film world, you want to create a new musical world that sets a slightly different emotional tone for the picture. I see that as part of the job I can do. Part of what I can bring to a film is to create a palette of sound that makes those pictures feel just a little bit unique. Part of that can be done by taking sounds that are known and people can relate to, but then adding a few things

that have never quite been heard that way before, so it becomes a slightly new experience.

Many accomplished musicians have recently tried their hand at television

Miles Davis could do what the trumpet historically had not been thought of as being able to do, which was be an instrument that could whisper in your ear.

—Mark Isham

composing, including yourself, Eddie Jobson and Jon Hassell. What do you think of this trend?
I think that television, itself, has grown up, and it's attracted a lot of people who
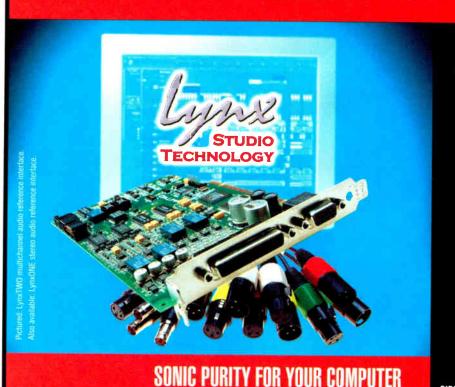
want to change the genre creatively, artistically, and music's gone hand-in-hand with that. The cinematography, the writing, everything has tried to step up, just grow up, for a lack of a better word. So it's attracted a lot of people from features across the board. I think it's very healthy.
Why do think you have such a good relationship with Alan Rudolph?
We work very, very similarly. With *Trouble In Mind*, we just found each other, because he picked up a record of mine in a record store and said, "I wonder if this guy scores films?" And I had just gone out and seen *Choose Me* and said, "This is somebody I would like to work with." And the phone calls literally crossed on the same afternoon. We already knew of each other and were looking for each other, and the relationship has just sort of gone on in that way.

The first day we met, he came over to my house and I just said, "Here's what I do." I made a couple of sequences, threw in a few loops and blew some trumpet over it. He said, "Can I take that with me?" He temped half the film with stuff I made in a single afternoon for him. The relationship has just gone on like that. He's basically a jazz musician disguised as a film director. He likes to take those

chances on the set—set people up in situations, give them a few instructions and see how things go. He likes the fact that I work similarly in music.

We've actually structured different scores to take advantage of that. *Afterglow* was pretty much like that. It's a jazz score, and we knew when you have the likes of [jazz greats] Billy Higgins and Charles Lloyd, you don't necessarily write everything down for these guys; you're not getting what they do best if you do that. So you open up the process to allow them to create something brand new and be willing to let that enter the film. We sat down and designed a whole way of doing that on that score. Very few directors have that level of courage. Directors get nervous. They want to get control over that last major element in the film. But I think [Rudolph] had such fine performances from Julie Christie and everyone that he was totally willing to take the chance. I thought it was certainly one of the most fun, most adventurous and most effective scores I've worked on.

Have any of your Hollywood peers influenced your soundtrack work?
I really admire Elliot Goldenthal. For orchestral writing, when I want a shot of "let me dive into some orchestral music to get inspired," I'll generally pick up something of Elliot's, because I think he's the real deal. I like Thomas Newman's work a lot. He seems to have a similar taste as I do, he makes similar sorts of decisions as I would make, so I always find myself smiling when I listen to his music. I have definitely sat down and listened to John Williams, because, for that traditional approach, it doesn't get any better. He's truly the master of that.

It seems that Hollywood has taken time to warm up to electronic scores.
I think they go in and out of favor. When I first started in the '80s, for five years there was this very high interest in Vangelis and all this stuff. Then they'll go out of favor. There was a while where, because I was thought of as the "electronic guy," that the good movies weren't open to me. That's why I got my feet wet with orchestras to the point where I felt totally confident as an orchestral composer. It's shifting around again, now that you see Moby and this next generation of electronic artists becoming very, very popular through the licensing of their music.

Let's talk studio gear. You're using an Euphonix CS3000 console?
We made the decision about five years ago to go to a Euphonix. At that point, the [concept of the] computerized studio
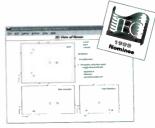
was still pretty shaky, and I certainly didn't trust it. What we have today wasn't implemented yet, so I felt that, because I do so much work in film, the Euphonix was a fantastic choice. It's so flexible, and it could allow me to quickly move back and forth between projects and also to get a really wonderful 5.1 mixing environment in my room. That was a great choice; I love the console.

We're trying to stay up-to-date with all the computer gear. I'm a Logic user. The virtual studio is being developed as it's being released and as we are able to confront it and get it all working. So for various projects, I think the album stuff is being done much more in the virtual environment, while film stuff still tends to be done on tape. We'll go record an orchestra on analog, because, what can you say, 2-inch Dolby SR still sounds great. For an orchestra, it sounds great. The 2-inch obviously is left over from the old days, but we keep it up and running, just because the sound is still hard to beat. Then the Pro Tools is expanding; there's more hard disk space.

Your engineer, Stephen Krause, uses a lot of Lexicon gear for mixing, correct?
Steve is the old Class-A collector. He's the one with the Neve modules—the Neve preamps and the Neve compressors; the old stuff. He's got the Focusrite stuff. I myself haven't invested heavily in that area because he has. When we do use it, especially for the virtual stuff, when you insert it in the chain, it makes all the difference in the world. So if that seems missing from my particular setup, it's because he has it. In the practical day-to-day world, a lot of the Class-A stuff gets inserted into the whole process.

You use a lot of Akai samplers and Korg synthesizers.
I started off with Akai, just because it was recommended to me, and I still love the sound of the Akais. I think for high-end transience, they're still the best, so I have a whole lot of them. I have [E-mu] E4Xs, just because they were the first large-capacity sampler. I invested in those, because a film composer has to be able to mock up a sampled symphony orchestra and have it sound pretty effective. It's just part of the game, it's part of the job description these days. So five years ago, the E4s were really the way to do it. If you can play these things for the director ahead of time with a pretty convincing sound, then the director has the opportunity to respond before you're in that environment of spending $10,000 an hour and having 100 people wait for you. I don't have a synthesized orchestra on hand to

replace an orchestra. That's not the point at all. The point is to really be able to mock it up so that the director has an opportunity to respond. We get the score exactly the way we like it, and then the recording sessions [with the orchestra] are just fun. "Wow, I didn't think it could sound this great!"

I've noticed you like "old school" analog synthesizers.

I began collecting that stuff when I could first save up my money and knew that I wanted that ARP Odyssey, which I traded in toward a 2600, which I still have. I have a Prophet-5, I have an old original Moog 12, an original Oberheim 4-voice and Oberheim Xpanders. And I have the Waldorf Wave; the new stuff. If I were to take a vacation, I would love to sit down with a couple of old synthesizers and tweak knobs. That would just be pure fun.

Over the years, you have worked with a lot of inventive musicians: Peter Maunu, Terry Bozzio, Hector Zazou, XTC, Harold Budd...Do you have any favorite projects that you have worked on?

In terms of working with other people, I've been very lucky that the conduit for that has been mostly through a couple of different producers—Don Was and Paul Fox. Paul brought me in to work with XTC, and Don brought me in to work with a wide variety of different people from Bette Midler to Ziggy Marley. They are two excellent producers who always choose fascinating people to work with. I always know that if Paul or Don has called, it's going to be interesting, it's going to be fun.

I've worked on and off with David Sylvian for a number of years, and he's a great artist. That was fun, because we not only toured the world, but we recorded a couple of albums. It's always nice to really get to know someone and experience working with them in a couple of different types of environments.

With Patrick [O'Hearn] and Peter [Maunu], that's a whole other level. Those guys are my friends, like school yard friends. The kids play together, although Patrick's moved away; I don't see him nearly as much anymore. But Pete, I still see all the time, and we hang out. We know all the cranky, creaky sides of each other.

In 1998, you released a solo album called Miles Remembered: The Silent Way Project. *How much influence has Miles Davis had on your sound?*

Looking back, the first thing that attracted me to the trumpet was the sound of the classical trumpet. Just that pure sound, a very heroic sound. Then it was a few years down the road, and I was already playing when I heard Miles, and I think it was the fact that he had that emotion in his sound. He could be heroic, he could be pure and beautiful, but he could also be very, very intimate. He could do what the trumpet historically had not been thought of as being able to do, which was be an instrument that could whisper in your ear. It would always be the shouting instrument at the top of the band—the electric guitar, if you will, of the first part of this century.

He changed that in a big way. Not that there weren't people before him who foreshadowed that, but he really put it there as that whispering music trumpet. It became a major part of our whole musical vocabulary because of him. That had a huge influence on me, just to show that the instrument had such a diverse spectrum that it was capable of. Several times in his career, he re-conceptualized musical contexts in which to place the trumpet—cool jazz, electric jazz, even toward the end getting into the hip hop world. It's a tremendous legacy he's left in that regard.

It's very inspiring to me as a film composer, and just as a composer in general, to see that you can move things around [like that]. You can play pretty piano over a reggae groove. You

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can play muted trumpet over a hip hop groove. You can do a wide variety of things that are juxtaposed against each other and create tremendous effects. For me, that overall elasticity was tremendously influenced by Miles Davis.

You've played classical, jazz and rock music, both in the studio and on the road. You've composed film soundtracks. Is there any one style you prefer over the others?

No, I can't say there is. I still think that there's a way of evolving instrumental music beyond the jazz tradition, but that has a lot more artistic interest than where a lot of instrumental music has gone in the past 15 years. I can't say that I'm particularly proud of the state of instrumental music right now in our culture. I haven't quite nailed it yet; it's something that I've been working on for a long, long time. Group 87 was a big push into this area, just because I am a trumpet player, and, therefore, instrumental music is what I would do as a performer.

Without bashing anyone in particular, I know there's something that could be done in the instrumental genre that's not only interesting to a wide number of people, that isn't just an esoteric art form, but that also doesn't pander to ei-

ther history or the lowest common denominator. It's done in rock 'n' roll all the time, it's done in various aspects of pop music, and it's done in classical music. There's no reason that contemporary instrumental music can't follow suit. So that's my mission right now, to find that. ■

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and M. 33, bassist Dorian 27 and drummer Al 3 are more akin to *Ziggy Stardust* or *Space Oddity* than freshly baked Bizkit. However, this didn't deter the group from recruiting veteran hard rock producer Terry Date to oversee their new project—P5k's third label effort and fifth release. Date's resume reads like a who's who of hard rock and metal acts: Limp Bizkit, Deftones, Buckcherry, Staind, Jane's Addiction, Incubus, Pantera, White Zombie, Soundgarden, Mother Love Bone, Helmet, Prong, Sanctuary, Fishbone, 24-7 Spyz, Metal Church, The Accused and Dream Theatre. He's even been nominated for two Grammy awards: Best Hard Rock Album for Limp Bizkit's *Significant Other*, which sold 6 million

copies, and Best Engineered Album for White Zombie's double-Platinum *Astro Creep: 2000*.

