

Mix Master Chris Lord-Alge • Daft Punk in the Studio • Producer Mike Mangini

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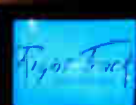
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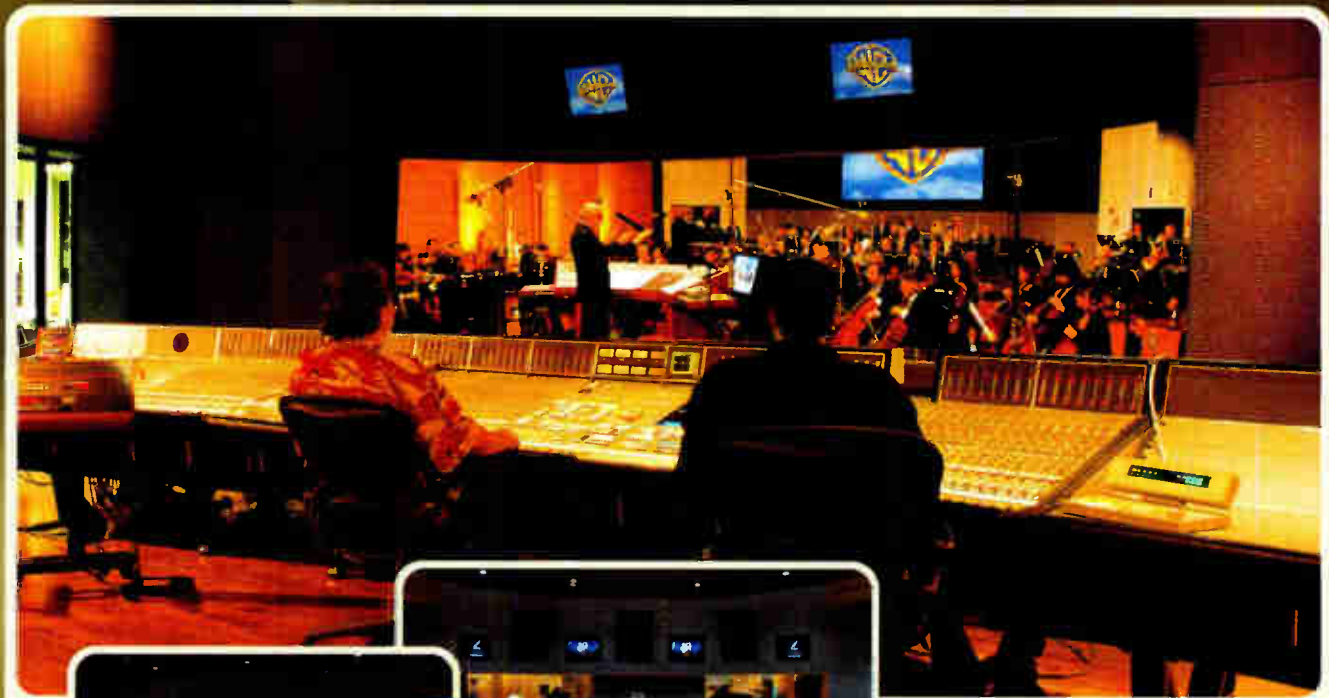
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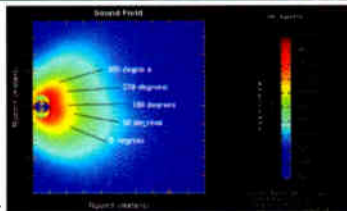
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On the Cover: Designed in conjunction with architect Dennis Janson, Right Track Recording's new orchestral facility, which will be engineer Frank Filipetti's new home, features a 96-in SSL 9000 J and Genelec monitoring. For more, see page 92. **Photo:** Dave King. **Inset photo:** Steve Jennings.



MIX

PROFESSIONAL AUDIO AND MUSIC PRODUCTION

October 2001, VOLUME 25, NUMBER 10

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by Mel Lambert

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by Dan Daley

As part of our expanded New York coverage, our East Coast editor talks to some of the city's hottest urban music producers. Also, Gary Eskow talks to Kenny Gonzalez and Louie Vega, the force behind Masters at Work.

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by Paul D. Lehrman

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by Gary Eskow

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92 Frank Filipetti and Right Track Studios

by Paul Verna

After helping make Right Track Studios the powerhouse that it is, independent producer/engineer Frank Filipetti has invested in his own room, adding a Westside presence to Simon Andrews' colossal Manhattan facility (on this month's cover).

118 Understanding Phase

by Bob McCarthy

Part 1 of a series that attempts to demystify phase response, showing how changing phase response over frequency affects the sonics of a single speaker, and the way the speakers interact with each other and with a room.

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by Philip De Lancie

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If you have one of these...



The Perfect Pro Tools® Companion:

If you're one of the thousands of people that rely on computer-based Digital Audio Workstations (DAWs) for recording and editing music and audio, here's something you need to know. The **TASCAM MX-2424** was specifically designed to work with – not against – your DAW system. Here's how.

Time-Stamped Sound Designer II and Broadcast Wave Audio File Formats

The MX-2424 offers your choice of two native audio file formats: Sound Designer II on HFS/HFS+ Macintosh-formatted drives, and FAT-32 Broadcast Wave on PC disks. Why did we choose SDII and Broadcast Wave? Because they support time stamping, giving you a fast, convenient way of transferring audio into your Pro Tools or other DAW system. While other formats can be exported and imported to and

from a DAW, the MX-2424's time-stamped files will appear in the exact location in which they were originally recorded, with sample accuracy. Started your guitar solo two minutes, twelve seconds into your tune? That's where it will stay when you bring it into Pro Tools. Other hard disk recorders may force you to spend hours aligning each track to its approximate original location.

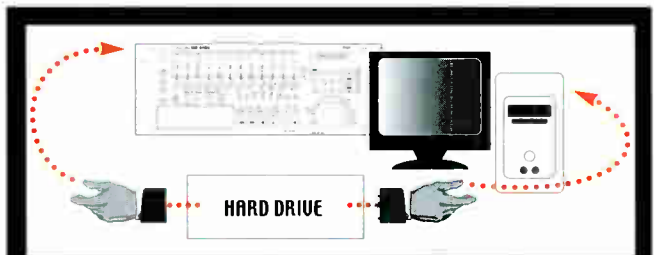
Hot-Swappable SCSI Drives

Since the MX-2424 records to reliable, robust SCSI drives, there's another advantage: hot swapping. Unlike IDE drives, you don't have to shut down your recorder or computer every time you need to exchange SCSI drives...just pop in the drive, mount it and keep on working. SCSI is a time-tested, professional hard disk format that ensures the highest degree of compatibility with all DAW systems.



will still be there when you open the session in your DAW system... not at the start of the song.

Using its native Sound Designer II and Broadcast Wave audio files, you can send audio to and from Pro Tools with sample-accurate time stamping. If the kazoo solo started at 3:12 in your original recording, it



You don't have to go through a lengthy process of converting files to get them between the MX-2424 and Pro Tools. Just record onto a removable SCSI drive with your MX-2424, then pop it into your Mac or PC. Your DAW system will open the files just as if they'd been originally recorded on the computer.

...you need one of these.



TASCAM MX-2424

The Portable Solution

Lugging your entire computer, keyboard, monitor and mouse to gigs for live sound recording isn't the most convenient way to record. Same goes if you work at multiple studio locations. But the MX-2424 is a sturdy, reliable recorder that fits in a four-space rack and goes where you go. Leave your computer in the studio where it belongs, and let the MX-2424 be your mobile recording solution.

Feels Like A Tape Deck

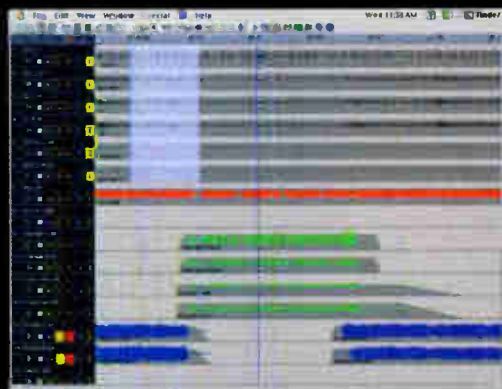
One thing that computer recording leaves to be desired is the classic feel of a tape recorder. With the MX-2424, the transport controls, jog/shuttle wheel and editing buttons give you a familiar environment for doing your best work without being forced to mouse through your tracking session.

Superb Audio Quality

While the power of nonlinear editing is a huge creative advantage of hard disk recording, the sonic fidelity of your DAW may not satisfy your highest expectations. With professional-quality 24-bit converters, audio pros have found the MX-2424 and its IF-AN24 24-channel analog interface module perfect for everything from audiophile classical and jazz recording to scoring feature films.

TASCAM
a whole world of recording

If You Don't Have Pro Tools...



MX-View: Waveform Editing for the MX-2424

If you don't have a DAW system, the MX-2424 offers a high-powered editing interface of its own: MX-View™ waveform editing software. Running in native Mac and Windows versions and connected via a fast 100Mb Ethernet interface, MX-View offers sophisticated, sample-level waveform editing. You can drag and drop on the fly, repair clicks and pops with the pencil tool, get onscreen metering for up to six MX-2424s, edit across multiple machines, manage virtual tracks and much more. Included at no cost with every MX-2424.

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For all the details on the MX-2424 go to
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24-TRACK 24-BIT HARD DISK RECORDER/EDITOR **MX-2424**

World Radio History



How Ironic

Working in audio can be tricky, especially when you're with a client who knows just enough about technology—or "art"—to be dangerous. And when you're dealing with a group of people—either mixing with a whole band present (each needing to be a *little* louder) or doing commercial spots with the "help" of six agency people—the role of the engineer requires a major dose of diplomacy. The irony of it all occurs when clients demand the finest engineers available and then tell them how to mix.

A well-known film mixer in the Bay Area tells a story about how, in the midst of the films-being-too-loud craze of the mid-'90s, a director kept asking him to push the levels on the music track. Not only did that upset the balance of the scene, but it bordered on dangerous. So he played it back at a slightly higher level, but didn't print the changes. On subsequent playbacks, the director loved it.

I once got a call to do a FOH mix for a folk-rock show at the Berkeley Community Theater. The sound company that hired me sent a Renkus-Heinz SMART System—a fairly compact rig, yet with plenty of oomph for a mostly acoustic show in this 3,000-seat venue. During setup, one of the band's managers started screaming that the system was too small. Unfortunately, this was the company's loudest system, so one of our techs went back to the shop to get some empty JBL "W" boxes: We put two on either side of the stage, stacked the SMART cabinets on top and fired it up. The manager was impressed, saying, "That's exactly what I wanted." Sometimes, creativity involves more than just pushing faders.

I'm not advocating deception. But when you hire talent, sometimes you have to accept, and learn from, the expertise that you hired. And sometimes it's the responsibility of the engineer to educate the client. It isn't always easy to correct those who sign the checks, but that's where diplomacy enters the creative equation. Recording is a service industry, where the customer is always right, so if we mix to please clients and they later determine that the mixes sound bad, the result may be the customer bad-mouthing the engineer or studio. However, there should be no surprises here: The audio business has always been laden with ironies of all sorts, from the vintage LA-2A compressor next to the bells-and-whistles Nuendo rack, to the engineer who's loading TR-707 kick drum sounds into a 24-bit/96kHz system.

For some real audio ironies, you may not have to look any further than an AES show. Besides the obvious examples, such as tube gear in a digital world, I'm always impressed by the number of young engineers—often spike-haired kids—who pack into a recording forum featuring revered masters such as Phil Ramone or Bruce Swedien and soak up every word.

On the show floor, it's hard to spot the major players by appearance alone. Woe to the console rep who bypasses the shabbily dressed fellow—possibly a hot new producer—in favor of the guy in the suit, who may simply be an accountant/audio hobbyist on his lunch hour. So, who's more likely to plunk down \$500,000 for a big digital board? Audio may be filled with ironies, but there can be no assumptions. I like that.

See you at AES!

George Petersen

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Founded in 1977 by David Schwartz and Penny Ritter



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selected Genelec monitors to satisfy the diverse needs of a teaching institution's audio post-production instructors and students. For main L-C-R monitoring, they chose an array of our **1038AC's** – industry renowned for their high-output, dynamic headroom, sonic accuracy, and precise, stable imaging. For additional surround monitors, **Model 1031A's** were selected. Each active system is a superlative audio solution designed and manufactured by a professional monitor company with more real-world, multi-channel surround expertise than anyone else.

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World Radio History

Letters to Mix



THE PRICE OF FIBER

As someone who does network consulting, I found the June issue very good and worthwhile as a general background for clients who are not familiar with networking. However, I find the assertion by Ed Bacorn [of Glyph Technologies] that "Ethernet is very high overhead" and so is slow to be silly. The calculation of checksums and breaking up messages into segments is typically done on the NIC card and presents no overhead to the host computer. Ethernet is slow because it is designed as a shared media network and has to wait to see if someone else wants to talk before transmitting. The problem with LANs as a storage device is that they are optimized to share information in relatively limited volumes. NFS does allow sharing files over a LAN, but it is not high performance nor does it support isochronous traffic such as video or audio well. This is why SANs were invented—to allow sharing of storage and bulk files, rather than information.

STK and EMC, among other vendors, have hybrid products that transmit metadata and thumbnails over a LAN, and bulk over a SAN. These are in the early days of development and so are very expensive.

The other inaccuracy is that "fiber costs an arm and a leg." We are not buying gasoline here. A well-installed fiber plant costs about the same as a cat 5 cable plant installed, according to the cat 5 specs. Yes, switches are costly now, but they are not necessary unless we are talking about work groups requiring more than about five workstations accessing the SAN simultaneously. (Hopefully, they will go the way of Ethernet switches and fall in price by a factor of 10 over the next two years.)

I find myself puzzled by the statement "...you get a sustained 25 MB per second..." With a Fibre Channel-arbitrated loop, you will get whatever the sustained throughput of the disk is, and you can multiplex several disk accesses onto the loop at up to the available Fibre Channel bandwidth (either 100 or 200 MB per second). Also, there is no reason to mess with SCSI drives and SCSI to Fibre Channel interfaces when there is no premium for native Fibre Channel drives. (See Seagate's Website, www.seagate.com, or any drive dealer, www.dirtcheapdrives.com.)

Gerald Robinson
Via e-mail

TAKING TIME TO TEACH

I was happy to see that Mick Guzauski was nominated for a TEC Award. While there are many other people who could write about his extraordinary talent as a mix engineer for widely diverse musical styles, I wanted to take a moment to nominate him as a helluva guy. I recently contacted Mick totally out of the blue and asked if he could help a group of high school students who were in my music technology class. Not only did he respond, but he offered us what has to be a very precious commodity: his time. I don't think my students will soon forget his generosity, and I know I won't forget our visit.

Michael Groarke
New York, N.Y.

FUNNY YOU SHOULD MENTION IT

It's quite funny to read in the last "Feedback" (August 2001) a letter from Andrew Hamilton about the idea of running, maybe someday in the future, a Pro Tools MixPlus on a laptop... (with the adjunction of a Magma PCI expansion unit). That's exactly what I was already doing some years ago, and am still doing now, but with a Soundscape workstation (first a SSHDR1-Plus unit, now an R.Ed), just by connecting it on the printer port of my big, big, powerful, 4-year-old, 133MHz notebook PC! It's still running on Win95 and equipped with a 1.2GB (very slow) drive and a whopping 32 MB of RAM! What do you think of 32 tracks of 24-bit digital audio plus onboard mixing?

Just add the converters, which I did, and this is the setup I use on a regular basis for all my orchestral, choir and big band

recordings...and mixes! So, unlike Andrea and Leonard Hospidor wrote in their July "Field Test" of the Soundscape R.Ed, this system really doesn't use the power of the CPU, or the RAM, or the drives, and this is *not* like Pro Tools!