"Again, it's about balance," says Spider of the band's decision. "There is a certain truth to [the fact that Terry Date is the "metal" guy]. But you have to be aware of what's going on in your world. Just because I don't listen to Slipknot or Limp Bizkit when I go home doesn't mean I haven't heard their records. I know that our fans are their fans. When you play that music all day, it's not what you want to listen to during your time off. But of all those records, Terry made the best ones, and he's the person everyone in the band agreed on. His consistency level is really high, which isn't the case with a lot of producers—they do one record you like, and then 10 more and you go, 'Why did he do that?' We wanted this record to be a little looser, so you go for what you know. Terry knows that world."

Born in Michigan, Date grew up in Cleveland and Cincinnati, attended college in Idaho and continued his education at Eastern Washington University, near Spokane. His climb to the top of the production ladder began with running the board for bands back home,

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working at college radio stations, recording local acts on a 4-track tape recorder, relocating to Seattle after college and becoming staff engineer at Steve Lawson Productions. He landed in Seattle shortly before the city's burgeoning music scene exploded. In 1984, the local band Metal Church chose Date to engineer their first album. When that group signed with Elektra, gave Date co-production credit and then sold a quarter-million albums, his phone started ringing and hasn't stopped since.

"My methods of making a record are basically the same today as they were then," Date says. "Music has definitely changed, and the biggest change, technically, of course, is computers. So we have to adapt to new sounds and new toys. But I basically work the same way I always have: I still use tape heavily. I use computers more and more, but the final product starts and ends on tape. The computer is in between those stages, although I still use it sparsely. I don't manipulate the music too much. I use it for things like backward reverb, where I'd have to flip the tape—it takes less time on computer. For certain effects, the computer is an easier medium to work with, but I'm more comfortable with tape. That's been the biggest change for me other than a new piece of equipment here and there."

P5k began recording this album in early January at NRG Studios in Los Angeles. Date produced and engineered, assisted by his "full-time right hand" Scott Olson, with whom he has worked for three years. "NRG is a studio I love," Date says. "I love the management, and it's always fun to work there because they have great gear. It couldn't be better." Mixing was done at Larrabee West Studios, "another place that sounds great and is managed and run very well." While "equipment changes day to day and week to week, so I like to experiment," Date says that some things are a given whenever he's at work. "I always have my own vintage EQs," he notes. "I carry a rack with Neve 1081s and Focusrite 110s. I don't carry my own compressors; we use those at the studios, because they have what I like: UREI 1176s. That's really the only gear I'll use as outboard. Processing stuff, I use an old, discontinued 9050 Zoom. I use a SansAmp Tech 21 PSA 1 for distortion and addition to sounds I need to add flavor to. Those are probably the most consistent things I use.

"On this album, I used all of that and a lot of Shure microphones. For vocals, we used a Shure 58 and [a Neumann]

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47. Outboard gear for vocals was an old vintage Roland vocoder. I'm also using an old ART Powerplant, and that's pretty much it. We used a lot of assorted foot pedals. I tend to find what's laying around and see if it sounds good."

Date says he prefers to stay out of pre-production, opting instead to have bands send him demos of the work in progress. For P5k, this was another advantage. "We're definitely a band who has a good idea of what we want to do, and we've never required a producer who is also a songwriter," says Spider. "We like somebody who, most importantly, gets it, gets the sound we want and has the sonic ability to make it happen, to translate what you hear in your head to CD and keep that energy. Terry is a no-nonsense producer. Some producers do odd things to create a mood or mike an instrument a certain way. Terry is from the school of, 'I know what I'm doing, and I've been doing it forever.' He doesn't need bizarre rituals or group prayers or blue candles. We get down to business, and it's like the road: You have to get up there and do it. That's my philosophy in the studio and on tour. From the practical side, we don't spend a lot of time or waste money. A lot of bands like to brag that they spent six months and $10 million on their album—doing what? Good move, genius—you'll never make a dime!"

Date still regularly engineers the projects he produces. "I hear the music better and can make a better record when I wear both hats," he says. "I started as an engineer, and I connect with the music through the board. I've never done a record where I was not involved 100 percent in the engineering side too—with the exception of the computers. I use them, but I don't run them." He selects his projects based on "incredible talent and creative musicians." "Then," he says, "my job is to expand on that creativity with them and make sure that they perform beyond what they thought they could do. But it has to start with them having that to begin with."

This was certainly no problem with P5k, whose albums are often an exercise in unique effects and unusual sounds tied together—not always deliberately—by a story line of sorts. "It was never intentional to do that on [*Tonight the Stars Revolt!*]," says Spider, "but you write an album within a short period of time and hit on all these themes. I've always loved records that were a bit of a journey. The reference points I use are Public Enemy's *It Takes a Nation of Mil-*

lions to Hold Us Back, which has no silence [between songs], and the soundtrack to The Monkees' movie, *Head*. That's an amazingly sequenced record. So I wanted to do that again and take it further. I don't like having 10 to 12 songs in a row with a second of silence between each. I think of things in a visual sense, where things connect like a movie or one big story, but not intentionally; not like Pink Floyd's *The Wall*."

P5k's music is full of textures and tones weaving in and out in an almost 3-D way. However, what many listeners

> **My methods of making a record are basically the same today as they were then. Music has definitely changed, and the biggest change, technically, of course, is computers. So we have to adapt to new sounds and new toys.**
>
> **—Terry Date**

mistakenly interpret as keyboards and tape loops are, in fact, guitars and drums. "We recorded over half of this record as a live band, and the rest of the record was a partial band," says Date. "Every song they plugged in and played. The only thing that wasn't done all at once was the vocals with the music, which I rarely do anymore. But half the record is everybody in the room. All the songs were designed to be played live. This wasn't, 'Play one note, and I'll make the record for you.' It's a typical old-school recording where the band plays and you pick things that need to be fixed. The other half was played partially because of the rhythmic loops—classic rhythmic loops, not taking the song and adding a cymbal over it. There are some atmospheric keyboard lines involved, but we recorded everything as a band."

"We live in a world of computers," says Spider, "so we sequence things and use loops and effects. But the stuff on top of that are guitar lines, vocals. It's

like building a house. The foundation is level, and the rest you make up as you go along. You have to be prepared enough not to waste time, but if you're too prepared, you'll convince yourself that everything should sound a particular way.

"It's difficult to put a label on what we do, but I realize that no one in music is reinventing the wheel. Every band likes to think of themselves as compelling and original, but we're all recycling what we've heard. In this band, we have the ability—not even an intentional ability—to create what we like, fail miserably at it, but come up with something cool anyway." ∎

that, because it all goes down at once. James is pretty organic, and I think his playing speaks to that, in terms of being raw and straight-ahead and gutsy. So I think the direct-to-2 is a format and style of working that is particularly conducive to James. Yves, as the producer, has a great acuity on an artist-by-artist basis, developing a work style for each artist. I really have grown to admire Yves' versatility in that respect, to really suss out what best suits an artist's performance and material style. So this worked for James. This way, he could get to do more things repetitively until he liked what he did.

"We used a Genex 8000, an 8-track digital machine, and simply recorded on two of the eight tracks. And we used outboard converters in and out, rather than go straight into the Genex." They rented the Genex from Ted Jensen of Sterling Sound, who did the mastering on the project. "That was a helpful arrangement, because Ted knew what he was dealing with when it got to mastering. Ted has the magneto-optical disc Genex recorder with the oversized discs, and it actually has two recording sides with 30 minutes a side," Kopelson explains. "What I found was that the low-end response had the best of both the analog and digital worlds. It was clear and bright, like you come to expect from digital playback, and it had that meaty kind of thickness that theretofore I had only associated with analog. It was really exciting to hear it come back that way.

"The low end on that record has a particular fascination to me," Kopelson continues. "It's really distinctive in illustrating a very favorable element of that 24-bit, 96k format. I don't think I made any great adjustment because of it, but what I did do was monitor through it. So I made certain balance and EQ decisions based on how I monitored through it. Not only did I feel that I got back an accurate representation of what I originally monitored, but that the quality of the low end on this digital format was really very different to me. I have associations with a lot of low end in digital format being very linear, not with that analog saturation sound, so that the low end is there, it's hard and it's punchy, but it's not thick. The quality of thickness that analog would give low end has always been somewhat absent from most digital formats.

"We just did a direct thing with the bass. I try to get the preamp to it right away. I don't have much of a run out of the DI into the preamp, so I can run line-level from the studio back into the control room, as opposed to it being mic level running back into the control room. With the bass, that tends to hold on to the integrity of it a lot better. The low end is better, and the harmonics tend to be a little more uniform. That's pretty standard for me."

The same depth and power came through on the drum sounds, too. "Yeah, it's very clear on Calvin Weston's drum kit that the [low end] is there across the board. It just really has a wonderful saturate presence. It being sort of an unusual jam record like that, it was new to all of us. No one quite knew how it was going to sound. We went to one rehearsal a couple of days

before, but it's really kind of raw in the sense that James performs that way."

They didn't use a lot of isolation at the Magic Shop. Basically, the musicians set up in a circle in the 42x23 tracking room and then tracked live, laying down multiple versions of most songs, blowing as long and free as necessary, going for complete takes. "The Magic Shop just suited that particular instrumentation," Kopelson says. "Everybody was in the same room, so the only thing we did do was remote the two guitar amps, so that you really don't have a whole lot of guitar bleed on either the drums or James' saxophone mic. What's nice is that there is leakage of James on the drums somewhat. There's a little bit of cross-coloration, but not a whole lot. Some of [guitarist Marc] Ribot's stuff bled, I think, because it was so loud. It's nice to get the leakage to work for you and enhance and support that vibe.

"Toward the front of the room, you had a circle of James, Marc, Jamaaladeen and Jef Lee. Calvin was all of 12 feet away from the nearest guy. They were all in greater proximity to each other than Calvin was to any of them. We're talking about relatively small distance, so we didn't get any real, pure isolation on the drums. We just put up a little baffling to stop it from dominating. On the louder passages, he hits pretty good, which is nice, because the drums sound full. I think I put a ribbon mic overhead the drums and mostly pretty standard stuff. I just miked the floor toms in sort of an area strategy and didn't go for super-tight or individual miking on the rack toms. I just hung a mic over the two rack toms so one could get two and then one over the floor toms. It was pretty minimal. We weren't going for anything sophisticated. The idea was having the bottom—sloppy is good."

Layin' in the Cut offers a wild mix of different sounds and colors from Carter's saxes and from the guitars. Carter squeezes and honks his tenor on "Drafadelic in Db" and gives a lesson in

textural playing on "Motown Mash." "Terminal B" is spray of unusual guitar sounds, and Carter sounds like he's eating his soprano alive, shouting out strange, twisted sounds. "He also plays bari sax in the upper register, and he can make it sound a little like a wacky soprano when he starts getting into his kind of Albert Ayler thing. It's hard to tell what it is," Kopelson notes.

The album closer, "GP," sounds like the sax has a chorus or phase effect, but it's actually guitarist Jef Lee Johnson doubling Carter's line. "A lot of times, the guitar tones were hard to distinguish from some of the wacky stuff that James does," Kopelson says. "So in that tune, when they're playing the head, that's exactly what you're getting. You're get-

My feeling has always been that you're better off taking what you get as live performance. He's the artist; it's up to him how he wants his horn to sound.
—Danny Kopelson

ting James playing a harmonic edge in addition to the fundamental note, playing some of the reed sound a little harder, so it's kind of whistling over the top of the fundamental. Jef Lee has that really compressed thing that almost sounds like the same voice. One's electric and one's acoustic, and they make that third thing happen where you're not quite sure what you're hearing. And part of it has to do with the balance, where I tried to get that ensemble thing, so I wasn't looking to push James way out front. Sometimes when you destroy the balance, that thing goes away. So it just so happened, by pure luck, that by going for the ensemble sound on the head, I had the kind of balance that produced a little bit of that wacky tone.

"At first, I thought we kind of undermixed the guitars. Some tunes I still feel might be a little guitar-shy, but I've really grown to like that kind of jam mix with the guitars as the support. With James jamming out front, I can't see how it

would work any other way. My tendency was to keep the guitars back, and, to me, it really kind of spoke to that. After hearing it and listening to it, it clearly dictated to my intuition which way it should go. It's unusual, in that you almost can't hear a speck of reverb on the thing. It's just kind of dry-bones, so it really has a particular character. You can hear the room, but without it reverberating in an ersatz way, which I think Yves is very sensitive to. If he hears something that's a little too lush or creamy, digital reverb, his back goes up. And I think for this he was really right. It was so raw and loose in a lot of ways. That kind of documented sound suits it well."

For Carter's horns, Kopelson mostly relied on a Neumann U47 mic. "It seems that wherever we go, the 47 tends to be the winner in a comparison. We might have used a Coles on something, but I can't be sure of that," he says, while also reporting that Carter sometimes wanders around a bit while he's playing, making accurate tracking a challenge at times. "He's from the Sonny Rollins school of, 'I can't feel what I need to feel and play and stay on your microphone at the same time.' If a lavalier didn't sound so shitty, I would use that on him, which is
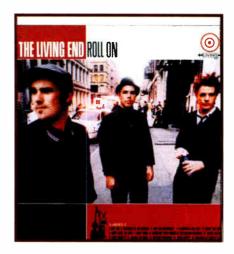
what Sonny uses. But the sound on the horn [with the fixed mic] is sort of like the Doppler effect. James definitely moves around a lot. But my feeling has always been that you're better off taking what you get as live performance. He's the artist; it's up to him how he wants his horn to sound."

According to Kopelson, there was only minor editing done to the direct-to-2 sessions; more important was finding the right takes of each tune. "I think some chunks were pulled out of extended soloing," he says. "There was a tendency for people to kind of get involved like, 'Yeah, the guitar solo is good on take three, but I like my tenor solo better on take four.' So maybe one of the cuts was edited that way. But usually when that was the case, it was like, 'Okay, let's try one more.' So the idea of the 2-track format, being 'play until you like it,' was used often enough." ∎

—*FROM PAGE 180, COOL SPINS*

The Living End: *Roll On* (Reprise)

Now that Green Day have gone all soft and sensitive on us (okay, that's exaggerating a bit), where's a guy to go for that aggressive, Clash-

oid adrenaline hit? Australia's the Living End is a good place to start. The Melbourne trio originally had heavy rockabilly leanings, but, more recently, have transformed into a hard-rocking unit that plays with an impressive ferocity and focus. They have the political consciousness of The Clash and Green Day and the sharp vocal blend of those groups and a hundred other punk predecessors. Guitarist Chris Cheney plays both lead and crunching rhythm very effectively, and bassist Scott Owen and drummer Travis Demsey are appropriately relentless in their attack. You might think you don't care about the concerns of Australia's working class, but like all great

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bands, the Living End makes their message universal, and besides, there's more here than just anthems for the oppressed; Cheney is a *good* writer. Already one of the most popular groups "Down Under," these guys could break big in America if they landed on the right tour. They've definitely got the goods.

Producer and recording engineer: Nick Launay. Mixer: Andy Wallace. Studios: Sing Sing (Melbourne; tracking), Soundtracks (New York City; mixing). Mastering: Tom Baker/Precision Mastering (Hollywood).
—*Blair Jackson*

Bob Belden: *Black Dahlia* (Blue Note)

Bob Belden has become best known as a jazz producer in recent years, but he is a compos-er and a musician, as well, and this CD should re-establish his credentials in that world. The lush suite for orchestra and jazz band is an evocative series of pieces that were inspired by the real-life murder of an aspiring actress named Elizabeth Short in Hollywood in the late '40s—the famous (and never-solved) Black Dahlia Murder. Belden says in the liner notes that he was influenced by Jerry Goldsmith's evocative score for Roman Polanski's *Chinatown*—still one of the greatest depictions of the seamy underbelly of L.A. in the '40s—and it is clear that he has also absorbed the musical vocabulary (including a few of the clichés) of the original *noir* composers. Belden uses an orchestra and a number of fine jazz soloists (including trumpeter Tim Hagan and sax players

Joe Lovano and Lawrence Feldman) to paint pictures of the glamorous world of Old Hollywood, of the dark side of the city, and to convey the hopes and fears of our heroine. Some of the jazzier pieces are reminiscent of late-'40s and early-'50s Miles Davis—another fine jumping-off point. This is really the score for a movie that doesn't exist. It's a fascinating and engaging work.

Producers: Bob Belden and Eli Wolf. Engineer: Richard King. Studio: Sony Music Studios (New York City). Mastering: Mark Wilder and Seth Foster/Sony (New York City).
—*Blair Jackson*

Jack Smith and the Rockabilly Planet: *Cruel Red* (Run Wild Records)

Run Wild Records does a great job of keeping the spirit of rockabilly alive with recent releases such as *Blastered*, a delightful tribute to Phil and Dave Alvin's band The Blasters. And Run Wild artist Jack Smith has been keeping the flame burning, himself, since he first got fired up by rock 'n' roll in the '50s. Smith is an exceptional songwriter with a special feel for the real deal. *Cruel Red* has plenty of dangerous Burnette Brothers-style guitar work, as well as some more blues and swing-tinged arrangements; it's a timeless pleasure and a real treat for fans of the genre.

Producer/arranger: Rory MacLeod. Engineer: Russ Martin. Studio: Viscount Records (Cranston, R.I.). Mastering: Russ Martin/Viscount Records.
—*Barbara Schultz* ■
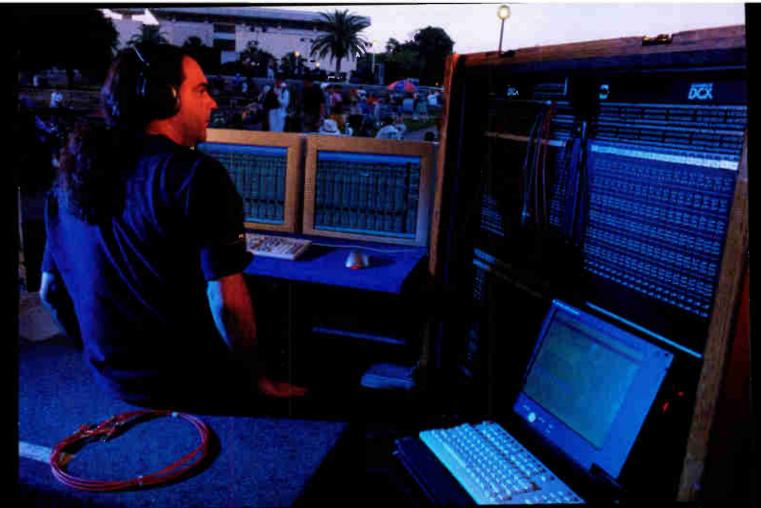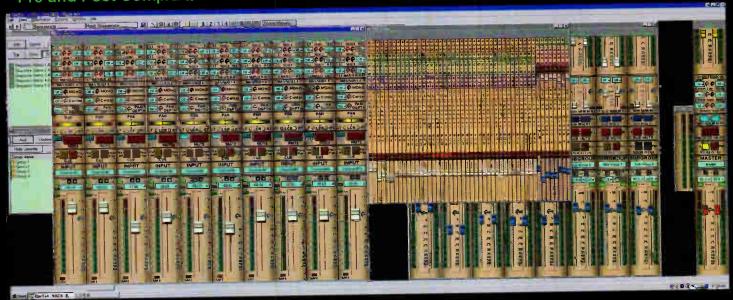
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L.A. GRAPEVINE

by Maureen Droney

Over at Future Disc Systems, they've found that cutting across the spectrum can be a successful business strategy. Chief mastering engineer

Chief mastering engineer Steve Hall inside Future Disc Systems

Steve Hall continues to work on stereo hits for artists such as Sisqo, Babyface, Lionel Richie, Jill Sobule and Green Day (whose Platinum HDCD *Nimrod* was mastered by Hall), while also venturing seriously into surround, with projects under his belt for the prestigious Pioneer Classics Series, as well as for Earth, Wind & Fire, Deep Purple's classic *Machine Head* DVD-A reissue, and Emerson, Lake & Palmer (Rhino's *Brain Salad Surgery* DVD-A). Down the hall, in response to client demand, a DVD authoring suite staffed by Dave Conrad has been set up for audio and video encoding. Meanwhile, Future Disc's vinyl department has been going nonstop, with vinyl expert Kevin Gray working his custom

Class-A Neumann Zuma disc cutter for both audiophile reissues by artists such as The Eagles, Al Green and Elvis Presley and 12-inch club mixes for Madonna, Cher, Ricky Martin and William Orbit.