A last word: Don't be afraid to use it "live." My system never crashed in more than seven years of (ab)use. Never. In fact, I even use it sometimes live as a source of (multitrack) audio and for mixing! Interested? Just check the Soundscape site: www.soundscape-digital.com.

Luc Henrion
Beta-tester for Soundscape
Belgium

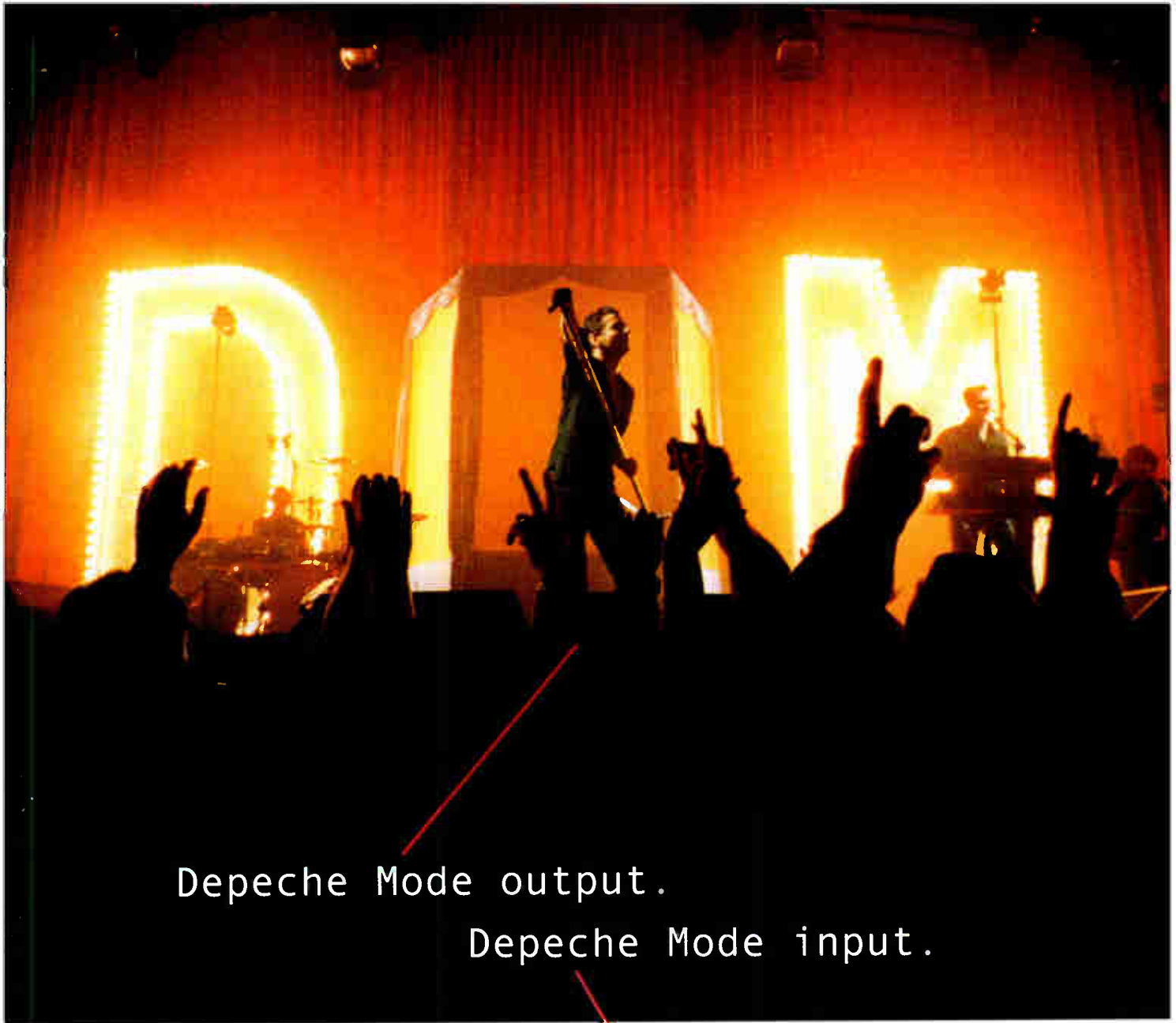
ACOUSTICAL CORRECTIONS

Thank you for covering Illbruck's SONEX products in the recent acoustical materials guide (June 2001). The article unfortunately contains errors and misleading in-



formation that give your readers an incorrect impression of Illbruck products and their benefits.

The article does not include the important point that all SONEX panels are available in Willtec foam, which is Class 1 fire-rated for flame spread and smoke density. SONEX panels are available in a wide range of designs and thicknesses, including SONEXone, SONEXclassic and SONEXvalue. SONEXclassic is not a



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polyurethane version of SONEXone, which the article states.

SONEX panels are also available in polyurethane for use where fire codes permit. Standard panel (not roll) sizes of SONEX Panels measure 24x48 inches (not 24x28 inches or 64-square-foot roll).

Mary Jones

*Public Relations Account Manager
Minneapolis, Minn.*

**INTELLECTUAL PROPERTY:
THE EDUCATOR'S VIEW**

While Mr. Lehrman's article ("Insider Audio," October 2000) made some fine points about Napster and the Internet, I have to agree with Ms. Waldman's position ("Feedback," December 2000) that the songwriter is the one who stands to be hurt most by sites like Napster, which do not pay royalties for the use of music.

I am in the unique position of being not only a songwriter and record producer, but I am also a music business educator at Queensborough College, in Bayside, N.Y.

I see first-hand how difficult it is to convince young students—who are studying music business, no less—that taking intellectual property without asking, whether it be via sampling or downloading prerecorded music, is theft.

My latest tactic, which seems to get the point across best, is to ask one of my students to give me the keys to their car. At first they are incredulous, then they ask why. I respond that I want to use it and claim "fair use." It's out there in the lot, so I should be able to use it as I see fit.

When they cry, "But that's my property," I then respond, "Exactly, just the way a song is someone's property." If I am not entitled to use your house, car or guitar without your permission, then why should I be allowed to use your song without permission?

The marvelous technology that has made it better for all creative artists has also fostered a form of disrespect for the intellectual property rights of others. The Napster/Internet debate is not just an "us vs. the big guys issue," but an intellectual property issue. It is crucial that the whole story be told and that young (and old) users of the Internet be conditioned to respond to song theft the same way they would respond to having their lunch money taken from them.

Robert Porembski

*Faculty, Queensborough Community
College
Bayside, N.Y.*

PUTTING IT SIMPLY

I don't understand why it is so difficult to understand a simple fact: If consumers don't pay for recorded music, then the business of music recording will disappear.

Songwriters, producers, musicians, studio owners (like myself), technicians all will have to start working on something different from music recording.

And by the way, *Mix* magazine will also disappear, unless you just focus on sound-for-picture...until Napster or some other company becomes a "movie-sharing" system over high-speed Internet access.

Alberto Tarantini

Digisound SRL.

Buenos Aires, Argentina

**THE SMELL OF ANALOG TAPE
IN THE MORNING**

I just read your articles on Mix Online on analog tape tutorials. It brought back many wonderful memories. I started working with professional analog tapes back when I was a student at Vanderbilt in Nashville in 1969. I got to use the venerable old Ampex 2-track 1/4-inch machines, see the introduction of the 8-track Scully and Ampex recorders, and watch it grow into 16- and 24-track 2-inch behemoths. I work as an engineer in an industry where I do acoustics and sound work, as well as instrumentation and data acquisition, and I have spent many an hour on Honeywell 101 FM instrumentation analog machines inside Marine Corps AAVs and Landing Craft Air Cushion vehicles, recording instrumentation values for dynamic study of the machines.

Today, I use digital flying head machines to record events and find these machines as "finicky" in their own way as the old-style analog decks. The articles brought back many memories about learning, and being a trainee on recorders, calibrating and cleaning and troubleshooting them. The articles were well done, and I thoroughly enjoyed reading them.

Blake Van Hoy

Oak Ridge, Tenn.

SLIPPED UNDER OUR RADAR

I would like to comment on and clarify some concerns about the "Got RADAR II?" sidebar article on page 146 of the May issue of *Mix*. You state that iZ Technology Corporation is offering free downloads of software Version 2.50 for

the RADAR II. Because Otari is the exclusive distributor of the RADAR II (a fact that is not mentioned in your article), and because Otari warrants all of the RADAR products it sells, we also test all software versions extensively before approving them for use in RADAR II recorders. It is also standard practice that a warrantee for a product becomes void if the purchaser modifies the equipment in a way that is not approved by the seller of the product. This applies to the Otari RADAR II, as use of nonapproved software constitutes an unauthorized modification and is in violation of the terms and conditions of the warrantee that Otari offers.

Additionally, I would like to have it understood that Otari deliberately chose not to approve the software Version 2.50, as submitted to us by iZ Technology, because our tests found that, though it did provide a few new features and some minor bug fixes, it contained new bugs and was potentially less stable than the software Version 2.20 that Otari currently distributes free-of-charge to RADAR II customers. Otari has spent 36 years serving the pro audio industry, and we take our commitment to our customers very seriously. It is out of respect for our many customers that we wish to clarify these issues.

Chris Steinwand

Otari Corporation

REPEAT WHEN NECESSARY

I want to say thank you to Paul Lehrman for an entertaining and substantive read in last month's "Insider Audio." It would appear that the signal processing youth at consoles today have not only stopped listening to what's around them...they also have a dangerous and blithe contempt for all that has gone before in technology and art. What's the old "saw"? "He who ignores history is doomed to repeat the folly of the past." Again, thanks for sharing your story. I'll be watching for your by-line in the future.

Ron Rolland

*Fine Audio Recording Services
Lake Forest, Ill.*

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STUDIO-GRADE EFFECTS – Yamaha loaded the AW4416 with dedicated 4-band parametric EQ and dynamics on all channels, plus two patchable multi-effects processors

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ACQUISITIONS



NemeSys group from left, Bert Steinhilber, Dan Winkler and Joe Sillescu

COMPANY'S FIRST FORAY INTO AUDIO SAMPLING SOFTWARE

At the Summer NAMM show, Tascam announced that it had acquired the stock of Texas-based NemeSys Music Technology Inc. for an undisclosed amount. NemeSys, known for GigaSampler and GigaStudio, its popular software-based sampling and music production tools for the PC platform,

is now distributed under the Tascam brand name.

Tascam also announced that it has signed the principal software engineers and previous owners of NemeSys to a long-term employment agreement in order to ensure continuing development of the "Giga" platform.

"We are tremendously excited by the possibilities inherent in Tascam's acquisition of NemeSys," said TEAC VP Gene Joly. "We're certain that the addition of Tascam's distribution and marketing strength will allow these amazing tools to be even more broadly embraced by musicians and audio professionals around the world."

The newly expanded Tascam line will now feature all of NemeSys' current products, including GigaStudio 160, GigaStudio 96, GigaSampler 64, GigaSampler LE and NemeSys' sound libraries.

For more information, visit www.tascam.com.

MACKIE ASSUMES SOUNDSCAPE DISTRIBUTION

Mackie Designs will assume worldwide distribution and marketing activities for Sydec-developed products under the Soundscape brand name. Sydec was acquired by Mackie earlier this year. This ends a distribution agreement between Mackie and Soundscape Digital Technologies, the UK-based company that has been marketing and distributing Sydec products under the Soundscape name since 1993.

"By bringing the marketing and distribution of Sydec's Soundscape products under the Mackie umbrella, Soundscape dealers and end-users will benefit from Mackie's commitment to customer support and product innovation," said James Engen, president and CEO of Mackie Designs.

For more, visit www.mackie.com.

AUDIO MUSEUM FINDS HOME IN NEW JERSEY

DOORS TO OPEN IN 2003

A new museum, dedicated solely to audio, will rise in Camden, N.J. The Museum of Sound Recording president Dan Gaydos and project director Bernard Fox announced that they have signed a contract with Coopers Ferry Development As-

sociation of Camden to revitalize the waterfront with the museum/theme park.

The contract allows for the design and construction of "SoundWave—The International Museum of Recorded Sound and Entertainment Center," aided by a \$56 million planned

appropriation from the Delaware River Port Authority, the state of New Jersey and other sources.

"The Museum of Sound Recording and Coopers Ferry Development Association have been working in parallel for three to four years before being aware of each other's progress," said Gaydos. "Camden is a perfectly appropriate area to establish a museum and theme park, since Camden is where recording and record-making truly become a part of the socioeconomic and cultural fabric of America." Camden is home to The Victor Talking Machine Company, The RCA Victory Company and RCA Corporation.

The museum/theme park will showcase the history and presence of RCA in Camden. The three main areas of interest, according to Gaydos, are: SoundStages, depicting how recording has changed society and history; SoundLabs, demonstrating the nature of acoustics, sound, noise, music and recording; and SoundScapes, showing the interplay between human perception and sound environments.



The future site of "SoundWave: The International Museum of Recorded Sound and Entertainment Center." Standing, L to R, are Museum of Sound Recording director of development Bernard Fox, Coopers Ferry Development Association project director Joe Myers and Museum of Sound Recording president Dan Gaydos. In the background to the right is the legendary Nipper Building and tower.

IN THE STUDIO

CHRIS VRENNA AND U2

Grammy-winning producer/engineer Chris Vrenna (NIN, Smashing Pumpkins) was tapped by U2 to remix and re-cut the song "Elevation" for the *Tomb Raider* soundtrack. The band took a break from touring last summer and flew out to Enterprise Studios in Burbank, Calif. Engineer Paul Leary oversaw the tracking.



Chris Vrenna

"I started some of the stuff at home," Vrenna explained, "and then they flew in, and we re-cut all of the instruments in Pro Tools. I worked on the mix the following day, and they came in that night to give their feedback. It worked out really well."



U2

Vrenna, who records under the name Tweaker, also released his long-awaited debut album *The Attraction to All Things Uncertain* last September on Six Degrees Records.

NOTES FROM THE NET



DOJ PROBES ONLINE MUSIC DEALS

The Justice Department, which oversees antitrust law, has started a preliminary investigation into two Internet ventures: pressplay, backed by Sony Music Entertainment and Universal Music Group, and MusicNet, backed by EMI, BMG and AOL Time Warner. The probe will examine potential anti-competitive problems posed by the rival ventures' soon-to-be-released paid subscription music plans. U.S. lawmakers have also raised questions about whether the two Internet services will harm competition because the five record labels currently involved represent about 80% of copyrighted music.

Representatives from the Justice Department and the five labels did not comment on the investigation.

Legislators are also exploring the issue of music sales online. Representatives Rick Boucher (D-Va.) and Christopher B. Cannon, (R-Utah) introduced legislation that would require companies when they license music for sale to one Internet site to make the music available to other sites under the same terms, thus allowing an indie start-up access to the same music as, say, pressplay, at the same price.