There's more. Mastering engineer Kris Solem has kept busy with projects such as Master P and Enrique Iglesias, and engineer Pete Thomas has been specializing in edits, both clean and radio, for artists from Mötley Crüe to Snoop Dogg.

Hall, whose highly customized suite is set up for 5.1 surround, is staring to become known for helping make surround mixes sound natural. His tools include a custom Class-A console, Manley and GML EQs, Pacific Microsonics HDCD converters, a Weiss digital console and Sonic Solutions.

He's particularly proud of the work he did on the surround re-mastering of Earth, Wind & Fire's *Gratitude*. The project, which was remixed by Paul Klingberg, looks to

NY METRO REPORT

by Paul Verna

Among its many effects on the recording industry, the home studio explosion has polarized the mastering side of the business.

Nowadays, virtually all mastering studios fall into one of two categories: lavishly equipped, high-priced, multi-room facilities staffed by world-famous engineers who do the bulk of the major label business; or personal studios with modest digital audio workstations and owner/operators who know how to work them.

Somewhere in the middle is the Lodge, a fast-rising New York studio owned and operated by young engineer Emily Lazar. The Lodge is a far cry from your typical bedroom operation. It features a Sonic Solutions SonicStudio

workstation and state-of-the-art outboard gear from Avalon, Apogee, Prism Sound, Pultec, TC Electronic, Tube-Tech, Weiss and Z-Systems, to name a few.

On the other hand, Lazar's studio does not purport to be Sterling Sound, Masterdisk, Bernie Grundman, or any of the other upper-echelon, multiplex studios. For starters, Lazar is essentially a one-woman shop (though she employs a small support staff). Also, hers is a personal, idiosyncratic approach that puts the focus on the creative side of the mastering process.

"I was a creative writing and music major in college, so I approach mastering by seeing each project from the artist's point of view," says Lazar. "I can get as technical as necessary, but that's not always my natural approach."

In just a few years in business, Lazar—who assisted Greg Calbi at Masterdisk before venturing out on her

A distinguished group of industry professionals took part in the panel discussion and demo "Making Multichannel Music Work," which was co-sponsored by Dolby Laboratories and The Hit Factory and held at the Hit Factory. L to R: Blue Man Group founders Matt Goldman, Phil Stanton and Chris Wink, producer/engineer Phil Ramone, general manager for multichannel music at Dolby John Kellogg, technical editor of Sound & Vision magazine and panel moderator David Ranada, producer/engineer Frank Filipetti and composer/electronic music pioneer Wendy Carlos.

COAST

NASHVILLE SKYLINE

by Dan Daley

Nashville is rapidly becoming a Pro Tools town. Few major conventional facilities can get by without at least a basic system in house, and the number of large systems in personal use is ballooning. That's prompting some fundamental changes in the studios business here, as well as creating a host of new opportunities.

The infusion of Pro Tools has inspired studio JamSync, one of the city's earliest PT champions, to offer Pro Tools data transfers to various other formats—including 24-track analog and MDM formats—as a stand-alone service.

"It's funny. Transfers were something that we always just did as part of a Pro Tools project," notes K.K. Proffitt, chief engineer and co-owner, with her husband Joel Silverman, of the three-year-old studio, whose core business has been digital audio for corporate and special-interest video. "But more and more people began to come in and needed to have their audio transferred to Pro Tools, to the point where it made sense to offer it as a service."

Proffitt—who stresses that she has been working in Pro Tools for a decade, long before it surfaced in the Nashville market and when it was often derided as sonically inferior—adds that where the transfer business clientele is coming from is also interesting. "It's from studios that I've never heard of," she says. "A lot of home studios, personal studios,

project studios; ones that had invested in ADAT or DA-88 as their main format. Now they're coming to transfer to Pro Tools so they can go and edit, tweak and mix."

(JamSync also added another New Economy-type service this year: doing "up-mixes"—creating a multichannel audio master from a stereo one using phase, EQ and other techniques to extract and isolate audio elements—and then authoring them to DVD-R discs, which serve essentially as previews for record labels considering catalog reissues in a multichannel format.)

If the Pro Tools phenomenon seems to be hitting Nashville a bit late, compared to New York, L.A. and Miami, then it's worth remembering that Nashville's studio community was the first as a group to significantly embrace digital audio in the late 1980s, particularly the Pro-Digi 32-track format, and later the 48-track DASH format. There was a time, in the early 1990s, when Nashville had more digital multitracks than either New York or Los Angeles. The major difference is that this technological round of renewal is coming from the bottom up, not from on-high at the city's major facilities. Milan Bogdan, general manager at East Iris, agrees. "Studios at this level in Nashville adding Pro Tools have been driven by demand from beneath, definitely," he says. "It's not the [major] studios that are driving it this time. This time, the studios are reacting to a trend. But that's the way it's supposed to work. There's certainly no
—*CONTINUED ON PAGE 204*

Perry Farrell at Bernie Grundman Mastering in L.A. L to R: mastering engineer Brian Gardner, Farrell, mixing engineer Carmen Rizzo, programmer Brendan Hawkins and engineer Greg Collins.

SESSIONS & STUDIO NEWS

SOUTHERN CALIFORNIA

Seminal L.A. scene-hopping celeb Perry Farrell (Jane's Addiction/Porno for Pyros) recently stepped into Bernie Grundman Mastering (Hollywood) to put the final touches on his latest solo album, *Song Yet To be Sung*, which will be released June 19 on Virgin Records. Brian Gard-

ner was in to engineer along with mixing engineer Carmen Rizzo, programmer Brendan Hawkins and engineer Greg Collins...Janet Jackson and producer DJ Quick were hanging out at Skip Saylor Recording (Los Angeles) mixing and upcoming release for Virgin Records: engineer Chris Puram and assistant Paul Smith were behind the desk. Sony Music artist Gin-U-Wine also spent some time tracking and mixing some new mate-
—*CONTINUED ON PAGE 205*

Engineer Cynthia Daniels at the board in Kampo Studios

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be one of Sony's first DVD-Audio releases. "Paul mixed from baked original 24-track tapes at Kalimba Studios with [EWF leader] Maurice White," he explains. "One reason it was great to work on it is that Paul has become a genius at the center channel and how it should be used. So many people don't use it, but the way Paul does has made me a believer in it, because it totally anchors the front image."

Once the EWF masters arrived at Future Disc, Hall did some fine-tuning and enhancing, mainly using a TC Electronic 6000 and cutting 88k, 24-bit, 6-channel. "We panned the back to the front sides a little bit to make it feel more like you were in the audience," he notes. "A lot of the guys that started going from 2-channel to surround make a division between the front and the back. But the idea that the space is really circular is something that people are starting to experiment with, and in this case, it worked really well. We also used a 'concrete parking garage' program that's in the TC's surround environment, which was great, because it gave us a more cohesive environment and opened it

Partners Kent Verderico (left) and Nathan Smith at Blue Ribbon Studios

up into an arena. The result is a really great concert experience."

Another surround project that's been ongoing at Future Disc is mastering and authoring for a classical series recorded in premier European acoustic environments and released on the Pioneer Classics label in association with the production company Media Hyperium.

"I believe they were recorded for the BBC originally, some of them 10 or 15 years ago," Hall comments. "They come to us on Digibeta, we clean them up and de-noise, then we blow them out to 5.1. It's been very effective, and we've gotten some very gratifying reviews."

Some of Hall's tools for stereo to 5.1

World Radio History

expansion are made by AMG. He also makes heavy use of TC Electronic's TC 5000 and 6000.

"I went to the AMG world Website and read up on ambisonic recordings," he says, "then got one of AMG's boxes. It creates a phenomenal center channel where, basically, the sweet spot is as wide as your left and right speakers. You don't have to be right dead center to hear the whole front image.

"Working in surround has definitely been a challenge," he states a bit ruefully, "because the tools to do this aren't all intact. It's like bits and pieces of equipment that you have to try to get to work together. I'm hoping things progress rapidly and new technology comes out that makes life easier for multichannel mastering."

Studio 7, the DVD authoring suite, came into being because of client requests. "The DVD process is complex," Hall notes. "When a project gets loaded and/or modified by several engineers in facilities with different systems, it can cause errors and degradation. Preparation of a final DVD master should really be done at the mastering level, where they can retain the best possible quality."

About DVD-Audio in general, Hall

SESSION SPOTLIGHT
PIECES OF A DREAM TURNS 25

by Gary Eskow

Twenty-five years of success in the recording business is an exceptional achievement, especially if you're still under 40 when you hit that milestone. But that's how it is for James Lloyd, keyboardist and musical director of the smooth jazz band, Pieces of a Dream. Lloyd and drummer Curtis Harmon founded the Philadelphia band while they were teenagers and have kept the group active ever since.

To celebrate their silver anniversary, Pieces of a Dream released a new album, *Acquainted With the Night*, their first on the Heads Up International label. Most of the tracks were developed in Lloyd's project room and completed at The Studio in Philadelphia—owned by the noted string arranger and musician Larry Gold—with Jeff Chestek handling the engineering duties.

Lloyd's studio centers around a Mackie 32x8 analog console, Mackie HR 824 monitors and a Roland VS-880 digital recorder, which he uses for writing purposes only. "I lean heavily on my MPC 2000, and lately I've really gotten into the Roland VP-9000 variphrase processor," he says. "I like the fact that you can adjust pitch and time independently. I processed both drum and vocal tracks with it."

Lloyd brought his rack, which includes three keyboards (Korg Triton and SG Pro and a Roland XP-80), the MPC 2000 and an Alesis QSR synth module into The Studio, and over a two-day period, dropped songs to 2-inch tape. "It does take time to drop to tape. Some songs had as many as five kick drums and maybe six or seven snares. I used all eight outputs of the MPC during each pass, but the time still adds up.

comments: "It's starting to take off. It's been a slow start, partly because the labels really have to commit to it for it to succeed. And with all the new media transitions going on—all these formats and technologies coming at the same time—they've had their hands full. But it's obvious to anyone who has heard good surround mixes that it's going to happen. There's just no going back."

Downtown on North Main Street, in the artists' loft community known as The Brewery, three enterprising young engineer/musicians have set up a "weekend-run" recording facility dubbed Blue Ribbon Studios.

Partners Kent Verderico, Nathan

"After we dropped, we started doing overdubs. At times, we were using both Studios A and B. Gerald Albright was laying horn overdubs on the tune we co-wrote "Off the Hook" in one room, while vocals on some of the songs were being tracked in the other."