HAPPY BIRTHDAY

-  **Denon Electronics**—2001 marks the 90th anniversary for Denon and its parent company, Nippon Columbia Co. Ltd.; www.del.denon.com
- BGW**—Celebrates 30 years of manufacturing amplifiers; www.bgw.com
- Harrison**—A Silver anniversary for this Nashville-based console maker; www.harrisonconsoles.com
- Westlake Audio**—Designing loudspeakers for 30 years; www.westlakeaudio.com
- HHB**—25 years making digital audio equipment and recording media; www.hhb.usa.com
- Olsen Audio Group**—The company's WindTech™ Windscreen division is celebrating 25 years of operation; www.olsenaudio.com
- Rane Corporation**—In the signal processing field for 20 years; www.rane.com
- ATR Service Company**—Manufacturing Ampex analog mastering recorders for 10 years; www.atrservice.com

Industry News

Business development professional David Ward has been appointed to president and COO of iZ Technology (Burnaby, British Columbia)...Working for **Maxell Corporation of America** (Fair Lawn, NJ) since 1981, **Toru (Tom) Yamakawa** has been named president of the company...With an extensive background in broadcast engineering, **Scott Barella** joins the



New president of iZ Technology David Ward (left) joins Tom Yamakawa (right) and Scott Barella (center) with company founder and CEO Tony Henderson

Burst Group (Englewood, CO) as VP and chief engineer...**Paul Stubblebine Mastering** (San Francisco) welcomed music industry vet **Michael Romanowski** as its new mastering engineer...**The American Federation of Musicians** (New York City) elected **Tom Lee** as president and **Florence Nelson** as secretary/treasurer...Co-founder **Bob Lasiewicz** returns to **PBI Media LLC** (Los Angeles) as director of ShowBiz Expo Group...**Kent**, England-based **PM Components** has been appointed primary worldwide distributor for **Svetlana's** (St. Petersburg, Russia) glass and ceramic vacuum tubes. **PM Components** has set up a dedicated company, **PM of America Inc.**, to handle sales and servicing in North America...**Soundcraft USA** named **Scott Wunschel** to serve as Western regional sales manager for all states west of the Mississippi River...**E&E Exports** (Irvine, CA) has been tapped to handle distribution of **SRS Labs'** (Santa Ana, CA) patented **SRS Pro 220 Sound Retrieval System** to the overseas pro audio and music marketplaces...**EMTEC Pro Media** (Valencia, CA) added **Chris Piccione**, Northeastern sales manager, and **Mark Hornsby**, Southeastern sales manager, to its sales staff...**Crown Audio** (Elkhart, IN) also rounded out its sales force with the additions of **Jonathan Parker**, Eastern regional sales manager, and **Loren Robinson**, Western regional sales manager. In other Crown news, **Bob Lichty** has transitioned into the music industry market manager position...**Patrick Woolcocks** joined **Clear-Com Intercom Systems** (Emeryville, CA) as director of sales for Europe, the Middle East and Africa. He will be based out of Southampton, UK...**Network Pro Marketing** has moved to: 2250 East Imperial Highway, Suite 220, El Segundo, CA 90245; 310/648-6677; fax 310/648-6678...**Julia Frodahl** joins **Wax Music & Sound Design** (New York City) as director of marketing and sales...The new marketing director over at **Crest Audio** (Paramus, NJ) is **William (Bill) McGrane**...**Tascam** honored representative **Innovative Audio** (Waterford, MI) with the award for overall territory sales growth, while **Joseph P. Mazzeo Associates** (Rochester, NY) received the award for overall sales growth for the Tascam Cable Up! product line.

CURRENT

ON THE MOVE

Who Fred Guarino

Position: President, SPARS; owner, Tiki Recording Studios (Glen Cove, N.Y.),
Main Responsibilities: "To work with the Board of Directors and executive director [at SPARS]. My goal is for us to carry out the many new products, services and ideas that we have planned, while maintaining our focus on networking."

Previous Lives: Owner of Tiki Recording Studios, 1978 to present

I first became involved with SPARS... "In 1989, I was involved with the SPARS board and president Bruce Merley in exploring a local Long Island presence for SPARS. I attended my first SPARS Biztech Conference at UCLA in 1991. I came back from that conference with valuable business information, especially since it was during a recession."

My most memorable moment with SPARS was... "Besides the numerous casual discussions with so many bright SPARS studio owners and managers, the many cool studio tours I have been invited on, and the fun SPARS outings and conferences (like the time we rented Liberty Island and the Statue of Liberty), it was when president Paul Christensen called me up and said, 'We need some good people to serve, and I want you!' After that patriotic Uncle Sam-type speech, I was on the board of directors."

Owning a studio has helped with my responsibilities/commitments with SPARS because... "I have learned a lot about diplomacy, balancing art and business, meeting deadlines, sacrifice, long- and short-term planning, survival and camaraderie. Running your own business is tough. I often say, 'There's a price for freedom,' but I would do it all over again."

My first concert was... "Black Sabbath in 1971. Guess it was the cool thing to do when you were 14 years old."

Currently in my CD changer... "Old stuff like Ambrosia, Tubes, Toy Matinee, Collective Soul, Sting and Shawn Colvin."

The last great movie I saw... "The Perfect Storm—I'm a boater."

When I'm not in the studio, you'll catch me... "Cruising and relaxing on my boat with my wife and dog."



THE FLAMING LIPS

Known the world over for their '93 hit "She Don't Use Jelly," the Flaming Lips have returned to the studio to work on the follow up to their critically acclaimed '99 release *The Soft Bulletin*. The band, who consist of Wayne Coyen, Mike Ivins and Steven Drozd, are camped out at **Tarbox Road Studio** in upstate New York and producing the effort themselves. Ivins is also sharing the engineering duties with studio owner Dave Fridmann. The as-yet-untitled release is slated for release sometime next year.



HOT LINKS

www.OnTourWithShure.com: Shure Incorporated has launched a new online magazine that gives users a backstage pass to today's hottest acts and engineers. The site includes Web-only artist interviews and photos, technical and gear-related advice, contests and an archive of articles that have appeared in their *On Tour With Shure* magazine.

www.toaelectronics.com: TOA has updated its Website with such new features as the "Technical Library," where users now have easy access to spec sheets, product manuals (for both current and discontinued products), CAD drawings, engineering specs and East loudspeaker data. Users can also download video animations of the H Series Interior Design speakers, as well as DACsys 2000 control software for the new DP-0206 modular DSP.

www.themusiclink.net: The Music Link Corporation has released its eCatalog, an electronic version of its Counter Catalog, available in PDF format. The eCatalog is a guide to the entire product line, including Johnson guitars and amps, Palatino strings and wind instruments, CODA drums, and AXL guitars and amps.

Frampton Comes Alive!



October 2-October 15.

Produced and arranged by Peter Frampton. Engineers: (live) Ray Thompson, Chris Kimsey and Eddie Kramer. Studios: Winterland (San Francisco), Marin Civic Center (San Rafael, CA), Island Music Center (Commack, NY), State University of New York (Plattsburgh, NY), Wally Heider's Mobile Recording Truck (CA) and Fedca Recording Truck (NY).



October 16-November 5.

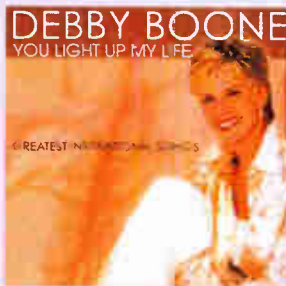
Produced by Stevie Wonder. Engineers: John Fischbach and Gary Olazabal. Assistant engineers: Dave Henson, Howie Lindeman, Cris Morris, Steve Smith and Rick Smith. Mastering: Andrew Berliner and Jeff Sanders at Crystal Industries Inc. (Hollywood). Studios: Hit Factory (NYC) and Record Plant (Los Angeles and Sausalito, CA).

MIX LOOKS BACK

In anticipation of *Mix's* 25th anniversary next year, we want to begin looking back at where we started. Here are the Number One albums and singles from *Billboard*, October 1977, the month of *Mix's* debut, with special props to the engineers, producers and studios who make the magic.



October 10-October 15—"Star Wars Theme/Cantina Band." Arranged by Meco.



October 15—"You Light Up My Life." Produced by Joe Brooks.

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Calling all sound designers and video editors. Through the collaboration of Mindshare Ventures and Future Media Concepts, with cooperation from Avid and Digidesign, the first Avid World and Pro Tools Conference will be held October 7-10, 2001, at the New Yorker Hotel. The four-day event will include a two-day expo, educational classes, keynote speeches from Mark

Goldblatt (left) and She'lspere (right), and networking events. The seminars and sessions will cover editing and designing tips and techniques for users of Media Composer, Symphony, Avid|DS, Xpress DV, Unity, and AvidProNet Review and Approval. There will also be a separate Pro Tools track.

For registration information, contact Mindshare Ventures at 212/645-8140 or visit www.avidworldeast.com.

FLICKERSTICK



Fresh from their win on VH1's *Bands on the Run*, Flickerstick stopped in at **The Zone** in Norcross, Ga. The band was in re-cutting their independent debut *Welcoming Home the Astronauts*, which is slated for release on Epic records. The band worked with studio owner/engineer Billy Hume and producer Rick Beato.

"They're really nice guys to work with," Hume said. "They sort of got portrayed on that show as this bunch of crazy guys, and they kind of are. [Laughs.] But when it's time to work, they really get down to it. They're all extremely talented, and it was a great experience."

WHEN HOOSIERS COME TO NASHVILLE...



They meet in a pickup truck. At the recent Summer NAMM show, Sony hosted a party at Denny Purcell's Georgetown Masters. Purcell grabbed a few basses from his extensive collection and formed a band, The Lownotes, on the spot. Across the front, L to R, Nash-villains Dan Daley and Rick Clark, both *Mix* contributors; producer/engineer and former Hoosier Chuck Ainlay; and Nash-villain producer Norbert Putnam. In back, former Hoosier Purcell and former Hoosier Tom Kenny, *Mix* editor.

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- Click on hot links to important sites such as the TEC Awards, *MixBooks* and "20 Years of *Mix*," a complete database listing the contents of issues since 1982.

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World Radio History

FUN, FUN, FUN

'TIL HER DADDY TOOK THE T-BIRD AWAY

As I go through life, working in this industry and writing this column, I occasionally come across little gems that make life easier or just more fun. Sometimes I simply mention them in the body of that month's column, but this month, I thought I would devote an entire column on some of these items that improve my life.

I will limit the scope to items that cost less than \$10,000 each. Further, as a sign of respect to my readers and editors, I will attempt to assure that at least half these items are in some way related to audio.

So, without any further ado (and without my usual five-paragraph set-up), we begin.

Oh, wait. I guess we don't begin quite yet, as there are a couple of points I want to cover. First, while some of these items may be brand-new and unknown to you, others may not be. In fact, some may be years old, but still valuable and so useful that I can't pass them up. Second, as I am apparently mellowing somewhat, I find that I am now able to enjoy toys that may not be 24-bit perfect, or may not have a 150dB dynamic range. For example, I must, in all fairness, warn you that I now actually listen to an occasional 192kHz MP3. Not with both ears, of course, but sometimes, while I'm setting the idle jet on my straight-pipe Harley, I might listen to a tune or two with one ear when no one's looking.

Please note that this admission is in no way an endorsement of lossy data compression! Nor am I stating that I think MP3 or today's typical digital television is good enough. Once you have experienced either data stream in its honest, uncompressed mode, you are forever cursed with the awareness that today's compression *significantly* damages music and video.

I am just admitting that I have discovered what the kids today know—portability is so much fun that, under

certain masking conditions, you just might go for it. In fact, to quantify this, let me take a few lines of ink to list times that I can enjoy compressed entertainment:

- during or immediately after flying.
- any time up to four hours after an afternoon on the firing range.
- while tuning engines at the drag

FireWire circuitry. Buy these. Use them. Be happy. If you break one, call Maxtor and they will send you another one with no questions asked. I actually did break one two days ago and called them, just to check this out. A replacement is on the way. I have also heard from many other Maxtor users that their service policy is superb.

I have this twisted belief that one way to keep from slipping into a rut is to get different pieces of gear that influence your creative process.

strip or race track, *after the first race*.

- while actively splashing around in the pool, or riding in a convertible (over 50 mph) or on any loud bike over 38 mph.

Now we begin:

MAXTOR

Yeah, that's it, just Maxtor. Lotsa big, fast drive for *not* lotsa money. For a couple of years now, I have been getting out of the control room and popping down to CompUSA to pick up a drive whenever I run out of space. While I'm somewhat disappointed that I can't buy these drives at my local 711 (yet), I am happy with the fact that I can go to my closest CompUSA and in minutes get a very fast, quiet 80- or 100-gig ATA drive when I'm feeling a bit digitally claustrophobic.

Additionally, Maxtor has had a line of FireWire drives for some time now. They come in creamy little translucent boxes with no fans and almost no noise. Until recently, these were 5,400 rpm only. But now, they have added a new series of 7,200 rpm drives with even faster

I love these drives. I use them exclusively for my DAWs, and I realized a week ago that I have, over the past years, replaced every internal drive in every one of my computers with a Maxtor by now.

ROXIO AND ROLL

Both Toast and Jam have been around for a long, long time. Personally, as a kid I always preferred English muffins, but when Toast first came out, I gave it a try. In the beginning, it was a bit squirrely and certainly, um, interesting. But the people were nice and the idea was great, so I stuck with it. Then Adaptec made significant improvements over time, and finally added Jam.

Now Adaptec has a dedicated division called Roxio, which is responsible for both Toast and Jam. While the new Jam isn't shipping quite yet, the new Toast is, and I must say it's even slicker, easier and more powerful than before. Toast has to be the bargain of the century. I think, at this point, I probably use it every single day. When one considers how the price of CD-R media has dropped and how reliable the new burners are, it's very attractive to simply put any new-

BY STEPHEN ST.CROIX

Aphex Delivers the Biggest Improvement to Your Sound... ...for the Smallest Investment



Why the Aphex Model 204 is superior to other "Enhancers"

AURAL EXCITER VS. OTHER SONIC ENHANCERS

The Aural Exciter adds dynamically related harmonics to the signal at very low levels and these harmonics add little, if any, level to the signal. Because of the intelligence in the Aural Exciter side chain, the effect is useful over an extremely wide input dynamic range.

Dynamic EQ boosts a part of the frequency spectrum when the input is above a threshold. If the input is already high, the additional equalization can result in overloading the amplifier, speakers or both.

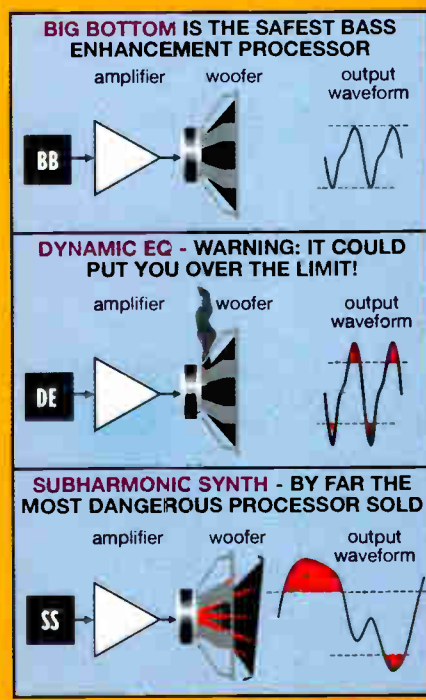
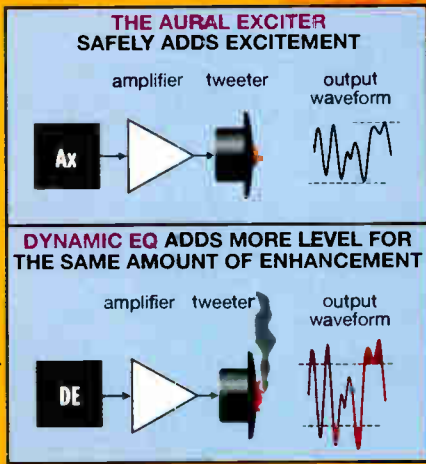
BIG BOTTOM VS. OTHER BASS ENHANCERS

A speaker's excursion increases with low frequency peaks. If those peaks are increased by a Dynamic EQ and/or a Subharmonic Synthesizer the speaker, at the very least, will fatigue more quickly. This will also increase the danger of the speaker jumping the gap or literally coming apart.

Big Bottom adds little or no peak energy to the signal. Instead, it adds density (persistence of a low peak-to-average ratio). This additional bass density adds presence and punch, even in less than powerful playback systems.

Dynamic EQ boosts a part of the frequency spectrum when the input is above a threshold. If the input is already high the additional equalization can result in overloading the amplifier, the speakers or both.

Subharmonic Synthesizers synthesize bass where none existed before by generating a signal component an octave below the lowest frequency present. The result requires much more amplifier power and extreme woofer excursions to reproduce. Result - DANGER!



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- Multitrack & Stereo Recording*
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World Radio History

ly created data on a backup CD at the end of every day and shove it on a shelf.

Not to mention burning audio dailies or even making MP3 CDs for your kids or for your moments of deafatude.

LET'S DANTZ THE NIGHT AWAY, THEN STOP AND GET A BIG MAC

Dantz Retrospect is *the* mandatory backup program for Macs, but as of this writing, it can't see the internal burners on my new machines, so I am using Toast for backup as well, even though that is not what it is meant for.

As is obvious by now, I am a Mac guy. I know this puts me in the minority, and I generally don't say too much about this in my column, because I know that all you PC guys out there will just get glazed eyes and stop reading. But this time there are things I must say. Apple has, amazingly, done a few things so correctly this year that I simply cannot suppress the urge to share these new technologies with you.

If you have ever given even the slightest thought to leaving the dark side and picking up a Mac, but the price/performance ratio scared you back into the shadows—or if you are a current Mac user

who carries around a 9-pound notebook in a world of 6.5-pound PC notebooks just for the privilege of being right—then your ship has come in. And, like all good ships, it is a pristine glistening white.

Go to CompUSA or your local Apple store, walk right by the ambitious but underdeveloped lame Ti book for 50 grand, or whatever it costs, and proceed directly to the closest iBook and touch it. Open it. Look at the screen. Type a little. Pick it up.

For a grand-and-a-half, you can have an incredibly fast, impressively powerful, 4.9-pound laptop with every feature you would ever need (and the best DVD player on the planet) that is so small, it fits sideways in half of my old laptop carrying case. This thing is just...Right.

I am currently sitting out by the pool dictating this column into an iBook on my lap using IBM ViaVoice. It is fast enough that I see what I'm saying while I say it (a new experience for me—I'm used to waiting up to 30 seconds to see what I say). Oh, wait. I just checked my stocks using Apple's optional Airport wireless LAN. The profound wave of depression that washed over me as my 16 little symbols came up red is almost totally offset by the geeky joy that I'm experiencing while listening to music from the iMac in my house 200 feet away.

No, it's not just that I'm listening to the music, it's that I'm actually picking the songs I want to hear on my laptop's screen, and controlling the iTunes player in the house on the wireless LAN, while the music is being transmitted back to me again. And this brings me to my next item...

MAKOTO NAGATA, AKOO KIMA

For 99 bucks, a company called Akoo will send you something called a Kima. And while I would not exactly master through this thing, it *is* serious fun. You get two little alien-looking devices, one you hook to your computer (or any stereo audio source) and the other you plop down wherever you happen to be, even if that's hundreds of feet away. The first box transmits the music at some dangerously high frequency to the second box. The second box then has stereo output jacks for hard wiring to an audio system, and a re-transmitter that allows any FM radio to receive the music at 88.1 or 88.3.

Serious geek fun. I have my iMac set up as an MP3 Jukebox with well over 5,000 songs inside (come on now, I used the finest codec and ripped from my CDs at the highest quality, yada, yada), and I

—CONTINUED ON PAGE 314

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THE PROJECT THAT WOULDN'T END

ONE MAN'S ADVENTURES AT THE DV DANCE



ILLUSTRATION PETER BENNETT

If you were around during the bad old days of the first computerized music and digital audio tools, say 10 to 15 years ago, then perhaps you remember, or perhaps you've mercifully forgotten, some "features" you were forced to deal with:

- Loss and/or corruption of files.
- Loss of sync at odd and unpredictable moments. Momentary drop-outs and digital "clicks" at random times.
- Programs that crashed just when you finished a complicated session, but before you saved.
- Programs that wouldn't save.
- Programs that wouldn't quit.
- Clumsy modal programs that made you switch gears entirely when you went from assembling to editing, or vice versa.

- Blind signal-processing functions, in which you had no idea what a process sounded like until after you executed it.
- Processing functions that refused to do anything.
- Processing functions with fixed, and useless, parameters.
- Non-undoable functions.
- Functions that took enormous amounts of time, but were uninteruptible.
- File-compatibility issues among different programs.
- File-compatibility issues among different versions of the *same* program.
- Lousy technical support.
- No technical support.

BY PAUL D. LEHRMAN

- Undocumented features, and documented features that didn't exist.
- Documentation that's just plain wrong.
- And that perennial favorite: blanket denial on the part of the developers that there was anything amiss.

Aren't you glad that we've gone beyond all of this—well, most of it? Well, don't count your chickens quite yet, because there's a whole new world that's becoming more and more important in the work that a lot of us do. In this world, each of these problems is back and in force, and ready to bite us on the behind. I know, because thanks to these new tools, it has taken me nine months to get a project done that should have taken about six weeks. But before

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INSIDER AUDIO

you panic, let me tell you I'm not talking about audio: I'm talking about video. Specifically, Digital Video, *aka* DV.

If you're not familiar with DV (which I assume means you live on the Outer Hebrides without a satellite dish), it has taken over the low- and medium-budget video production markets even faster and more dramatically than digital audio workstations did in our part of the universe. Those \$2,500 broadcast-quality camcorders, \$8.00 60-minute tapes and editing decks the size of a Happy Meal have revolutionized the industry. Done

right, the quality can be fantastic; I'm told that a producer at WGBH, my local PBS station, did some tests when it first came out and found such little visible difference between DV and their standard format, BetaSP, that he recommended their producers adopt it. Computer editing systems that use the format work on the actual digital video data, not pointers to spots on a tape, or temporarily converted or transcoded analog video. So there is no generation loss *anywhere* in the chain, and there's no distinction between online and offline editing. Interfacing various devices—cameras, decks, editors, video cards—is trivial, thanks to the near-uni-

versal adoption of FireWire in the format.

There are various versions of DV (mini-DV, DVCAM, DigiBeta, etc.), but they are almost all plug-compatible, and the format can accommodate different resolutions, color spaces and aspect ratios, so in its higher-end incarnations, it's a perfect medium for producing HiDTV. Like 24-bit audio, you need the right converters and more storage space to handle the higher-resolution formats, but the technology is basically the same as the cheap stuff.

Whatever resolution you work at, you will need gobs and gobs of storage to do

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a project of any length, but now that we have \$150 (and falling) 60-gigabyte (and growing) removable hard drives, that's not really an issue. Perhaps best of all, the same way that software plug-ins have forever changed the way we process audio (even if more and more plug-ins are emulating hardware processors of yore), in the DV world, if a software engineer can dream up some way to modify a picture or a scene, then it can be done.

MAC-BORN, PC-BRED

My friend and colleague Howard Woolf, a longtime photographer and filmmaker, has been very excited about DV for a while. He considers it the first video medium that comes anywhere near film in its quality and flexibility, and it is available at a very small fraction of the cost. Woolf works both in the administration and in the Multimedia Arts department at Tufts University, where he teaches courses in digital video production and is faculty adviser to the school's closed-circuit

—CONTINUED ON PAGE 308

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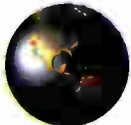
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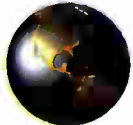
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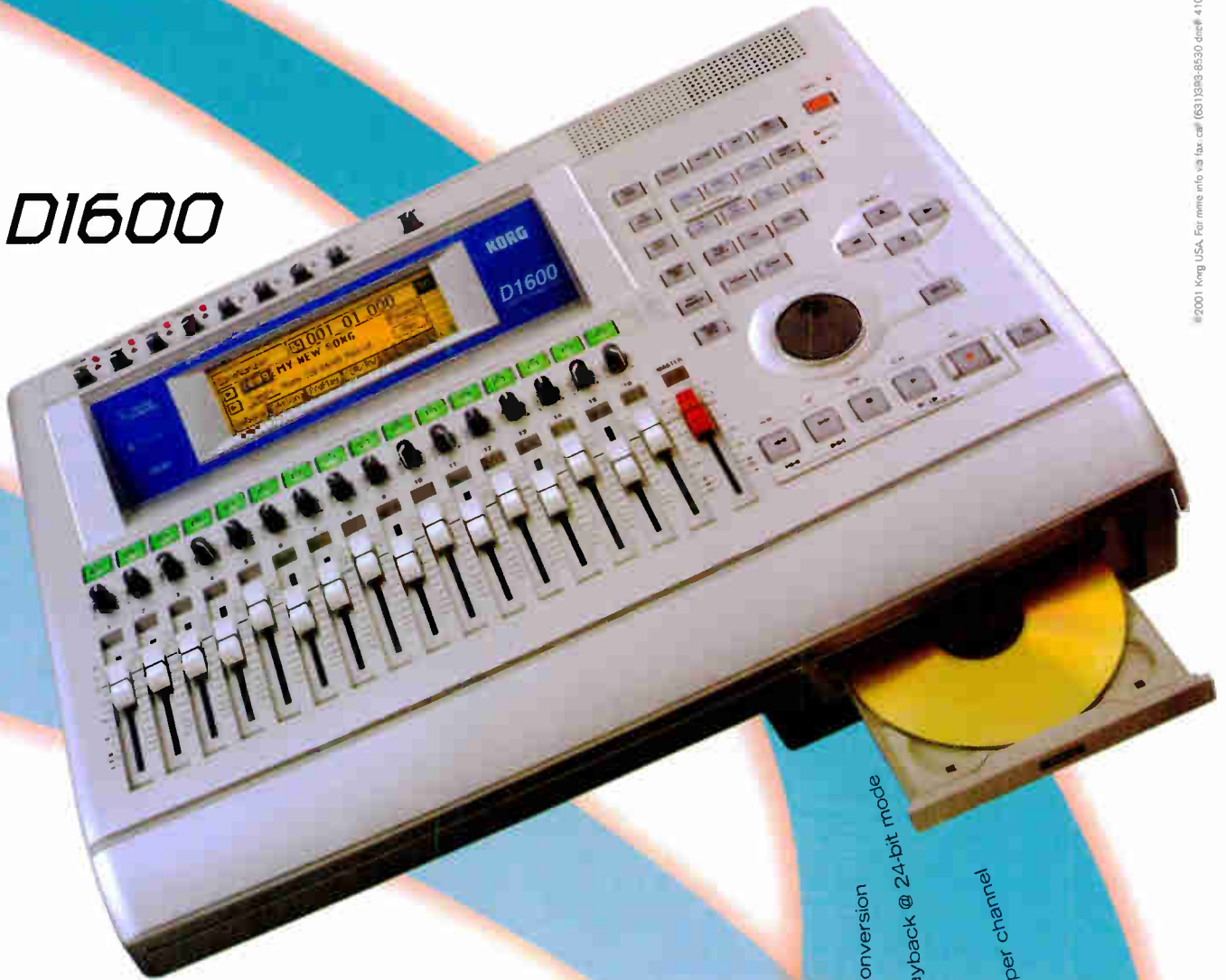
When it comes time to master or backup a project to CD you'll appreciate the D1600's internal CD-RW drive bay. (The Korg model CDRW-2 and many ATAPI-compatible devices can be used.) No cables. No additional power supplies. You can even record audio directly from the internal CD-RW drive. Try doing that with an external unit!

The effects power of the D1600 really shines when recording and mixing. Have up to eight Insert effects configured any way you like, plus two Master and one Final effect. It's like having a professional rack of high-quality effects processors with everything from reverbs and delays to compressors, limiters and EQs. Plus, our special REMS™ models of mics, guitar amps and speaker cabinets.

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ROY HALEE

INCIDENTS, ACCIDENTS, MIRACLES AND WONDERS... AND A CAREER WORTHY OF THE TEC HALL OF FAME

Like it or not, the great New York engineer/producer Roy Halee will forever be linked with Paul Simon and Art Garfunkel; he recorded every album Simon & Garfunkel made, co-producing a couple of them, and did many of Simon's solo records and Garfunkel's acclaimed first album. That's quite a body of work right there—sales in the millions, and honors including Grammys and a number of other awards. But during the course of more than 40 years in the recording business, Halee has amassed many other credits, too, covering a broad range of musical styles, and it is for his entire career that he has been named this year's recipient of the coveted TEC Hall of Fame award.

Did you know, for example, that Halee worked with The Yardbirds? That he engineered the classic '60s jam disc *Super Session*? That he recorded and produced great albums for '70s funksters Rufus? It's a helluva resume, stretching from the early '60s to the present, and including



The Roches, Mark Almond and many, many others. He's one of the guys the term "golden ears" was invented to describe, a master engineer with impeccable taste and an encyclopedic knowledge of both musical and technical matters.

We caught up with Roy Halee this summer at his Florida home...

How did you get your start in the business? And are you from New York?

Yes, I grew up on Long Island. How I got my start is I worked for CBS Television. I started at the bottom there, pushing cameras and booms around in the late '50s.

Were you technically inclined?

Not really. I was studying to be a classical trumpet player and I got pretty far in that, but at some point I sort of gravitated over toward broad-

casting and got in at CBS. I graduated up in CBS Television to being a straight audio man—doing the Goodson-Todman game shows and other things. I did *The \$64,000 Question* for a while, which was the Number One-rated show for a long time. It was all live, so I got broken in pretty well.

Then I got caught in a union lay-off because all the shows were moving out to Hollywood. I never would've left CBS Television had I not been laid off. But when it happened, I went right across the street to Columbia Records and ended up in an editing cubicle for about a year-and-a-half.

What did that involve?

Just editing tape—classical, pop, you name it. I did a lot of classical editing.

Is this stereo by this point?

Stereo, and some mono. It was a lot of editing 3-track master tapes, work-

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such name artists as Peaches & Herb, Chad & Jeremy, Moby Grape, The Cyrle, The Byrds, Barbra Streisand, Blood Sweat & Tears, Edie Brickell, Neil Diamond, Journey, Willie Nelson, John Klemmer, Boz Scaggs, Laura Nyro, Ladysmith Black Mambazo,

BY BLAIR JACKSON

FOH ENGINEER TEST:

FOH engineer A and FOH engineer B are each tuning venue-appropriate line array systems using well recorded demo material. All equipment is identical or equivalent except for the loudspeakers. Each proceeds to adjust system response to taste. Engineer A tweaks house EQ. Engineer B tweaks house EQ, alters processor settings, adjusts amplifier levels, lands the arrays to check polarity, whimpers softly and contemplates a career in footwear sales.

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ing with the various producers.

Who were some of those Columbia producers you worked with in that era [early '60s]?

Oh geez, there were so many—everyone who was on staff at Columbia at the time. Al Kascha, who went on to win Academy Awards, Tom Wilson, Bob Johnston, Teo Macero, who I did some jazz stuff with... John McLure, Thomas Shepard and Paul Meyers, they all did classical. You had to edit everything. I got a tremendous amount of experience editing tape. Plus, you would also mix down tapes from 3-track to stereo and mono to be mastered.

I assume this was all on the label's custom-built consoles.

Correct. In those days, Columbia did everything in-house—the consoles and studios and editing rooms. We had a vast amount of editing cubicles—I couldn't guess how many we had. And mastering rooms, too.

So I was a year-and-a-half doing that, to the point where I was going crazy being cooped up in that editing room, and quite frankly, I threatened to leave. I lined up a couple of jobs outside—I wanted to get into the studio; I thought of myself as a studio guy. They said, "No, you're not going anywhere. We'll put you in the studio." So they put me in the studio, and I started doing sessions almost immediately.

Do you remember your first session?

I very much indeed remember my first session: It was Bob Dylan, "Like a Rolling Stone."

Wow!

"Wow" is right. I didn't know what the hell I was doing. But I ended up doing that album [*Highway 61 Revisited*], and that evolved into my doing Simon & Garfunkel and the Lovin' Spoonful and a couple of dates with The Yardbirds. And then interspersed with that was all the pop stuff that Columbia had at the time. They sent me down to the Bon Soir nightclub and I did Barbra Streisand's first session.