Although everything was tracked to 2-inch and all mixing was done in that medium, Pro Tools was also used during the process, according to Jeff Chestek. "We made slaves on Pro Tools. First we filled up one 2-inch reel, and then we dumped these tracks into Pro Tools. The Pro Tools station was then slaved to the 2-inch machine, which we used to keep tracking. When it came time to mix, we slaved the 2-inch machines together and worked off of the original analog tapes."

Many engineers these days like to track to 2-inch and immediately drop to Pro Tools, looking to avoid the wear and tear of multiple rewinds and playbacks on tape. "That's the way I prefer to work," says Chestek. "I personally have no problem mixing with Pro Tools. If you use good converters on the way in—we have Apogee AD-8000s—the sound is very nice. On this project, we mixed off the multitracks. We used an SSL E Series console. The Studio is getting ready to install an [SSL] J Series console in several months. We really like the sound of that board."

For more info on Pieces of a Dream, check out their Website at www.piecesjazz.com. ∎

World Radio History

Smith and Jeff Champlin, who met while studying recording at USC, took over the 1,800-square-foot live/workspace a year ago. The trio then proceeded to lie out some major sweat equity enlarging the control room to over twice the original size and improving the existing tracking space.

Downtown is not the first place most Angelenos in the music business think of for a recording studio location. But USC is downtown-close, so the partners were familiar with the area. And, during their hunt for studio space, they found the price at The Brewery to be right. Actually, getting into a space there was a stroke of luck, because, in consideration of the graphic artists who dominate the building's population, only five of the lofts are designated to be recording studios.

"It was pretty seedy when we moved in," comments Verderico, while taking a break from setting up for the weekend's session. "There had been this kind of gothic, punk band living here and rehearsing, and there was a small studio. We took over and worked every weekend for nine months to build it out."

Now, Blue Ribbon is equipped with a DDA AMR-24 console that was previously housed at Santa Monica's busy AdMusic, where Verderico spends weekdays working as an assistant engineer and studio tech. (All three partners have industry-related "day" jobs, hence the description "weekend-run" studio.)

"It's a British board that's had a lot of modifications done on it by AdMusic," he says. "It has a custom Class-A API stereo bus, and it's retrofitted with Uptown moving fader automation."

Blue Ribbon offers a Pro Tools 5.1 system, as well as 24 tracks of hard disk recording using three E-mu Darwins, which clients can transfer to ADAT or Pro Tools if necessary. Verderico, who spent some time working for E-mu, is a fan of the rather esoteric Darwins. "These came out in '95, and were totally state-of-the-art," he explains. "They basically had then what Mackie and Tascam have just come out with. They were so cutting edge then, and, personally, I think they still are. The sound quality and the craftsmanship were really well done."

For those who must have analog, there is also a Soundcraft 24-track 760 recorder. "If nothing else, it looks cool," laughs Verderico.

Smith, meanwhile, is a Pro Tools fan, as well as a computer maven, and has modified his Macintosh G4 laptop with

a Magma CB2 expansion bay that allows him to run up to 32 tracks of Pro Tools on it. "Digidesign doesn't officially support Pro Tools for laptops," he notes. "But this has been pretty reliable. And it's very cool, because if I record a band at the studio and then need to grab a vocal or a guitar track somewhere else, I can do it with just my laptop. The ideal is, if you're on a trip and you want to mix on the airplane, you can do that too.

"Another reason I like using the laptop for live recordings in different locations," he continues, "is that, besides convenience and the use of multiple inputs, with Pro Tools, there are plug-ins

with great analyzers such as Spectra Foo and Waves. I can go into a hall where I'm going to work and do a whole room analysis from each microphone—reverb time, phase, frequency response and just about anything else I could ask for."

That kind of creative approach to equipment is one of Blue Ribbon's strong points. Another is the goal of taking a very personal approach with each client. To that end, Champlin and Verderico, who have worked together on several albums as well as soundtracks and demos, often find themselves serving as an in-house production team for Blue Ribbon projects.

"We're just getting started," Verderico comments, "working with bands doing demos or making their own CDs and doing voice-overs. We've also done some commercials and independent film score work; we have picture and SMPTE capability, so we can do things that require locking picture and sound. We're into pretty much whatever comes along."

Monitoring at Blue Ribbon is on Tannoys and NHT M10s with custom Thomas "Beno" May passive crossovers. Outboard gear includes Alesis, Lexicon and Yamaha effects, a Demeter tube mic pre and Apogee Rosetta 24-bit A/D con-

version. Instrument-wise, Blue Ribbon's recording space is home to a Hammond T-200 organ with a built-in Leslie, a Hohner Clavinet D6, a Fender Rhodes 88 and various guitar amps.

A plus to recording at a studio in what has been called the largest artists' community in the country? Barbara's, The Brewery's hip, on-site restaurant, featuring 12 different beers on tap and the potential for a David Hockney or other artist-type celebrity sighting. Hey, it's L.A.—you never know. ∎

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own—has amassed an enviable list of clients whose stylistic range reflects her own diverse tastes. Recent projects at the Lodge have included albums by Taj Mahal & Toumani Diabate, Health & Happiness Show, Dash Rip Rock and Sinéad O'Connor. Lazar also mastered the *Saturday Night Live* 25th anniversary boxed set, the *Hedwig & the Angry Inch* cast album, a Lenny Bruce retrospective, nearly two dozen titles in the Putumayo World Music Series, and a host of high-profile soundtracks, including *Pokémon: The First Movie, American Psycho* and *Boys Don't Cry.*

"We're doing great," beams Lazar. "We are constantly growing! We're expanding into new areas of the industry, and I'm like a kid in a candy store...I always want to try out all the new flavors!"

Lazar's credits are a huge reward for an arduous, dues-paying process, in which she worked as an assistant by day and a mastering engineer by night, accommodating a growing pool of (mostly independent) artists who, impressed with her technical grasp of the studio machinery and her sensitive approach, would hire her to do their projects. At the same time, Lazar was teaching music technology at New York University, where she earned her master's degree and a graduate fellowship.
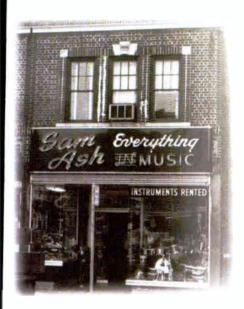
Torn between her academic career, a promising position at Masterdisk and the lure of opening her own shop, Lazar did what any savvy entrepreneur might do: She got out her credit card and went a chargin'.

"One insane day, I just bit the bullet and ordered some gear, and the rest is history," says Lazar, breaking into a hearty laugh. "I had some ideas, but I never imagined that I would be this fortunate. I really love what I do, and I get to work with so many truly gifted people."

Located in a vast loft on Broadway in Lower Manhattan, the Lodge features a spacious mastering suite, a vibey lounge set up with a 5.1-channel monitoring system, and a programming/composition room equipped with a Pro Tools system and other assorted goodies. (The latter studio is used mostly for Lazar's own music, which she continues to pursue despite her grinding schedule running the creative and business sides of her operation.)

One of only a handful of female mastering engineers in an overwhelmingly male-dominated field, Lazar is at a loss to speculate on how—or if—her gender has affected her career. "There's
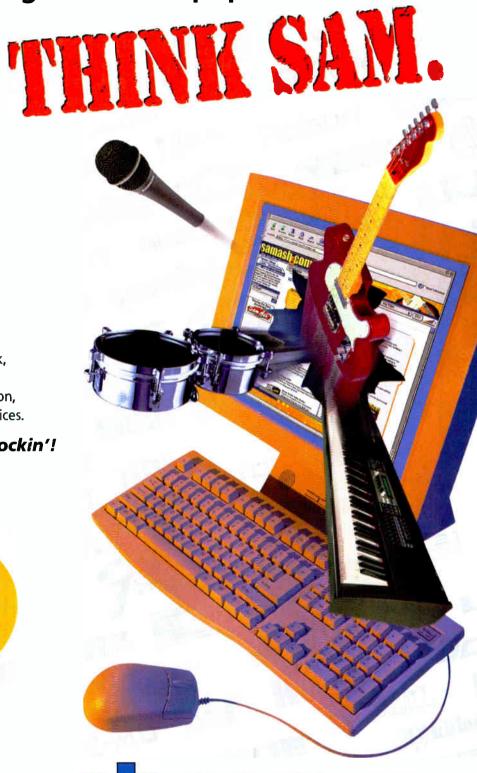
World Radio History

no way for me to know what it would have been like for me if I had been a guy," she says. "Maybe it would have been easier, or maybe it would have been harder. Who knows? Every individual has their own set of challenges in life, and I don't consider being a woman an obstacle. I don't think of myself as a 'female' mastering engineer, and I don't think most of my clients see me that way either. I just do what I do."

Any time you can get Wendy Carlos, Phil Ramone, Frank Filipetti and the founders of Blue Man Group in the same room, you've got something going. If the room happens to be a studio at the Hit Factory and the event a panel discussion and demo of 5.1-channel projects, then all the better.

Co-sponsored by Dolby Laboratories and the New York Institution, the April 4 event brought together an eclectic roster of musicians and studio professionals who are on the cutting edge of the multichannel revolution.

Dolby's John Kellogg, himself a 5.1 pioneer, played "Toccata" from Emerson Lake & Palmer's *Brain Salad Surgery* DVD-Audio, which he mixed. Blue Man Group sampled their own DVD-A, titled *Audio*, and Filipetti showcased the James Taylor track "Line 'Em Up," citing it as an example of what he calls "super stereo," i.e., a surround mix that does not dazzle with its effects as much as it renders an enveloping acoustical landscape. Because of a fluke, Carlos was not able to play a selection of her own material. However, the *Switched-On Bach* and *A Clockwork Orange* composer praised the multichannel medium for its ability to deliver "more clarity for each instrument."

Moderated by David Ranada, technical editor of *Sound & Vision* magazine, the panel included lively discussions among the participants and an invited audience of some 80 industry pros. One skeptic asked Filipetti whether 5.1 offered a real advantage over stereo. Filipetti replied: "I can remember when people were asking why bother with stereo, since consumers at the time typically put their two mono speakers in different rooms." Kellogg reported that ELP members Keith Emerson and Greg Lake, on hearing the 5.1 mixes for *Brain Salad Surgery*, said, "This was how we envisioned our music being heard, but we didn't have the format back then."