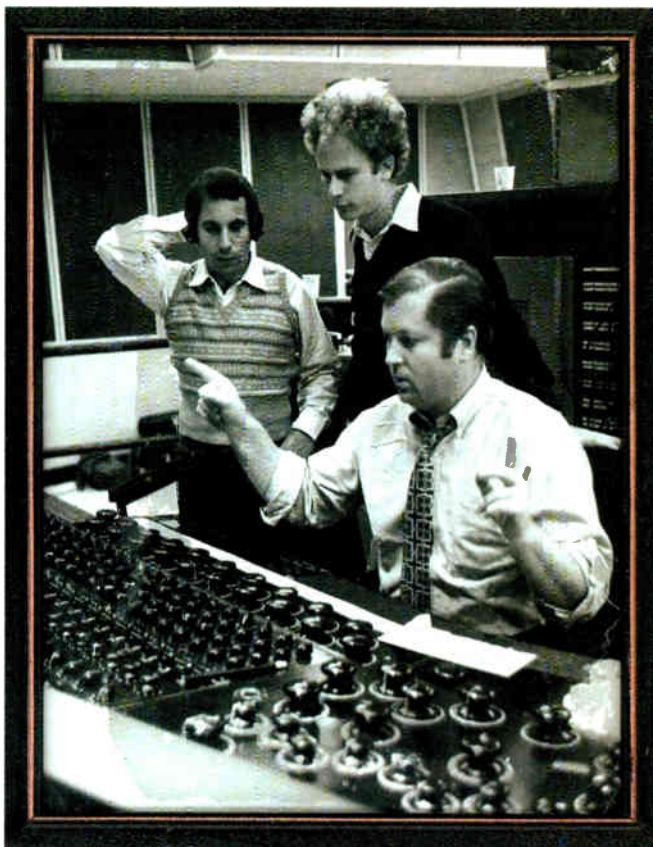
I'm intrigued by the thought of you being thrown into a session with Bob Dylan. I mean, here you are, you've been in television and then doing editing for a while, and, all of a sudden, you're in a room with this strange guy and what turned

out to be a revolutionary sound... It must have been pretty jarring for you, no?

It was. I was nervous, to say the least.

I gather there was sort of an uneasy relationship between some of the mid-'60s groups and the recording world, which was so conservative on many levels. How did you bridge the gap?

It was tough, no question about it. I think I was able to do it successfully because I enjoyed the rock and pop stuff so much.



I found it really creative, because on those records you could sort of stretch what you knew and come up with all kinds of sounds and mic techniques. Whereas with the classical stuff, it was pretty straightforward: "This mic goes here, this mic goes here, this mic goes here; that's the way we do it." It was more like television in that it was very schooled and orderly. But I liked that Dylan would say, "Hey, I want to do my vocal over here by the drums." Okay, well, how am I going to do that? That became a challenge. So there was a lot of experimentation, and not everything worked out every time, of course, but that attitude was good, and I think it helped me in later years.

Had you been schooled at all about, say, what was happening over at Atlantic with Tom Dowd and Ahmet Ertegun?

Certainly we were aware of what they were doing, but, quite honestly, I didn't

pay that much attention to it because I was too busy doing my own thing. I had a lot of outside clients coming in who had heard about this young guy who would try anything and they wanted to work with me. I brought in a lot of younger acts who previously wouldn't have thought of recording for Columbia, which was considered sort of square at the time.

Well, it was Mitch Miller's label after all. That's right. Actually, Mitch Miller's the one who brought me in. I never actually worked with him. But he was a great, great musician.

Was it hard to switch back and forth between, say, the Lovin' Spoonful and a big pop session?

No, I can't say it was. One might be a little more challenging than another. You go into the studio with a 70-piece orchestra and you're doing it live—that was a helluva challenge. You couldn't spend two hours getting a drum sound, obviously. You had to get it right away. But then a group like the Lovin' Spoonful was challenging in its own way. You're working to really capture the sound of the group, and that's not always easy. I really liked them. John Sebastian was really great to work with. They got a little crazy sometimes, but they were a lot of fun. To cut a record like "Summer in the City," and watch it go up to Number One and sit there for weeks—that was a

ball; it was really thrilling.

I imagine that in the pre-Revolver days, bands pretty much let the engineers and producers call the shots in terms of how the records should sound...

That's right. We were mostly doing live tracks, maybe overdub a few things, and then put vocals on. But we'd experiment, too. Like on "Summer in the City" that explosion is from putting a mic in a garbage can that we had in the studio and banging it.

Did the highly experimental approach of George Martin affect you the way it did so many engineers and producers?

No, not really. Like I said, I had my own thing going.

But it certainly affected musicians and producers in terms of making them aware of the potential of the recording studio.

That's true. As you said, I think it affected

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some producers quite a bit. I worked with a guy out in L.A. who loved to imitate everything The Beatles were doing—Gary Usher. He loved to copy them. “Here, listen to this record, Roy,” and it would be some phasing thing; no big deal. Actually, I used a lot of that on Simon & Garfunkel. *At what point did you book up with them originally?*

Well, I was there for the audition. Then Columbia signed them, and Artie said, “Can’t we have the engineer we had on the audition? We really like him.” And I ended up doing all their sessions; every one.

Can you talk a little about their evolution in the studio? A record like “The Sounds of Silence” had a pretty distinct sound, but that’s very different, obviously, than what we later hear on Bookends or Bridge Over Troubled Water.

Well, “Sounds of Silence” was originally the audition, and then [producer] Tom Wilson and I went in the studio and overdubbed the studio musicians, and it came out as a single and it was a big hit. After that, we brought the same musicians in the studio and went on from there on the album.

How much control did Paul Simon have at that point over the music and arrangements and all?

Total. Or just about total. Artie was more into the vocal backgrounds, the pretty harmonies, etc. But Paul was the writer, and he really had a vision for what he thought we should do. Still, he would bounce ideas off of us; he’d come into the studio and say, “What do you think of this?” and he’d play something, and Artie would say what he thought, and I’d say what I thought, and we’d go from there.

Was theirs the typical story of each record taking longer than the previous one? An album like Bridge Over Troubled Water has so many styles on it; it must’ve been harder to pull off in the studio.

Well, it also didn’t help that Artie went off and did a movie [*Carnal Knowledge*], so that sidetracked us a bit. Also, Paul is not the fastest writer in the world. He wasn’t one of those guys who could just grind it out—boom, boom, boom—like he did more in later years. But, yes, that record did take a long time. Isn’t it that way with all successful groups? I think that’s normal. *What was the separation between producer and engineer in those days.*

Total. Although it wasn’t with me; not at all. The engineer was the engineer; the producer was the producer. The producer called the shots in the studio. He was



Roy Halee with Laura Nyro

running the session, and the engineer followed along. He was considered a good engineer if he didn’t get in the way. I was fortunate in that they drew me in more musically; they picked my brain more—“What do you think?” “What kind of sound would go well with that? What texture might go well with that?” “Well, how about a piccolo trumpet and a tuba in a church on that?” So we’d go and do that, like we did on “The Boxer.” We went into the chapel at Columbia University to overdub a piccolo trumpet and a tuba.

So that’s not something that was planned way in advance.

No, we were always experimenting with different combinations, different sounds. And you know, all the Paul Simon sessions were “head dates”; none of them were arranged. You go in and pick the brains of the best musicians in the world. You don’t put a chart in front of a Hal Blaine or a Larry Knechtel. You let them do what they do—draw on that.

You did Blood Sweat & Tears’ classic second album, which I always thought was a sort of left-field success, because born bands weren’t exactly hot at the time...

That’s true, though I always thought it was very commercial-sounding music. Of course, I had no idea it would be that kind of success. Horns on a rock ‘n’ roll record? It was almost unheard of. But the tunes were strong enough. And they had a great singer [David Clayton Thomas].

Did you keep an ear on pop radio at the time? Radio in the late ‘60s was so eclectic,

it must’ve been hard to make any generalities about what was “hot.”

I listened all the time. You’d hear what was making it and what wasn’t. I can’t say I changed anything I was doing because of what I was hearing, but it was important to know what was out there. So, yeah, I listened...and then I’d go home and listen to classical music to clear my head. You’ve gotta have that, man, or you burn out.

Were your bosses at Columbia comfortable with all the sonic experimentation you were into?

Up to a point. You know, I really wanted more tracks, and for Columbia to invest in an 8-track machine or, later, 16-track, it didn’t just involve me—it involved studios in Hollywood and Nashville, because they wanted their studios to be the same everywhere. It was a big investment any time they wanted to make a change.

You were instrumental in setting up some of the other Columbia facilities, weren’t you?

Well, they gave me my own studio in San Francisco. Clive Davis basically told me I could build the studio and do whatever I wanted out there.

But hadn’t you been in L.A. right before that?

Yes, but that studio was there already. I did a lot of recording in L.A. with Paul and Artie [Simon and Garfunkel]. I cut The Byrds there, too.

And that studio was like the one in New York, equipment-wise?

Right; it was Columbia equipment. Which

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some of the groups were not particularly crazy about, to be very honest. You know, groups are very fickle about studios. But Paul Revere & The Raiders always worked in the big Columbia studio [in Hollywood]. The Byrds did most of their sessions there. I liked working out there, but the union was a little strangling.

How so?

Creatively. If you wanted to do something really strange with a lot of machines, they didn't like it. If I had four or five tape machines running with echoes and reverbs—because you didn't have digital delays in those days, of course—I'd line 'em up in the hallway of the studio, and the union didn't like that. "What do you need all those machines for?"

So did CBS want to open the San Francisco studio because at the time it seemed like it had an important music scene?

Yes, they wanted to get more active in the business there. Janis Joplin was there at the time. Santana. There were a lot of acts there; it was flourishing, and Columbia wanted to get involved in it. What happened, though, is that I ended up bringing a lot of my own acts in there. I brought in Blood, Sweat & Tears, and we cut a lot of Paul Simon's first album there. Then Art Garfunkel came out and we did a lot of his album there.

When there was the transition from Simon & Garfunkel to Paul doing his solo material, was there much of a difference in the way he worked in the studio?

Well, he wanted to do that first album in a sparse, almost homemade way; almost like a demo. No big arrangements or big flourishes; just straight ahead, his voice way out front.

But then with his next album, There Goes Rhymin' Simon, it was back to the big productions.

Right, that was very arranged. Phil Ramone produced that one.

When [Simon's] Graceland came out in 1986, obviously there was a lot of talk about "world music" and all that, but the fact is, he's always been into different world music strains, whether it was the Peruvian "El Condor Pasa" or the various Latin and Caribbean things he did—"Cecilia," "Me & Julio."

That's absolutely true. It's because he's always looking for something different.

So did the San Francisco studio have the same equipment as the other CBS studios?

Yes, for the most part. It had the same custom console. It had a lot of good tube electronics—like the old RCA compres-

sor/limiters, which were really good-sounding units. And we had the old Pul- tecs and the UREI 1176s. And, of course, the microphone selection was out of this world. Today, you can't even get half of those microphones. I must've had 10 M49s and 10 U67s, KM84s, AKG C-12s for classical work. What a wealth of micro- phones!

What finally happened in San Francisco? You left in the mid-'70s...

I eventually got really tired of it, because I had to keep bringing musicians in from L.A. I tried using Bay Area players. I brought in San Francisco Symphony play- ers a few times. And there were a few horn players. I brought in Jerry Garcia a couple of times, which was nice. But Hal [Blaine] was down in L.A., and so many of the regular musicians I liked to use

**You do whatever
you have to do
to get it on tape.
That's always been
my feeling.**

were down there, and then I got involved with Albert Hammond and I was spend- ing more time there than in San Francis- co, so I figured I'd go back down there. I just couldn't find the musicians I needed to help me.

How did you feel about the physical change in studios during the '70s? The rooms became dead; there was a move away from live tracking in favor of build- ing layer by layer from the drums and bass up...

I didn't like it. I like ambience and I like to cut a good live track with a band. I've gone into the studio with producers and heard them say, "Hey, that's leaking! That's leaking!" And I say, "That's right, I like that! Listen to the overall sound!" If you don't have the leakage, the sound suffers. You have to have some ambience. Of course, sometimes you can't, and obviously you've got to overdub, but even there I'll do whatever I can to get some ambience happening. So, going into these dead rooms and putting all these guys in their little cubicles...I didn't like it at all. I liked studios where you could do both—like the old Mediasound in New York. It was a very live room, but you could dead- en it if you wanted to for some reason.

But did you do it?



No, I didn't. It was very challenging, for instance, doing *Graceland* in Africa, because I had to isolate these guys so that we could cut up the tape, take instru- ments out that we didn't want, replace them with other instruments. Yet I want- ed them all close so they had eye and ear contact without headphones. So how do you do that without building all these lit- tle houses?

What did you do?

I'd have to show you. It's complicated. I could write a book on the technical side of making *Graceland*. Briefly, though, it was mic placement, person placement and a few goboes. You'd be surprised what you can do in a room that's fairly dead, without any baffling, if you do a sensible setup. Musicians love to have eye contact. I've found that the drummer al- ways needed phones, but other musicians really didn't need them and didn't want them, because nine out of 10 times the headphone feed is bad.

Did you build the rhythm tracks and spend endless hours on drums sounds?

Oh, sure. You do whatever you have to do to get it on tape. That's always been my feeling.

So you wouldn't have recommended against working that way?

No. It's in the nature of being experi- mental. I go to a studio in Africa, I see what I've got or what I can get, and I think, "What do I need to do to get this on tape?" So I go out and listen to each musician and hear what's happening in the room overall and between each of the players and then work up a strategy to get that on tape. That's my job! If I don't figure that out, we're going to get back to New York and we're not going to have anything useable.

You work whichever way works for the group. If a band is *roaring* in the stu- dio [live], you can't throw up your hands and yell, "Help! Let's overdub all this!" You just gotta do it.

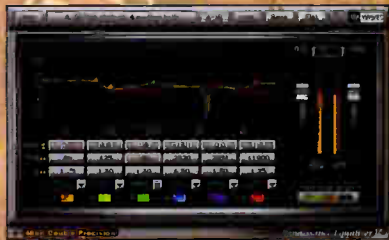
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that a band playing together?

I think so; pretty much. But let me give you an example of something they liked to do, and I went right along with it because that's what they wanted to do and it was my job to get it on the tape. They liked to put the drummer in the studio, put the bass, guitar and keyboard in the control room and cut a track. Their manager would come in and say, "What the hell are you doing? We're spending \$900 a day for the studio, and you're not using it!" "Yeah, but we're getting it down on tape, and it sounds pretty damn good." I would've preferred it out in the studio, sure. But we tried it the other way and they liked it and we still had fun doing it. Those were good records.

Did editing 24- or even 48-track tape in later years involve the same sort of skill set as 3-track in the old days?

Pretty much, I guess. Editing 3-track classical tapes was very, very difficult. Finding the spot in a sustained string section where they might change a note...you scrub the tape and you don't hear it immediately. So to have the technique to hear that and then cut the tape and make the change—that was very

tricky to do. Some of the editors there were amazing; they never made mistakes. Now, editing digitally seems like a piece of cake.

Though you prefer the sound of analog, right?

Oh, yes. Sometimes we would do a com-

**I didn't like going
in the studio
for 24 hours straight,
because I thought
your ears were gone;
I knew mine were.**

bination of digital and analog. When we went down to Brazil to work on [Paul Simon's *Rhythm of the Saints*] we cut it analog and digitally, and then I could compare the two.

You did both at the same time?

Right. I wanted to capture the analog sound because I think it's far superior; I feel there's no comparison. But I had to

do the digital for editing purposes. I couldn't have done either of those records [*Rhythm* or *Graceland*] without it; where I was going 10 generations to do my editing. Then in the end I mixed it down to half-inch analog at 30 ips, which is a sound I like.

Of course, all this is before a lot of improvements in digital processing, and before things like SACD and even upsampling normal compact discs, which does improve the sound.

You've also produced a number of great records through the years, while remaining an engineer principally. Do you remember what your first credited production was?

I think it must've been with Simon & Garfunkel. I remember at one point there was talk of Lovin' Spoonful doing a record with me, and of John Sebastian doing one, but I think in the end their manager decided that Erik Jacobsen had done a good job with them so let's not make waves. But I did Simon & Garfunkel, and Blood Sweat & Tears, Laura Nyro...

I see you produced Journey's first record.