With sales of DVD-Video players in the tens of millions of units and interest mounting in the nascent DVD-Audio and Super Audio CD multichannel formats, it seemed as good a time as any for Dolby and the Hit Factory to foster fresh dialog on this liveliest of topics. ∎
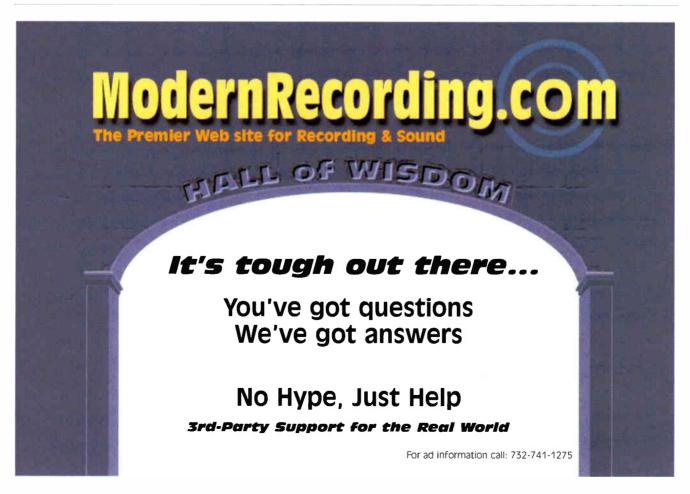
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shortage of Pro Tools sessions; the session we're doing now with John Hiatt is the only 24-track analog session we've done since November."

Predictably, Pro Tools proliferation has drawn considerable responses from major facilities. In March, Sound Stage opened its Drive-Thru studio, centered on a large Pro Tools systems with a 40-fader Pro Control. "It's definitely in response to client demand," says studio manager Michael Koreiba. "But our approach is that everyone using Pro Tools on their own has certain limits. We see that as clients come in because their drives are completely full. We say, when you've maxed out your system, come in here and let us take it from there."

Jim Stelluto, partner in Entropy

Recording, watched his business go from recording band practice at rehearsal facility Soundcheck to becoming a full-blown, Pro Tools-based tracking facility using Soundcheck's 80x40 room. "Now there's so much Pro Tools in Nashville that you have to have something—in our case, the large tracking room—that differentiates one Pro Tools studio from another," he observes.

The project studio was slow to arrive in Nashville, but now that it's here, it's proliferating at a very rapid rate. And, in the process, it's creating an ad hoc new audio infrastructure in Nashville: more personal/project studios based on hard disk recording and more conventional studios adding technologies and services to support them the minute the bedroom or garage door opens.

In other news, noted Nashville studio designer Steve Durr has merged his firm, Steven Durr & Associates, with A/V project management and installation company Broadcast Marketing Associates. The new entity is called Durrell, and its newly combined capabilities will broaden both its customer base and its range of competencies, Durr says.
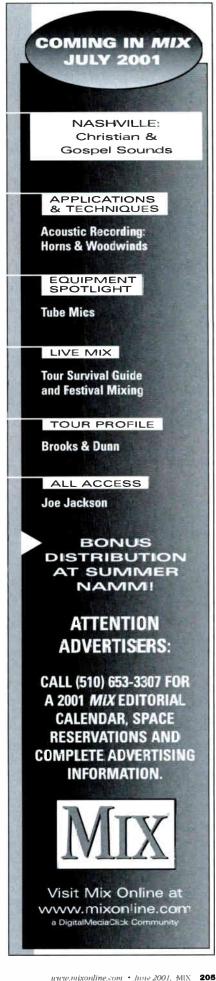
Coda: A wag once described the U.S. and England as similar cultures separated by a common language. Nashville and Austin, Texas, have had the same sort of relationship; the fence they share being country music. So here's a little gem on that topic I ran across. Take it for what it's worth. From Brett Sokol's report in the Miami *New Times* on the South by Southwest music conference in Austin last March: "...Austin itself has become something of an exiled Grand Ole Opry, maintaining the same tortured love-hate relationship with Nashville that Miami's Cuban exiles enjoy with Havana: a longing to return to what's seen as their cultural wellspring, mixed with a loathing for a regime viewed as illegitimate usurpers." ∎

Send your Nashville news to dan writer@aol.com.

—FROM PAGE 197, SESSIONS AND STUDIO NEWS rial with producers Damon & Greg, engineer Ian Blanch and assistant Jaymz Hardy-Martin III. Dead and buried, but still moving units: The latest Tupac album *Until the End of Time* was also recently mixed at Skip Saylor by engineers Claudio Cueni and Keston Wright, with assistants Hardy-Martin III, Regula Merz, Jason Vescio and Smith. Long Beach Dub Allstars and producer Mar-

shal Goodman mixed some new cuts for Dreamworks; Puram and Hardy-Martin III were in to assist...Deana Carter and mastering engineer Steve Hall put the final touches on her new album at Future Disc Systems (Hollywood)...The Carmelite Sisters of the Most Sacred Heart stepped into Tom Weir Recording Studio (North Hollywood) to record the song "My Eyes and My Heart Will Remain Forever" with producer/engineer/studio owner Tom Weir and assistant Greg Whiteside. The project was part of a commemoration for the 60th anniversary of the Sacred Heart Retreat House. Also at Tom Weir: Verve recording artist Mighty Jo Rodgers was in tracking with Weir and engineer Justin Bell...Jazz master David Benoit was in Studio B at Ocean Way (Hollywood) recording his 23rd album with engineer Clark St. Germain...Mariah Carey and producer Dana Chappelle tracked vocals for Carey's forthcoming album at Westlake Audio (Los Angeles). Guest artists on the album include Ludacris, Da Brat and Xhibit. Kevin Guarnieri assisted on the sessions. LL Cool J also tracked some new material at Westlake with engineer Claude Achille and assistant Cesar Ramirez... New band sub.bionic finished their new album *You I Love* at Extasy Recording Studios South (Hollywood). Ed Cherney mixed the project with additional engineering by David Byrnes.

NORTHEAST

Dave Matthews stopped in at Indre Studios (Philadelphia) for two radio broadcasts, which included a solo acoustic performance. House engineer Michael Comstock engineered the session. Shawn Colvin also cruised into Indre for some radio time, opting to bring her full band to promote her new release *Whole New You*. Guest musicians included drummer Shawn Pelton of the *Saturday Night Live* Band among others; Comstock again engineered the session...The Verve Pipe were in at Sound on Sound (NYC) recording and mixing a forthcoming project for RCA. Producer Adam Schlesinger was at the helm with engineer Chris Shaw and assistant Bojan Dugich...The band In Between Blue camped out at Jolly Rodger Recording (Hoboken, NJ) to work on their latest album, *Heterogene*, for Orchard Records. The effort was produced by Mike Mazerella and engineered by Dave Dominsih...Score Productions finished a full 5.1 orchestral suite based on the *ABC World News Tonight* theme at Kampo Studios (NYC). Cynthia Daniels

In at Mushroom Studios, Vancouver, BC, with Tokyo punk outfit Foul, L to R: producer/engineer Chris Fuhrman, bassist Manabu Hiramatsu, guitarist/vocalist Ken Taniguchi, interpreter J.D. Ullrich, drummer Daisuke Ohchi and manager Hiroshi Nagamori.

engineered the piece originally at Ocean Way (Nashville), and then mixed the project on Kampo's SSL Axiom-MT.

SOUTHEAST

Kansas stopped in at East Iris Recording Studios (Nashville) to work on a forthcoming album for Sony with producer/engineer Jeff Glixman and engineer Kevin Szymanski.

NORTHWEST

Tom Waits was back at Prairie Sun Recording (Cotati, CA) cutting some new tracks for the new Debra Winger film *Big Bad Love*. Engineer Oz Fritz was in on the session with assistants Jeff Sloan and Gene Cornelius. Also at Prairie Sun, jazz guitarist Larry Coryell, drummer Steve Smith (formerly of Journey), alto sax player Steve "The Count" Marcus and bassist Kai Eckhardt were cutting some new tracks for a forthcoming Magna Carta release. The effort was produced by Smith with Mark "Mooka" Rennick engineering; second engineers on the project included Cornelius, John Anaya, John Klose and Ralph Patlan... L.A.-based producer/engineer Chris Fuhrman was up north at Mushroom Studios (Vancouver, BC) working with the Tokyo punk outfit Foul. The band was cutting their new album for the Japanese label King Records.

STUDIO NEWS

Sunrise Sound (Houston) recently upgraded their Studio A with the installation of a 72-input SSL 4000 G+ console and an integrated 48 I/O Pro Tools system...Rainstorm Studios (Seattle) has moved into the former home of Jungle Studio in downtown Seattle. Studio Pacifica designed the five-year-old, 1,800-square-foot facility. ∎

Send your Sessions and Studio News to rhanson@intertec.com.

NAB 2001

offering real-time networking and instantaneous file location via a touch-screen interface.

Digidesign (www.digidesign.com) announced Pro Tools|24 MIX³ (pronounced MIX-cubed), offering more audio processing power and support for 48 channels of I/O. The $11,995 retail

AETA MIX2000

SADiE Artemis

system includes the MIX core and two MIX Farm cards and the surround mix-capable Pro Tools 5.1.1 software, which now supports both Power Mac and Windows 2000.

Fairlight has added support for the huge range of VST software plug-ins with the announcement of its Plug-Ins Manager system offering high-speed, low-latency operations via System Services Module DSP boards, with seamless integration with existing FAME2 and Prodigy 2 user interfaces and automation. Both real-time and non-real-time VST plug-ins are supported.

WaveFrame (www.waveframe.com) debuted WaveFrame/7, the latest generation of its flagship DAW. The new system retains the familiar WaveFrame editing interface, while adding 24-bit audio resolution, 5.1 mixing, DirectX DSP plug-in support, networking and up to 32 channels of I/O. The system records/plays standard broadcast .WAV files and can import SD2, WaveFrame V6.x files and the OpenTL files used by Tascam's MX-2424 multitrack. Meanwhile, Version 4 software for the FrameWorks/DX system adds features such as 24-channel AES/EBU support, 192kHz functionality and a DSD/SACD option.

Speaking of SACD, **Merging Technologies** (www.merging.com) should ship its Pyramix DSD editor (developed jointly with Philips) this month. Features include 2 to 24 channels of DSD recording/editing, real-time FX and crossfades, and PCM-to-DSD conversion.

So after using all of these cool tools to create a masterpiece, how do we get it out to the world? Microsoft (www.microsoft.com) suggested a solution in the form of Windows Media Audio and Video 8, offering real-time delivery of full-screen, near-DVD-quality film content over today's broadband connections. The Windows Media Audio and Video 8 codecs are compatible with Windows Media Player 7 and 6.4, as well as Windows Media Player 7 for the Mac, released at NAB.

NAB returns to Las Vegas from April 6 to 11, 2002. Mark your calendars, and don't forget those jetpacks! ∎

Picks You May Have Missed

If there was a lot to see at NAB, there was a lot to miss. Here are a few slick items you may have overlooked…

Audio-Technica AT3035: This cardioid studio condenser features a large (26mm) diameter capsule, 80Hz filter, incredible 158dB SPL handling (with -10dB pad), and impressive 12dBa noise performance. Price: $349—with shockmount. Visit www.audiotechnica.com.

Edirol VideoCanvas™ DV-7: Need a low-cost, nonlinear video editing system? This one rocks, especially with its T-bar hardware controller, real-time processing (cuts/dissolves/wipes/effects), real-time DV output and removable 60GB hard drive. Visit www.edirol.com.

Nagra V: Targeted for early 2002, this 4-channel/24-bit field recorder writes Broadcast .WAV files (with timecode stamping) to inexpensive, removable 2.2GB Orb disks. It also has two minutes of buffer memory for swapping of drives *during* recordings for long-play applications. To be priced at 8 grand. Visit www.nagra.com/nagraaudio.

sound-effects-library.com: Making its USA debut at NAB, this on-line (hence the name) collection offers some 200,000 major studio sound effects, music compositions and MIDI samples, with fast, web-based auditioning and a powerful search engine that finds what you need. Sounds are sold individually or via an annual license.
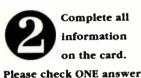
Studio Network Solutions (studionetworksolutions.com) was showing off its highly advanced Fibre channel Pro Tools network, which can deliver 128 tracks of playback (24-bit/48k).The single-rackspace enclosure can hold up to four 180-gigabyte drives. And on the show floor, everyone was talking storage!

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17. ☐ Production & Direction— Producer, director, etc.
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19. ☐ Artist/Performer— Recording artist, musician, composer, other creative
20. ☐ Other _____

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23. ☐ Have no involvement in purchasing decisions

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29. ☐ Immediate purchase
30. ☐ Files/future purchases

❻ Where your audio-related work takes place (check all that apply):
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32. ☐ Private (personal) production facility
33. ☐ Corporate or institutional facility
34. ☐ Remote or variable locations

(02)

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003	047	091	135	179	223	267	311
004	048	092	136	180	224	268	312
005	049	093	137	181	225	269	313
006	050	094	138	182	226	270	314
007	051	095	139	183	227	271	315
008	052	096	140	184	228	272	316
009	053	097	141	185	229	273	317
010	054	098	142	186	230	274	318
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012	056	100	144	188	232	276	320
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018	062	106	150	194	238	282	326
019	063	107	151	195	239	283	327
020	064	108	152	196	240	284	328
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024	068	112	156	200	244	288	332
025	069	113	157	201	245	289	333
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028	072	116	160	204	248	292	336
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034	078	122	166	210	254	298	342
035	079	123	167	211	255	299	343
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037	081	125	169	213	257	301	345
038	082	126	170	214	258	302	346
039	083	127	171	215	259	303	347
040	084	128	172	216	260	304	348
041	085	129	173	217	261	305	349
042	086	130	174	218	262	306	350
043	087	131	175	219	263	307	↑
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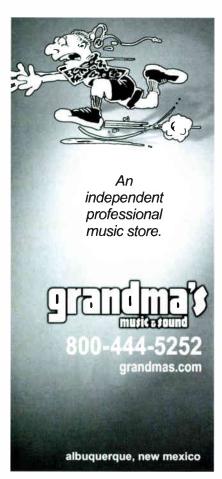
gineer and that my understanding of acoustics was exceptional. But, luckily, I also learned that there were people out there who knew a hell of a lot more than I did. And, again luckily, I came to realize that it made more sense on many levels to *buy* this knowledge instead of doing it myself.

And so it went. My very first real facility was built using everything I knew combined with and corrected by the knowledge of a few well-chosen professionals. And the result? That studio is still happily online today, essentially *unchanged.* The remix of MGM's *The Wizard of Oz* and countless other major films were done there, along with my fair share of albums. A new 128-track PARIS has replaced my MCI 24-track machines and my British desk, and my giant 130dB wall of pain is now a set of beautiful near-fields with well-designed sub assistance. But the room itself images so well that I have no plans to change it, even today.

Expanding from 24 to 128 (soon to be 256) tracks was no problem, as the snake troughs were built to expand. Conversion from analog to digital— from copper to glass—was painless, even though neither even existed when the place was designed and built. Hanging and feeding the HDTV projector was painless as well, as I was advised that some day a projector might happen, though 20 years ago I thought the guy was a bit of a dreamer (stone crazy, actually).

Back in the beginning, when I was advised to float a slab on neoprene, I was shocked by the price, and, to be honest, I only went with it because I thought it would seem really exotic and I could draw on it. The advice was based on the belief that the building rested on bedrock that reached under an untraveled superhighway about a half-mile away. Well, that highway has since been widened twice and is now gridlocked six hours a day. But that advice, along with some sand-loaded, dual-wall isolation technologies, is even now giving me a 23dB room with AC full-on during 5 p.m. Friday traffic.

SOLID, MAN, REAL SOLID

It's all about foundation—in this case, literally. But, in all cases, foundation is worth more than any other component. That pyramid is such a great example that it appears on our most circulated bill as an image of stability.

Be it a construction project as major as a studio, a custom Harley or even the next big Top 10 tune, your odds of success increase dramatically if the project rests on a solid foundation. A little work up front can (and probably will) save you a lot of pain and expense later.

Let me leave you with this thought: I knew a lot back when I built my first studio, and I assure you that I knew a whole lot more when it was completed. And, as I have been through the construction of several more since then, I know even more now. Boy, do I know a lot of stuff. And I know this: If I were to undertake a new facility right now, then I would call Peter Vanbergonis Storella. And if I were to design a new DAW, then I'd call Pirali—he knows what I don't. The next custom Harley? Jesse James or maybe Bourget. Experts.

Life is simple. Life is good. There are experts out there who can lay a foundation for your project and keep you out of the ditch now *and* in the future (well, maybe not on the Harley).
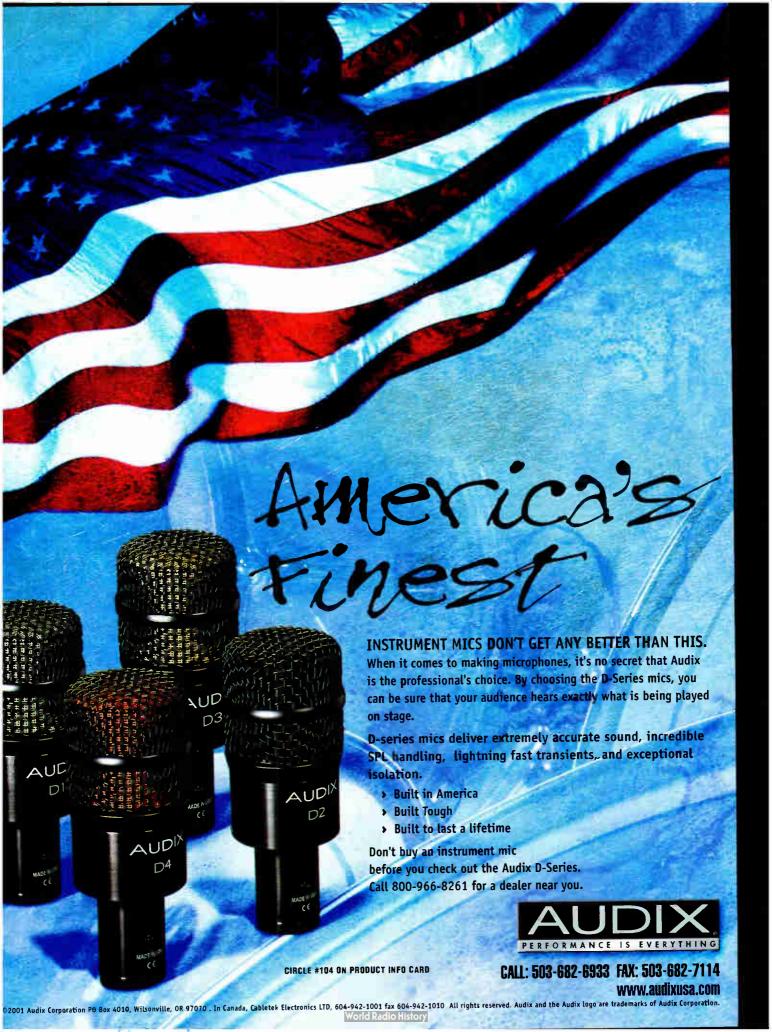
Now, don't get me wrong. I am *not* one to deliver a suitcase of cash and hand over the creative process. I need input, I need experts who work with me, not for me, and I suspect many of you are the same. So, maybe *that* should be your first step. Instead of planning your facility or your project, perhaps you should first check (honestly now) to see if there are areas where a little insurance, a little expert help in the beginning, might increase your odds of success.

This column isn't about hiring talent, it's about checking to see if you have all the talent and experience needed, and if not…acquiring it.

Do you think the women on magazine covers *look* like that? Or do you think they made themselves look that way? It works the other way: Agents comb the world looking for faces that their experience tells them are good *foundations* to build on. Once "discovered," a face is brought in and makeup artists transform it into a shootable dynamic canvas. Then the photographer creates attitude, lighting and settings and finally takes frozen slices of the animated totality. One of these is what stares through you at the magazine stand—the work of 20 creating the face of dreams on the foundation of one.

A good foundation is essential for building perfection. Just look at your nearest pyramid, or if not available, any supermodel's face. ∎

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and Barnes & Noble has been violating it. Amazon even managed to get an injunction against Barnes & Noble, forcing the company to take that feature off its Website. Tim O'Reilly, one of the most respected publishers of books and newsletters about the Internet and an open-source advocate, wrote an open letter to Amazon CEO Jeff Bezos, criticizing the company for its action and calling on Bezos to relinquish rights to the patent. While Bezos didn't agree to that, he did something potentially more intriguing: He teamed up with O'Reilly and

a Boston patent lawyer named Charles Cella to create a new Web-based company called BountyQuest, whose mission is "market-based patent reform."

BountyQuest is looking for people— inventors, engineers, researchers, even graduate students—who might have information germane to a patent fight, but who otherwise might not think of getting involved. How are they going to find these people? By offering "bounties" of up to $25,000 for information that helps to debunk any of the dubious patents and copyrights on their list. What goes on the list is determined by BountyQuest's corporate clients, who put up the bounty money (and Boun-

tyQuest takes a chunk). As of this writing, the list includes a patent on pre-paid cellular service, a patent on window shades that open and close automatically when the light changes, and a copyright on the design and image of a particular-style Japanese pagoda. The clients are usually anonymous, but sometimes it's pretty easy to guess who's looking for information.