I actually signed them! I thought that band was unbelievable! [Guitarist] Neal Schon really knocked my socks off. What a play-

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er! And Aynsley Dunbar was a fantastic drummer, of course. They didn't have the vocalist [Steve Perry] yet. But they could really play, and their material was good, and they had this craziness and drive I thought was really magnetic.

Did you have trouble making the transition from being purely an engineer to being a producer, listening for musical things, etc.?

A little, yes. And I would always lean toward the sound. But I didn't have any problem dealing with musicians on their level, telling them to do something again

if there was an intonation problem. "Oh yeah, *where?*" And then you better know what you're talking about.

I gained a lot of confidence from the people I worked with that I really knew what I was talking about. Like when I would do vocals with Paul or Artie or both of them, they would really listen to what I would say. And I helped them enormously with pitch problems.

At some point, Columbia stopped using their custom consoles and started buying commercial consoles. Did you have input into the types of gear they bought?

I was out of that loop. I think I was an independent by then. You know, those

consoles might not have been the cleanest consoles in the world or have the greatest transient response in the world, but they were the most *reliable* consoles in the world. They never, *ever* broke down. And the reason for that is that in New York—and Hollywood, too—if you've got a hundred musicians in the studio, you can't have a breakdown of the console. It's too expensive. So they really cared about maintenance—the maintenance crew would come in each morning and run a check, and then those consoles would just go and go, for 24 hours straight if you needed them to; no problems. That was important to them.

What happened after the change?

You start having breakdowns. I did a lot of sessions at Mediasound in New York with their Neve board, and I liked the sound a lot, but the damn thing was breaking down constantly, and that would drive me crazy because I was used to not having that problem. You're in the middle of something that's really great, and then you have to stop because you've got a breakdown—that drove me up the wall. It used to happen at the Hit Factory once in a while, too, in the middle of the night. And I'd go nuts. "Look, Roy, you've got to cool it. Forget it. That's life." So, I learned to deal with it. You take a break, walk around the block, whatever.

Was it hard branching out to other studios after you left CBS?

Well, I didn't that much. One time I had Cat Stevens come out and he wanted to work at Sunset Sound, and I said, "No, I think I'll work here [at CBS]." I was very, very spoiled.

Is that studio gone?

No, it's part of CBS Television studios. Of course, the [CBS] studio in New York that I loved and worked in all the time was sold to A&R—that was Phil Ramone's place—and has since been torn down, and I think there's a school there now. What a shame; that was a great studio.

So, what became your favorite studios in New York?

That one. Then Media, which was in an old church on 57th Street and now is a disco or something. Then I found the Hit Factory and pretty much did all my work there for many years. That worked out great for me.

Did you feel part of a New York recording community? Did you bobnob with Phil Ramone and others?

Not really. I mean, I hung out with Phil a bit because I worked at A&R a lot. I've always been very friendly with Phil.

Were there times you felt like you had to

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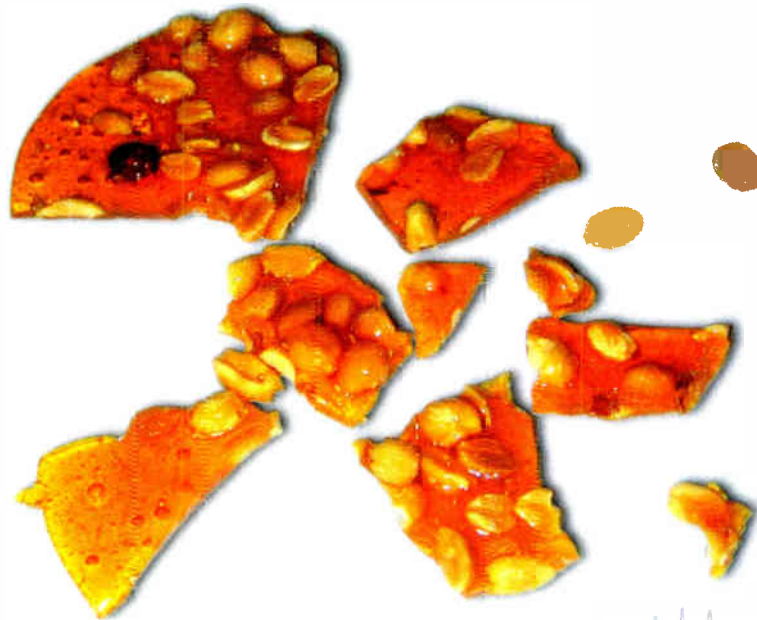
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step away from recording to keep from burning out?

Yes. I always enjoyed my time off. And I didn't like going in the studio for 24 hours straight, because I thought your ears were gone; I knew mine were. I knew damn well that we'd come back the next day and do whatever we'd done near the end all over again. Like I said, I liked going home and listening to some good classical music to clear my ears out.

Did you ever get back to doing classical music?

A bit, yeah. But as you know, you get pegged in this business. For a while I got pegged as the guy who makes good horn records, because of Blood, Sweat & Tears. And I got pegged as the guy who does these sweet, soft, beautiful records with Simon & Garfunkel.

There's something in the temperament of the great engineers that allows you to work with egotistical and demanding people. What is it? It's more than tolerance. It must be a certain empathy, knowing what the artist is going through...

I'd call it respect. It is a certain amount of knowing what the artist is going through; that's very well put. Understanding the pressures on them. You're there to help in every way you can, providing the guy or gal isn't acting like a complete jerk. I've seen Phil [Ramone] in situations at A&R that the average guy would crack under, and he'd sail right through it.

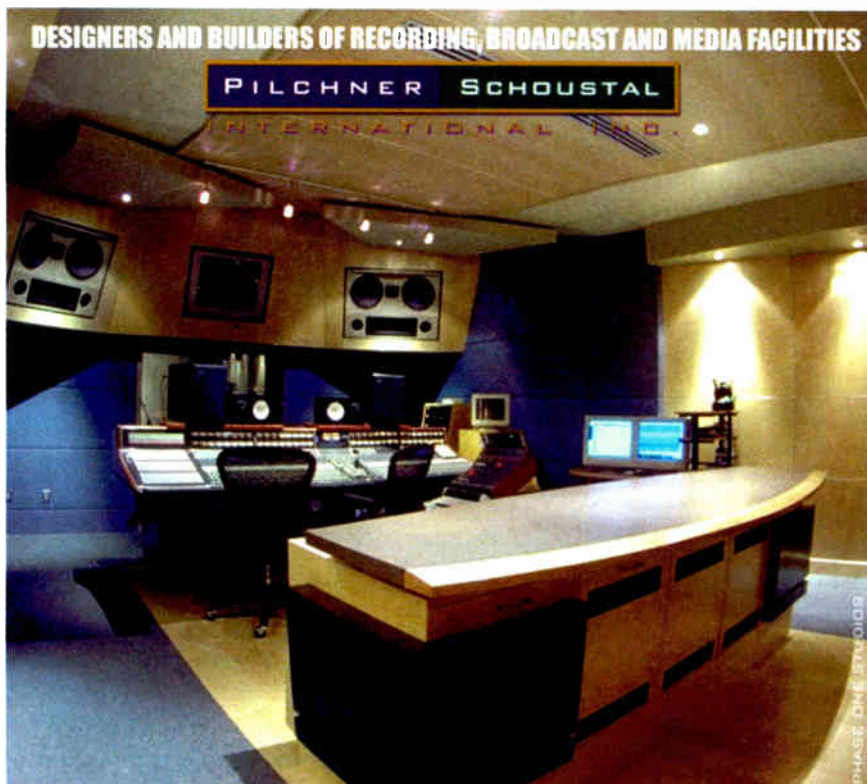
What do you think of the elevation of engineers to what could loosely be called star status? It was such an anonymous profession for so long...

I think it's great. Gosh, at Columbia I must've done a thousand albums that I never got credit for. Years ago, they didn't give credit. Like, do you know who the engineer was who did all the Tony Bennett albums or all those great early Sinatra records, or all the Mitch Miller records; every single one? It was the same guy: Frank Laico. One of the best. A great engineer, and nobody knows him, because he didn't get credit.

What was the last project you worked on?

I was a consultant on Paul Simon's Broadway show, *The Capeman*, a few years ago. But if something interesting came along right now, I'd jump right in with both feet. At this point, it would have to be something I'm really enthusiastic about. But I'd love to get a nice, hot project right now. ■

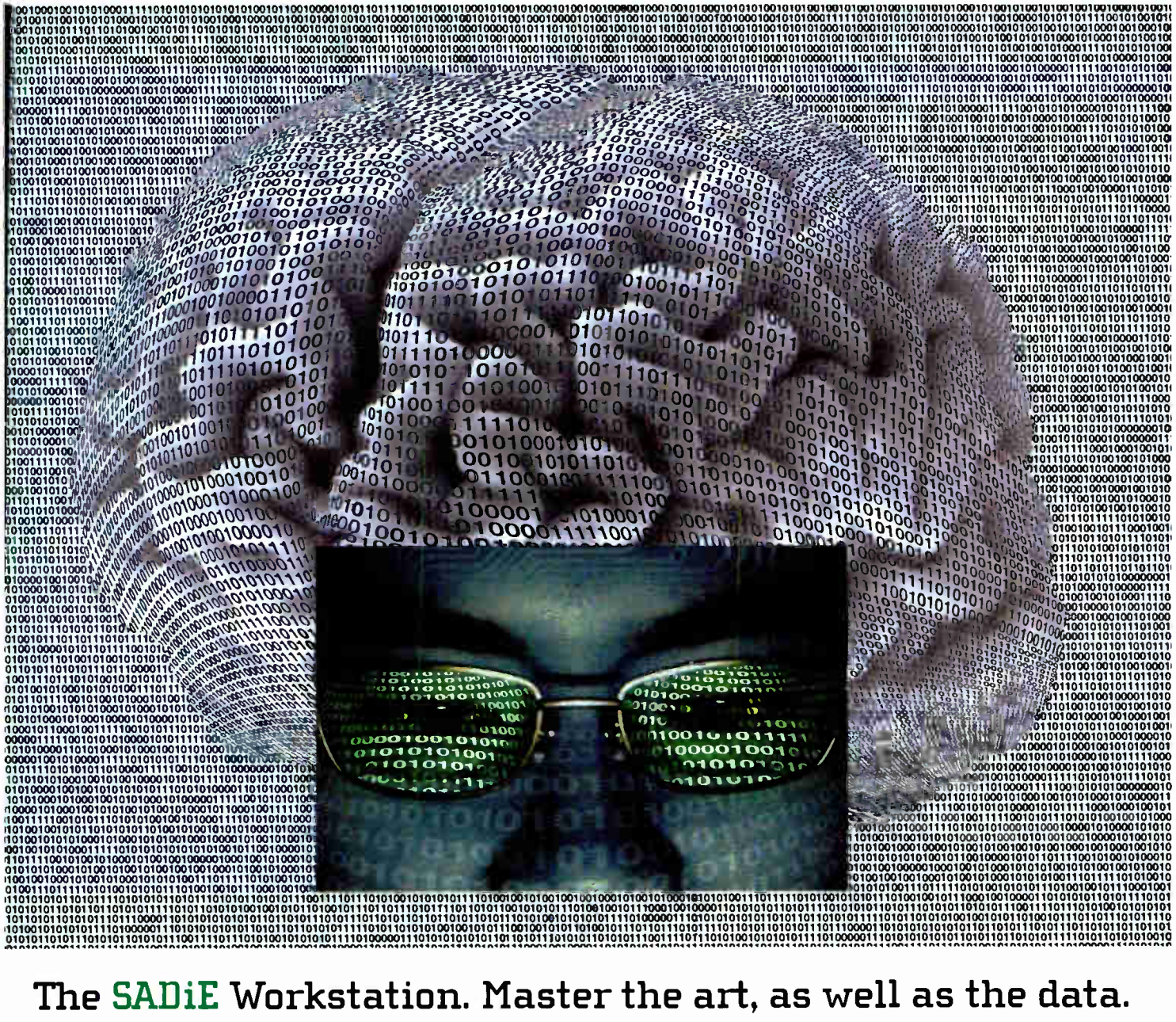
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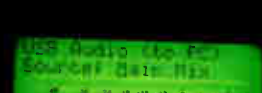
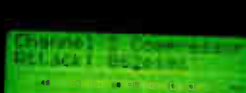
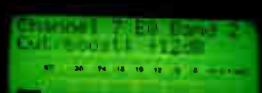
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 - EZ** Because it lets you do amazingly sophisticated audio processing with zero hassle.
 - EZ** Because it's got a ton of gozintas and gozoutas, and you've gotta ton of things that need gettininta and gettinouta.
- bus** Because once upon a time we took a Greyhound to see our Aunt in Cleveland. She was pretty far ahead of her time, having predicted the breakup of the Beatles, the birth (and death) of disco, and hanging onto her vinyl collection because she had a feeling that "some day people will use records and turntables differently than the way we do today."
- bus** Because an audio path is a bus, and the EZbus has a ton of 'em. Fully programmable ones, at that.



EVENT
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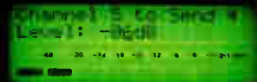
When is a Return more than a Return? When it's an EZbus Return, of course. In keeping with the EZbus design philosophy of ultra-flexible audio routing, the four Returns can accept audio from any EZbus analog or digital source. Those signals are then automatically routed to the Main Mix bus. So in addition to their traditional roles as effects Returns, the EZbus Returns provide you with four extra inputs to call on whenever you need them.



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AES31

Eliminating the File-Exchange Conundrum

By Mel Lambert

Analog was easy. A reel of 2-inch 24-track tape could be played back in virtually any studio or post facility, anywhere in the world. However, these days the situation is far more confusing. Since manufacturers of disk-based recording systems developed their proprietary approaches to speed and flexibility, we are now faced with an array of data-storage formats and media choices. And, if our aim is to integrate digital recorders and workstations from a number of different vendors—and there are compelling reasons why we might want to do that—how can we eliminate this Tower of Babel?

The most likely solution is in the form of AES31. For several years, the Audio Engineering Society Standards Committee (AESSC) Working Group on Audio-File Transfer and Exchange, under the chairmanship of Mark Yonge, digital product manager at SSL's UK corporate headquarters, has been refining the various elements of what has emerged as a viable technique for transferring sound files and project data from one workstation or recorder to another. The Working Group's initial task was to facilitate audio interchange in production and post-production (with or without synchronized picture); distribution and archiving formats are being considered separately. AES31 provides a set of technical specifications that, when implemented in a workstation, allow disk drives, digital audio media and Edit Decision Lists to be transferred from one AES31-compliant workstation system to another.

"The AESSC Working Group was set up in reaction to the audio industry asking for simple project interchange," says Yonge. "We had seen what was happening with OMF, but thought that something simpler might also have a place in the data-exchange landscape. So we developed a four-tier approach to the problem." These four independent stages form a series of scalable modules with interchange options, to produce a multipart standard. Applications range from the simple interchange of a single sound file to complex projects involving fine editing of many source sounds. "The interchange method needs to be flexible enough to support all these needs at a level of complexity appropriate for the task," says Yonge.

AES31: THE FOUR INGREDIENTS

- AES31-1 is concerned with *physical data transport*, how files can be moved from one system to another—either via removable media or (later) a high-speed network. Basically, AES31-1 specifies a transport compatible with Microsoft's FAT32 structures, although, for copyright reasons, it doesn't actually name Microsoft or quote its proprietary specifications.
- AES31-2 focuses on *audio file format*, how the data in BWF or Broadcast Wave chunks should be arranged on the removable media or packaged for network transfer.
- AES31-3 describes a *simple project structure*, using a sample-accurate Audio Decision List, or ADL.
- The more complex AES31-4 *object-oriented project structure* could use an extensible object model capable of describing a much wider range of parameters for applications where the costs of significant additional complexity can be justified. (More on this later.)

Stages 1 and 3 have been published as standards, with stage 2 anticipated shortly.