Not surprisingly, one of the first bounties the site offered was for prior art that could damage Intouch Group's claim on previewing digital audio. Just nine days after the posting, Perry Leopold, alerted by his lawyer who read about the reward in *The New York Times*, sent a copy of his 1987 paper to BountyQuest. According to the site, "It quickly became apparent that his submission precisely matched all the criteria necessary to make him a winner." And so Perry Leopold became one of the first four winners of a $10,000 prize for showing that he invented something—which he never claimed to own—that someone else was now trying to collect royalties on.

It's been many years since Leopold played his music on the streets and made records in basements. PAN, unlike many of the companies that used its services, was profitable from the word go and still is as a networking resource and Web hosting service. A lawsuit against Rupert Murdoch (who bought Delphi and ran it into the ground) won Leopold a hefty settlement a few years ago. But he could have conceivably made a lot more from the work that he did—with the help of some of the most important figures in the music technology industry in the '80s and early '90s.

"Someone recently asked me what other things I might have patented, had I been of a mind to at the time," he says, "and if I had even realized such things were patentable." He then reels off some 18 ideas that most of us take for granted today, but for which he claims he could have "planted the flag." "But I consider all of these things innovations rather than 'inventions,' per se, and thus, to my mind, are not worthy of a patent. It's not like inventing the transistor—now that is an invention!" And think of where we would be today if someone had taken out a defensive patent against the concept, before Bell Labs came up with it. ∎

Paul D. Lehrman is a composer, author and educator, as well as "the guy" on Mix's Website, mixonline.com. His personal page is at paul-lehrman.com.

"Something New," because they messed with their own very successful formula. "And it's easy to not mess with the formula," Derfler acknowledges, "but we have enough formula."

So, the Big Question is, after making the Big Move to work with Ballard, what's the Big Difference? "My opinion is that you'll hear more defined and concise music," Derfler says. "I think *Everyday* sounds more that way than their earlier records. That has to do with going electric and the writing, which makes these songs different for the band.

"I could be wrong, but I had a feeling that they thought of this record globally. It has so many subject matters and goes from 4/4 to 9/8 time signatures. That's very complicated for pop guys to even think about."

IN THE CAN

Perhaps that's why it's so interesting to have a producer with Ballard's musical pedigree producing the album. As he says, "I'm a musician first, and it's important to be able to analyze what we're doing. So having a score means I can hear exactly what's happening."

Derfler believes that Matthews just *feels* it and then intuits where it's headed. "But I think his South African influences have given him the ability to hear rhythm in an interesting way. He comes up with some brilliant riffs in varied time signatures. The Beatles did the same thing. They didn't always understand how they got there, either."

As for Ballard's contributions to *Everyday,* Derfler observes that it's amazing to see a producer morph from one artist's style to another's. "I appreciate a producer with a wide palette. That's Glen. He has that ability to bring out the best in people, but still let them have their own artistic voice or expression."

That puts him in some elite company, in Derfler's eyes. "To me, Glen, George Martin and Quincy Jones are in the same ballpark. Whatever you need done, they can do." ∎

Mark R. Smith has been a freelance writer for a decade. He hangs with his CD collection and his cocker pup, Dusty (as in Ms. Springfield), in Odenton, Md.

engine. The larger or more powerful the engine, the faster the access time. The number of channels supported can range from 32 tracks to 64 and beyond, if you use the new 15,000 rpm drives."

In addition to speed, reliability is a key consideration for drives. "We wanted our drives to be arrays," Berger says, "because we had heard of clients' drives getting corrupted and files lost, both from poor SCSI cabling issues and from not unmounting drives correctly. By switching to an array, we now have complete fault-tolerance—we are covered from any data loss, short of catastrophic failure."

Berger says The Village's storage design is completely redundant. "Every component has two power supplies, which have their own UPS backup. The drives are RAID-3 and have dynamic spares. We also back up the whole system daily to tape. We can assure the clients that all their data is both secure and safe at all times."

The RAID approach also gives The Village some additional benefits. "We no longer have to do any disk allocation," Berger says. "And when transferring files to a back-up set or a clients drive, the files we need are not spread out over several drives."

As far as actually installing the network, construction is usually not an issue. "Cabling is a relatively easy installation process," Bacorn says. "And most new facilities already have fiber optics installed. The storage is all installed in one location, typically the machine room. From that point, with the exception of the software and the HBA cards, the installation is complete."

Berger adds that the location of the networking gear needs to be well thoughtout. "We had to make sure that we had ventilation to maintain a optimal temperature for computer equipment," he says. "We also had to make sure that we were able to hear any audible alarms. Because a failure would not bring the system down, we would need to know if the system required immediate attention. Using fiber gave us flexibility. We didn't have to be centrally located in the facility, and we didn't have to worry about any kind of external interference when installing the cables."

Despite the many advantages of a Fibre-Channel SAN, Bacorn acknowledges that it's not the right networking approach for all facilities. "Most could use one," he says, "but there is a cost involved that some may find beyond their means. If you are looking for a SAN solution, however, don't just purchase the cheapest. There are a number of SAN vendors in the world that sell on price, not functionality. Like anything that sounds too good to be true, it probably is, and your facility is not a good place to test a SAN." ■

Philip De Lancie is Mix's *new technologies editor.*

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Enhancements: $50 per inch for 4-color; $25 for 1-color screen (CMYK only); $10 per bold line; $10 for a black border; $25 for reverse type (white on black background).

Display rate: $156 per inch; 1-inch minimum / half-page maximum. Classifieds display must be camera-ready, sized to MIX column widths and art specs. Frequency discount rates available.

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Tel. (800) 544-5530 or (510) 653-3307; fax (510) 653-8171 E-mail: mixclass@intertec.com**

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AKAI S5000 AND S6000
TAKING SAMPLING TO THE NEXT STEP

Believe it or not, it's been three years since Akai unveiled its two flagship samplers. Now, with Version 2.12 software and some of the great options covered below, the S5000/6000 provides a stable, powerful and intuitive option for musicians and engineers. And, while the S6000's detachable front panel and programmable user keys are unique to the instrument, the tips covered here are applicable to both units.

START ME UP!
One unique S5000/6000 feature is the ability to have a folder full of sounds load up automatically on power-up. To do this, simply save your work to a folder called Autoload. Switch the sampler on, and that folder's contents loads automatically. This is especially useful for live work.

GOING LIVE
Assuming you have enough memory installed to handle your entire set, prepare everything at home using the ak.Sys software suite or the front panel. When you're happy with everything, save it all to the Autoload folder. At the gig, all you need to do is turn up and turn on, and while you're at the bar getting a beer, the sampler is automatically loading up your set.

Also try using the Setlist feature to play your backing tracks at gigs. This feature not only allows you to associate MIDI song files with the correct Multis for backing tracks, but it will also set the order in which they play.

LIGHTS, CURTAIN...SAMPLER!
For theatrical applications, the Playsheet mode allows multiple sound effects or music "cues" to be triggered without requiring a MIDI keyboard. A playsheet allows up to 10 "cues" to be laid out and triggered from the front panel softkeys

on either side of the rather large display. The cues are actually programs that can contain a variety of different samples or even samples that have been layered.

Up to 128 playsheets can exist in memory at one time, with easy switching between them. Playsheets also can be grouped into "scenes," allowing you to easily organize your sounds for playback. Each scene can contain any number of playsheets, and even allows the same playsheet to be addressed multiple times at different locations within the same scene. While multiple scenes can be useful, it's not required. If desired, you can create a single scene with all of the playsheets for a single production.

Different playback modes accommodate every possibility that may be required in production. You can program the samplers to play the entire cue and stop, loop a cue while you hold a key, loop a cue until you press the same key again, or play a long cue and stop it at any time by pressing the key a second time.

ALL AK.SYS
If you don't have the ak.Sys software with the USB card, get it. This software can manage almost every aspect of your sampler (except the unit's Sample Editing feature) and provides almost all of the advantages of a computer-based sampler, but with less processing horsepower requirements, because the majority of the processing is native to the sampler. This means that ak.Sys can coexist nicely with your other audio applications, and it uses USB, so SCSI problems aren't an issue.

BY ALEX ARTAUD

Using your computer's disk management tools (Windows Explorer or Finder) offers a fast, efficient method of managing your sample library, and PC users are already in native format for the S5000 and S6000 samplers. If you're a Mac user, then ak.Sys will convert samples from .WAV to .AIFF on-the-fly. It's even possible to manage the files from the drives connected directly to the sampler.

LOOPING
If your work involves a lot of loop production, ak.Sys provides compatibility with Propellerheads Recycle! software. Use Recycle! as normal, but instead of sending the results to the sampler as you would with an earlier Akai unit, you can export the files in Sample Cell format to your Mac/PC desktop using the Sample menu in Recycle! Within Recycle!, you can export just the samples or the samples with the MIDI song file, although the MIDI song file generated by Recycle! is not supported directly in the S5000/S6000 sampler.
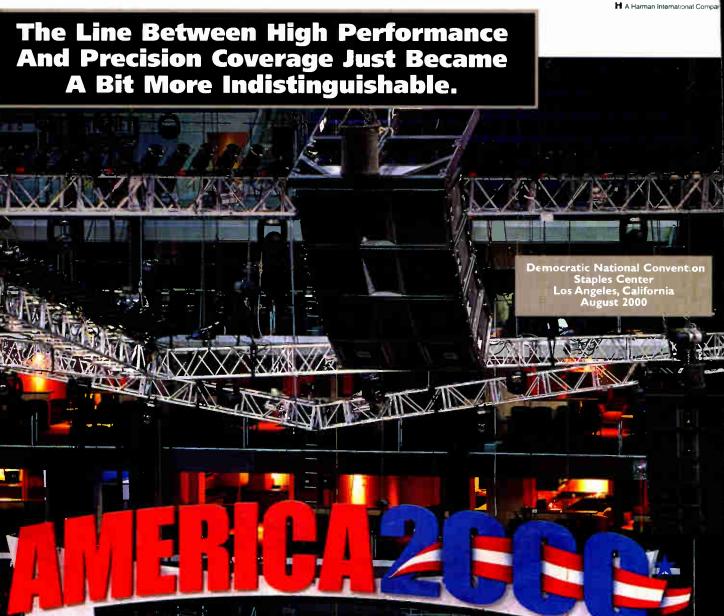
To do this, create a new folder on the Akai to export the files from Recycle! Next, simply export the files into the new folder and drag the entire folder onto the Memory icon in ak.Sys, and all of the samples that were processed within Recycle! will be loaded into memory.

More tips can be found at www.akaipro.com. ∎

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