GOALS AND IDEALS

The committee's primary criteria in forming the standard, Yonge stresses, were simplicity, reliability and competence: "We wanted to develop as simple a file standard as possible, based on FAT32 and Broadcast Wave, and a simple project structure to allow exchange of edited material." FAT32 is a more flexible and robust extension to Microsoft's FAT (File Allocation Table) that supports drives of up to 2 Terabytes, and uses space more efficiently because of its smaller cluster size. It is also implemented on the majority of Mac, Unix and Windows platforms and is inherently simple enough to be used in embedded systems.

BWF is a standard developed in part by the European Broadcasting Union (EBU) based on conventional IBM/Microsoft RIFF/Wave audio files. An additional header chunk defines the format of the audio data, and includes a description of the sound sequence, the name of the originator, a reference

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AES 31

of the originator, the origination and time, plus a time reference. In essence, BWF time-stamps each audio file with its proper location in a project and adds useful identification information: The format-independent time reference is a 64-bit number representing the first sample in the file as sample count since midnight, and can be used with any timecode or picture frame-rate and with any current or future sampling rate. For simple review, a BWF can be played on any system capable of playing a Wave file.

"AES31's ADL was modeled on conventional Edit Decision Lists," Yonge continues, "but with sample-accurate granularity or precision compared with that offered by PAL/NTSC video synchronization. And we wanted to include specific parameters for multiple audio channels, cross-fades, level automation and other important values."

Brooks Harris, vice-chairman of AES31 SC-06-01, and president of Brooks Harris Film & Tape, New York, is a genius at sorting out EDLs and ADLs. "Aside from being 'human readable' and easily understood, AES31-3 is based on two important parameters: sample accuracy and file locators. We need to label in/out points of the component audio files in H:M:S:F and sample count."

AES31-3 uses a form of universal resource locator for accessing files on any platform or network. This includes the "file" (URL scheme designator), followed by the "host" name, the names of the local disk volume, directory, subdirectories, and then the file name with a .WAV extension; all branches in the sequence are separated by conventional forward-slashes used in familiar http:// and ftp:// addresses.

In terms of timing accuracy, Harris spent a long while developing highly accurate algorithms that can mathematically accommodate any time base for the source and destination projects. "AES31 is the first set of analytic definitions that could be agreed upon by manufacturers to control data interchange," he says. "We have developed a technique for accurately defining the precise location of each sample of audio data, by combining conventional timecode data with a frame rate that lets the receiving DAW, for example,

know precisely where the data is located and how to play out the elements in perfect synchronism." The AES31-3 ADL contains information about what files are to be played at which location in the timeline. It specifies the frame rate and time base; the film frame (A, B, C or D for 4-perf) and whether the time base is drop or non-drop (NTSC-only; PAL video runs at a fixed 25 fps rate). Also included in

each other's formats—is that it only needs to be done once. An "anything-to-anything" solution can be extremely complex and costly to manage; AES31 compatibility is intended to reduce such effort.

ON THE ROAD TO A SOLUTION

With a growing number of manufacturers already embracing FAT32 file structures and BWF data formats, we are beginning

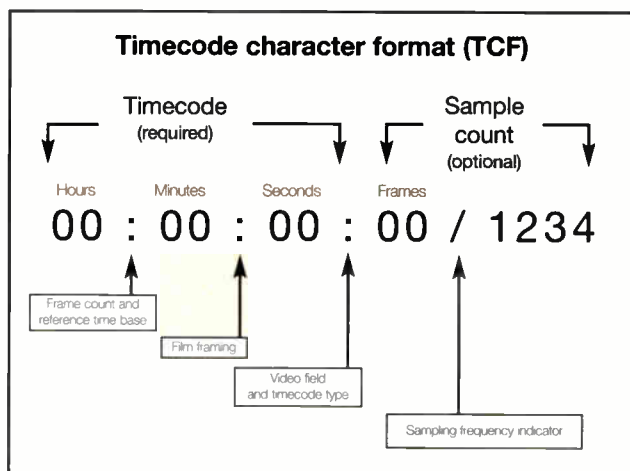
to see a road to file exchange between platforms, even if they don't—as of yet—include full AES31 compatibility for project data. For example, several firms, including Fairlight, SAIDe and Wave-Frame, offer the ability to save BWF data to FAT32-compliant removable media, while Digidesign Pro Tools 5.1 will directly import BWF files and their timestamps into a session. If, for example, a Fairlight MFX3 user saves a BWF file with timestamp to a compatible drive, like a Jaz cartridge, the file can be imported into Pro Tools. The editor can use Pro Tools'

Spot function to quickly place the file at the correct timecode location.

As Andrew Brent, Fairlight USA's international technical director, explains: "We currently support, in Version 15.6 and beyond, BWF import/export, and from 16.5 on we will be supporting FAT32 disk-file format. Our remaining development is the interpretation and creation of AES31 ADL."

In terms of the future, Brent feels that AES31 should be kept simple. "There is a lot of discussion about adding object-oriented events to the ADL. But the current ADL is a text-based, readable format. Any code developed to support complex algorithms such as real-time EQ, with the corresponding DSP code, or dynamic level and crossfades, or the ability to create a 'Takes Layered' environment on one track, will create an ADL that will explode in size. The best use of AES31 is a simple interchange of raw audio between these systems."

Howard Schwartz, president of New York's Howard Schwartz Recording, feels that "AES31 has a long way to go. The installed base for OMF is so huge that the switch will be slow. Even if the format may be better, it isn't easier to totally switch away from OMF. We install whatever our clients request, after the second or third asking. OMF and Pro Tools were the first really significant technical requests coming from clients, not other facilities. I am sure



A vital element of AES31's timing capabilities is the high-precision time stamping used in the ADL.

each BWF sample are the central sample rate—32, 44.1, 48, 88.2 and 96 kHz—and one of five pull-up/down ratios, to provide multiple, unambiguous combinations that allow the project to be re-assembled in perfect sync.

AES31-4 is currently undefined except for its intent, but could be based, Harris says, upon current deliberations by the industry consortium that is promulgating Advanced Authoring Format, or AAF. Because AAF is intended to function as a multimedia file format that enables content creators to easily exchange digital media and metadata across platforms, and between systems and applications, it will include complex project structures that enable sample-accurate editing of multiple sources. The AAF Association's membership includes Avid, BBC, CNN, Discreet, Fox, Grass Valley Group, Liberty Livewire, Microsoft, Omneon, Panasonic, Philips Pinnacle, Quantel, Sony and Warner Bros.

"Because AAF is being developed by a consortium and not a standards body," Harris explains, "it can have a wider scope. But the AES standards working group has an active liaison project with the AAF Association. AAF could be a 'super set' of AES31, with many common elements." Harris chairs this liaison group.

One of the main reasons DAW manufacturers cite for adopting an open standard—rather than attempting to emulate

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AES 31: Compliance of Popular Systems

Company	Product	AES31 Compliant?	ETA?	Verified?
AKAI	DD8plus MO	<i>Demonstration version</i> supports FAT16, not FAT32; Broadcast Wave Audio, TCF and ADL are implemented: both real-time read/write or import/export		Tested with SADiE products
AMS Neve	AudioFile SC	<i>Under Development</i> Import/Export plug-in	Q.3 2001 compatability pack with AudioFile SC2.1	
Digidesign	Pro Tools	<i>Not Yet</i> Supports native BWF files for both Mac and Windows platforms Natively record/play/edit and import/export BWF, SDII and .AIFF	TBA	
Digital Audio Research	OMR8 recorder	Yes		SADiE and others
	SoundStation STORM	<i>Under Development</i>	TBA	
DSP Media	AVtransfer	<i>Under Development</i> Some aspects of the AES31 spec are ambiguous—such as multichannel support	Early August 2001	
E-mu/Ensoniq	PARIS	<i>Not at this time;</i> second priority to mLAN/FireWire support		
Euphonix	TransferStation	Yes; but it does not render crossfades; does not read .AIFF files		SADiE products
	R-1 multitrack	<i>Under Development</i>	Six to 12 months	
Fairlight	MF3 and DAD	<i>Not Yet</i> Supports BWF import/export and FAT32 file format	Six Months Using System Service Module	
Fostex	DV-40 recorder	<i>Not Yet</i>	New product to be introduced at AES New York 2001	
Genex	GX-8500 MO recorder	Yes; with limited crossfaders	Has discovered some holes in AES31 ADL spec that are being addressed	Limited testing with SADiE
iZ Technology	RADAR24 digital multitrack	<i>Not Yet</i>	Within three months	
Mackie	HDR 24/96	<i>Not Yet;</i> multitrack	Still undecided; may be implemented in HDR 24/96 and future recording systems	
Merging Technologies	Pyramix Virtual Studios	<i>Not Yet</i>	AES New York 2001 Same implementation will be available for WaveFrame Frameworks/DX	
Otari	<i>New Product</i>	<i>Not Yet</i>	TBA	
Sonic Solutions	Sonic Solutions HD, Creator and Fusion	<i>Not Yet</i> Currently support mono/stereo interleaved .AIFF/.WAV files	Undetermined	Some testing with Euphonix and SADiE
Soundscape	Soundscape R.Ed and SSHDR1-Plus	<i>Not Yet</i> BTW import/export supported for some time; plus other formats for text-based audio projects	Full support expected by end 2001/early 2002	
Steinberg	Nuendo	<i>Not Yet</i>	Q. 3/4 2001	
Studio Audio	SADiE digital equipment	Yes		AKAI, DAR and others
Tascam	MMR-8 dubber MX-2424 multitrack	<i>Not Yet</i>	Depends on availability of engineering cycle	
WaveFrame	WaveFrame 7	<i>Not Yet</i> Frameworks/DX	AES New York 2001	
Zaxcom	DEVA hard disc recorder	Yes		WaveFrame, Fairlight, AKAI DD8, Tascam MMR-8



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AES 31

Avid, as has Microsoft, will do whatever they can to preserve their dominance in the file wars. Does AES31 work side by side with OMF? Together? On top of; next to? A whole retraining must take place, and for what gain?

But Jay Palmer from Universal Studios' post-production sound department—and a guiding light behind Hollywood Technical Audio Committee's efforts toward file-format standardization—feels differently. "AES31 compliance is very important. For TV editing and mixing of shows done in-house [at Universal], native Pro Tools is the usual choice. If the project comes from outside, there are a variety of ever-changing file formats. In these cases, all bets are off as the new file revisions of their platforms are not always supported by our equipment. A simple AES31 export would help solve this dilemma. The same applies to feature-film editing and mixing. There is a larger commitment to archiving the elements, predub mixes, stem-master mixes and print masters. Archiving in an industry standard would be much more

beneficial in the long run.

"And for DVD mastering, when film AB reels are conformed for continuous DVD payout, prior to AC3 compression and streaming, the files are non-compressed. These become the new DVD non-compressed audio masters, and will be used as network TV needs them and for future formats. It would be good to have a standardized format for this new archival master. Archiving is all about maintenance of the content owners' intellectual property—important stuff. You do *not* want to archive to a proprietary, ever-changing file format; we need an industry-recognized, non-proprietary, AES-badged standard."

In terms of what might be missing from AES31, Palmer cites such issues as conversion to/from disparate disk file systems, including Mac HFS and HFS+, PC FAT16, FAT32, Linux and BeOs. "The AES-31 format states ADL, BWF and FAT32. Period," he says. "Will folks have to drastically alter their workflow habits to support the standard to the letter of its spec? Will programmers be able to imbed all of the disk utilities necessary to implement the standard?"

"While AAF builds upon OMF as its container/EDL," Palmer continues, "it is controlled by the AAF Association, a trade association with dues-paying members.

AAF is very all-encompassing; it has wide-ranging standards descriptions for audio, video and metadata containing a complete edit history. But a main point of contention for many manufacturers is that they do not want to support a standard that is wholly owned by another competitor. OMF, for example, is owned by Avid, and OpenTL by TimeLine Vista. AES31 is a 100 percent truly-open standard that is relatively to implement."

"Our industry is based on workflow of projects and media through the production chain," adds Ron Franklin, president of WaveFrame, and a member of AESSC SC-06-01. "Anything that facilitates workflow is beneficial to both our customers and our company. We believe AES31 will prove to be a very important standard. First, because it works. And second, because it is the only digital audio project-file interchange scheme officially ratified by a standards body that contributes to ISO standards."

WaveFrame systems can read and write to various disk formats, including FAT16, FAT32, NTFS, and Mac HFS and HFS+. "OpenTL is the file format used in the Tascam/TimeLine MX-2424 and MMR dubbers," says Franklin. "We have implemented support for this in WaveFrame/7



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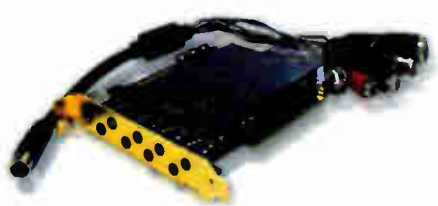
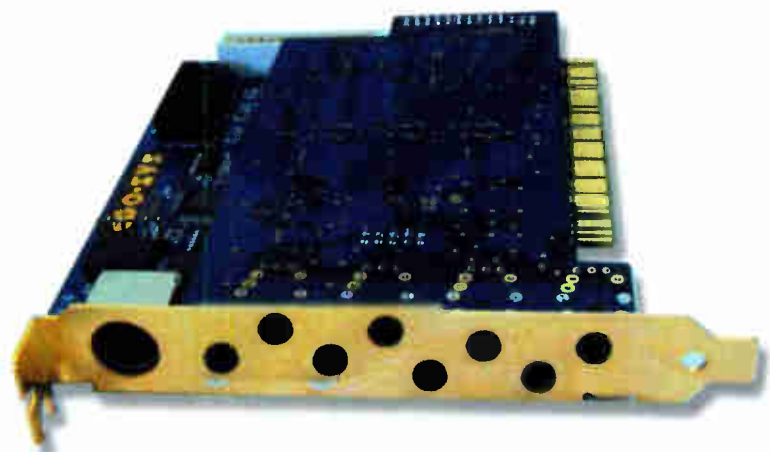
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3	Independent KVM support	NO	YES
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12	Multiple Direct Sound	NO	YES
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AES 31

since OpenTL is currently the only format the MX-2424 supports; we wanted to provide our users with file and project compatibility with this machine."

Andy Morris is president of Buzzy's Music, an L.A.-based post and voice-over facility. "A user-defined, AES-developed, non-proprietary standard will go a long way to breaking down the industry's data-exchange log jam," he says. "Currently, we provide clients with BWF files from all our

MF3+ systems. Contrast that technique with using a tedious method of transferring eight tracks at a time to a DA-88, or two tracks at a time to DAT—with or without timecode—and later re-aligning these multiple passes in the receiving DAW. It's a real-time process: to transfer 10 spots to DAT, each 60 seconds long, would take over four hours for upload and download. Oh, and did I forget to mention that the client is not willing to pay for all that wasteful transfer time? AES31 can handle that in a matter of minutes; it's a no-brainer."

Jim DeFilippis is VP of television engineering for Fox Studios' New Technology Group, and heads up a task force for AAF.

"We are working with the AES on defining the interoperability between AES31 and AAF. So far, we have determined that AES31, while suitable for many audio post applications, does not have the critical element that AAF seeks to provide: a complete history of the file essence, including all the post-production metadata.

"The goal of AAF is to allow post projects to flow from workstation to workstation and allow seamless transitions. AES31 stops short. Each time projects are transferred from workstation to workstation, the critical metadata has to be re-done or transferred via a different media (paper, floppy disk, tape label). This is somewhat inefficient and impedes the collaborative effort between departments."

SADiE's managing director, Joe Bull, also serves on AES31 SC-06-01, and says that "without AES31, the audio industry has to accept the 'one-size-fits-all' workstation philosophy. It's like a carpenter having only a hammer to fashion his creations; he needs a *range* of tools to achieve the job. Similarly, synching dailies, ADR, track laying, Foley, music editing, mixing, etc., are best handled using the most appropriate tools. AES31 implementation will allow the user to choose.

"With the first three parts of AES31 ratified," Bull says, "the only remaining part is mix automation; we always recognized that this was the trickiest part. So, rather than delay any form of interchange until every bell and whistle had been covered, the AES31 Working Group decided that a gradual approach would give the industry a working toolbox, with the basics initially and expandable in the future, and provide the best route forward."

SADiE is currently working to provide the first level of Part 4, level and mute automation. "We are prototyping some ideas, along with Brooks Harris and others, to see what can be sensibly achieved in a reasonable timescale," says Bull. "In the meantime, the industry has the basic toolbox that at least puts the right bit of audio in the right place in the EDL."

Bull considers that AAF, on paper at least, could provide everything that the industry needs. "However, until it's ratified, AAF provides absolutely nothing for anybody," he stresses. "There have been discussions that, to speed their deliberations, AAF may adopt parts of AES31. Even when they do finish and publish a complete working standard, there may still be problems. AAF is an object-oriented and thereby a complex, structured product handling everything from graphics, video, audio, etc. This may be fine for a video manufacturer with huge software re-

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AES 31

sources, but could be beyond the scope of what audio-specific manufacturers can afford to develop."

CAN WE AGREE TO DISAGREE?

For several years, Digidesign has been using its open-standard Sound Designer/SDII file format, with internal timing references, plus a proprietary Session format. Many workstation manufacturers have adopted SDII, and Digidesign has supported native BWF files for both Mac and Windows platforms since the release of Pro Tools 5.1. Pro Tools will natively record/play/edit BWF, SDII and .AIFF; import BWF, SDII, .AIFF and, with conversion, MP3 plus QuickTime; and export BWF, SDII, .AIFF, and, with conversion, MP3, RealAudio plus QuickTime.

"We're a very customer-driven company," notes Scott Dailey, Digidesign's VP of product marketing & business development. "Thus far, the vast majority of our customers have been asking us for other important things. Based on this feedback, we believe AES31 Level 4 is potentially very exciting and important to Digidesign and its customers, whereas Level 3 is probably not."

Dailey says that Digidesign and its parent, Avid Technology, have been delivering open, cross-application, cross-platform media and metadata interchange for several years, based on OMF. "OMF currently does everything AES31 Level 3 does, and more. It is mature, reliable technology, and thousands of post-production professionals around the world rely on it every day to get their work done. Further, OMF has been adopted by essentially every important company in post-production audio, as well as most—if not all—of the important film and video post companies. Given OMF's widespread adoption by end-users, and its broad adoption by manufacturers, AES31 Level 3 looks like a lot of work for a big step sideways."

It is important to note, Dailey says, that no company can reliably support a wide variety of interchange standards. "Our test grid is staggering already, and supporting a variety of legacy Pro Tools Session file formats, plus EDL, OMF, AAF, OpenTL, ADL, etc., is impractical. Digidesign must pick and choose the highest impact standards. Our highest priorities right now are OMF and AAF, because they encompass all the capabilities of the other standards. Not that AES31 isn't valuable; it's just a

lower priority than other interchange formats and general Pro Tools features customers are clamoring for.

"One of the problems with AES31-3 is that it deals only with audio," Dailey continues. "At the NAB convention, we were approached by senior representatives from several of the world's largest post facilities. They told us loudly and clearly that we must not adopt anything that deals only with audio. They need media-management systems and workflows that can handle video, graphics and other sorts of data. Further, these same customers—and many more—are asking for richness of interchange that AES31-3 was never intended to handle.

"FAT32 as the only supported file system is not a very good choice for manufacturers who build systems based on the Apple Macintosh," he says. "Our engineers have told me that FAT32 support is not physically impossible, but that it would require an amount of work that is greatly disproportional to the limited interest our customers have shown in AES31 Level 3 thus far. The other large unresolved issue is closure on AES31 Level 4.

"OMF, and its successor AAF, offer nearly limitless opportunity for 'rich' interchange and modernization of post-production workflows," says Dailey. "AAF is essentially a third-generation update to OMF, with a couple important improvements: It is implemented as open-source, and is being administered and developed by an independent, non-profit trade association, and it incorporates several important SMPTE metadata standards.

"OMF and AAF offer several interesting possibilities for rich interchange that are not addressed by AES31 Level 3," Dailey adds, "including 'bread and butter' functions such as routing, volume and multichannel panning automation, and more advanced operations such as hardware and software plug-in processing parameters. Other compelling possibilities include tracking and management of historical metadata that would define the series of processes applied to a piece of audio or other compositional data, thus providing a roadmap from the original source material to the material in its current state. Users could rebuild a sound—or even an entire mix—from the original elements, perhaps omitting or changing certain processes that were applied somewhere along the way." ■

Mel Lambert founded Media&Marketing more than a dozen years ago to provide communications and consulting services for pro audio firms and facilities. More details at www.mel-lambert.com.

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Scratching Out an Empire

significance, if any. What urban producers are looking for in an engineer, regardless of race, is the ability to translate verbal descriptives into actual sounds and moves. “[Engineering] in rap is different than it is in pop music,” Dawg states. “I think the moves are more intricate, you play with the beats more. You have to have a real feel for the beats to

away from the creativity, I think. It’s hard enough to be a player, producer and writer all at the same time.”

Irv Gotti came up as a DJ, working first in his neighborhood of Hollis, Queens, inspired by, as he puts it, “sitting there watching Run-DMC rule the world.” He is also less interested in the equipment than the music itself. Yet he has spent a long time in studios in New York, starting out on a Fostex 8-track deck and a “bullshit” console. It was the collaborative nature of New York rap

“You don’t have to know how to do everything. You have to know how to make beats and want to be a producer. But you meet people who can play and do engineering, and they took my production to another level.”

That first record turned out to be Gotti’s break when leading New York-area urban radio station Hot 97 put it into heavy rotation, after which it was picked up by Blunt/TVT Records, which also gave Gotti a production deal. He now also has his own studio, The Crackhouse,

I definitely have to act more in the capacity of defining what sounds good and what doesn't. The up-and-coming producers may not know what you need to make a competitive record.

-MAYHEM

make the punches. You can’t catch the punch if you can’t catch the beat.”

Adds Poyser, “Your job as a producer is to know what you want to hear and to be able to communicate it. In terms of engineering, I prefer to think about the music more than the technology. There are things I’ve learned about that, but getting your hands too deep in that takes

that got Gotti—a nom de musique conferred on him by rapper Jay-Z to commemorate the founding of Gotti’s production company, Murder Inc.—into the loop, so to speak. “My first artist was Mike Geronimo, and I made that record and produced it and pressed it myself, and also did the video. My friends helped me out on everything,” he says.

in Manhattan, and an office at Island/Def Jam Records, which has a joint-venture with Murder Inc. Gotti’s discography includes tracks for Foxy Brown, DMX, Ja Rule and Wu Tang Clan’s Ol’ Dirty Bastard.

Having a personal studio has become nearly essential in rap/hip hop, both for artistic and economic reasons. As Gotti puts it, “I did it ‘cause I didn’t want to give

aaah... the joy...

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Here are a few of the innovative software developers who offer support for the US-428. Cakewalk, Sonar and more virtual synth support coming soon. See the TASCAM web site for the latest info.

all my money to [the commercial studios]." Bink Dawg agrees, adding, "We realized that we could spend one-tenth and send the P.O. to the label and the money back in our pocket. It's a waste of mon-

ey sitting around doing beats in big studios." Says Gotti, "Those studios also get booked and you can't get in. Besides, when I saw that there was a \$300,000 [recording budget], I said to myself, 'I got to do some recording.'"

Still, all those we interviewed also agree that top-tier studios are an important component in urban records, mostly

for mixing on large automated consoles. And, says Dawg, the personal studio isn't for everyone. "There are a lot of people scared to take that step," he says. "It can be a big investment. Also, sometimes you need to have three or four rooms going at once, and the big studios can do that."

Major commercial studios also can act as a reference for audio quality, though defining that in hip hop and rap is tricky, because "grime" on the track is often a by-product of the creative process itself, where distortion and other artifacts can actually lend credibility to the finished song. "You want a rap record that sounds as clear as an R&B record but is still grimey," says Dawg. "A record shouldn't have to suffer to sound street. It can sound good and still come across as hard-core."

Nonetheless, major record labels in New York—which are not at all displeased to see recording moving into the producers' studios—have found themselves acting in the role of quality arbiters, telling producers where the threshold needs to be. Mayhem, director of A&R at Elektra Records in Manhattan, says, "I definitely have to act more in the capacity of defining what sounds good and what doesn't. The up-and-coming producers may not know what you need to make a competitive record, or what you need on a track to make it work for radio or for the clubs, for the level of quality you need to have on a major label release. I've become the litmus test for the [track]."

Mayhem, who has final approval for certain recording budgets at Elektra, agrees with the producers that money for overdubs is better spent at personal studios, and technology such as Pro Tools allows virtually every aspect of recording, up to and including mixes, to be done faster and less expensively. He's also very up-front about the fact that this allows the label to actually cut budgets on individual recording projects, and further allows Elektra to literally double the number of rap records it funds and releases. "If I can make twice as many records, I have twice as many chances of having a record hit big," Mayhem reasons. As for the big studios, he believes that they will always be in demand by top artists, including rappers. "A guy like LL Cool J, he wants to be in a place like the Hit Factory," he says.

Still, producers are aware that technical aspects of record-making need to be addressed at all stages of production. Bink Dawg, for instance, points out that he tries to make his samples as tight and as high-res as possible. "You don't fix a bad sample in the mix," he states. "And a good sam-

—CONTINUED ON PAGE 68

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—BINK DAWG

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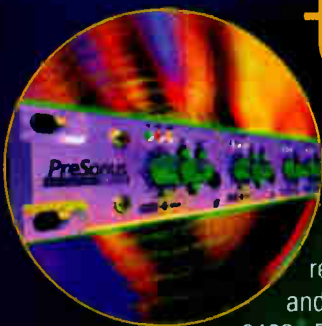
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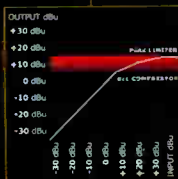
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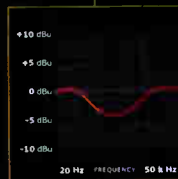


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Scratching Out an
empire

MASTERS AT WORK

BY GARY ESKOW

Remixing isn't the right term. When artists like Kenny "Dope" Gonzalez and "Little" Louie Vega get their hands on a track, strip it of everything but vocals, and produce an entirely new musical arrangement, they're doing a lot more than mixing.

Operating for more than a decade as Masters at Work, the two have helped define the Nuyorican sound and have applied their skills and spice to a remarkably large and diverse pool of artists, including Michael Jackson, Madonna, Lisa Stansfield, George Benson and Debbie Gibson. They recently put together a double album, *Our Time is Comin'*, that includes some of their best work from the past and new tracks from Shaggy, Patti Austin and Roy Ayers. *Mix* caught up with Gonzalez and Vega by phone from a New York recording studio as they were putting the final touches on their new record.



Gonzalez (left) and Vega

Many people put remixers and writers in separate containers, yet you two are both. What have you learned about songwriting through your remixing work?

Louie Vega: When we remix, we are actually writing, producing and arranging new music. Doing as many as a few thousand remixes, we have had plenty of practice. So we have learned a lot, but always looking to learn more. We have learned to work with singers, musicians and engineers.

Kenny Gonzalez: Basically, when we remix, we never use any of the original tracks, so we write new music and use the original vocals.

How has digital technology affected the way a remix session is handled?

Vega: Thank God for Pro Tools; we use it all the time.

Gonzalez: I still love the analog tape. Even though there are plug-ins, Pro Tools still does not simulate tape. On the other hand, the digital tools work for vocals, bouncing tracks and music. You could never do that on 2-inch tape!

You have project studios in your homes. How do you interface with the larger studios where you complete your work?

Gonzalez: I do all the pre-production at my house. I don't bother with a computer at home. I have both an MPC-2000 and 3000, and I drop all my beats and tracks to disk. When we go into the studio, I get my engineer to suck it all into Pro Tools. We create our arrangements in Pro Tools and then get on with our work. We've done a couple of projects entirely in Pro Tools; it's great for riding vocals. Most of the time, though, I keep the drum machine stuff and music automated on the board, so I end up with a mixture of Pro Tools tracks and live MIDI stuff.

What monitors do you use?

Vega: Consistent sound is the most important thing, so at my home studio I use only Tannoy speakers. I use System 15 for main reference with B400 subwoofer; 800As with a subwoofer for near-field.

Gonzalez: Tannoys are dope. I've always loved their sound—very true. In my house, I've got the Tannoy System 1200/B400. The end result always sounds exactly like what you heard in the room you were working in.

You must have some interesting stories to tell, given the level of talent you've worked with over the years.

Both: Watching Tommy Li Puma produce George Benson in the studio was like getting a crash course in producing. Co-producing "The Ghetto: El Barrio" with him in the studio was very special. When we remixed Michael Jackson's "Rock With You," we were blown away by the way it was recorded. When we brought the track up, it sounded just like the record; Michael's voice just needed a little reverb. When we put the faders up and lined them up at 0, the mix was perfect. Bruce Swedien is "the man."

Recording Eddie Palmieri in our studio for the Nuyorican Soul project was tremendous. He did his tracks in one take. Arranging background vocals with Luther Vandross for BeBe Winans' *Thank You* record, Luther knew exactly what he wanted—the different notes for everyone, stacking the sounds. He is a genius. ■

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—FROM PAGE 64, HIP HOP PRODUCERS
ple makes the engineer's job a lot easier.”
James Poyser knows that there's a world of difference between a Neumann U87 and a Shure 57. Still, he says both have their place on vocals. “I've cut vocals on a 57, though I try not to,” he says. “It all depends on the voice and the vibe. When guys start worrying about perfection, it takes away from the vibe. I've tolerated distortion on vocal tracks if it's part of the vibe. You want a clean signal, but sometimes noise is a great thing. On Erykah's [Badu] record, there were times when she just grabbed the 57 and sang into it, and that was the vocal. You can hear her talking under some of the tracks; you can hear that kind of stuff on D'Angelo's records, too. There are tracks where you can hear [programmer/drummer] Amir Thompson's cell phone going off. It's organic if it happens on the session. It's like going back to mom's house for dinner: It's not cooked up by a great French chef, but there's something special about home cookin', even when it's not perfect.”

All of this underscores the fact that this particular universe is less about making technically great records than it is about climbing a much larger ladder. Entrepreneurship interlaces every action in hip hop, in or out of the studio. Bink Dawg puts it most plainly when he says his ambition as a producer is to “conquer the game like Jermaine [Dupree] and Puffy did. Being a producer is just a start—what you really want is to be known as the guy who can break an artist. All the while you're making records, you're also building your production company and building relationships with the record labels. By producing records, I'm getting seasoned for the game. You start out as a guy doing beats and you want to end up president of a record label, or whatever. Producing is something you do along the way.”

And New York is the ultimate test track for urban's next generation of producers. While they may be coming of age in a very different landscape than rap's earlier days, they are acutely conscious of the heritage they've become a part of, and of hip hop's ability to embrace change. “There are a lot of different kinds of music that rap embraces,” says Poyser. “And that's exactly why it's endured so long.” ■

Dan Daley is Mix's East Coast editor.

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KEVIN ODOM AND LL COOL J

ROCKIN' THE BELLS AT HOME

When he's not making movies or starring in television shows, seminal rap artist LL Cool J turns his creative energies toward recording his own material through Rock the Bells Music Group, the Warner Brothers-affiliated production company he's headed for the past 15 years. Lately, LL has also been producing other artists as well, working as often as possible in his own Rock the Bells studio, located in the Queens, N.Y., home where he grew up. A small, comfortable space, the facility lacks some outboard gear but is otherwise a fully functional studio. Working frequently with LL on a variety of projects has been freelance engineer Kevin Odom, who is also a musician and something of a computer expert, with many years working in and around New York.

Although he's comfortable working with traditional consoles and the 2-inch tape format that LL Cool J remains fond of, Odom is immersed in workstation-style recording and, little by little, is making a convert of his boss. "I was one of the first people to record audio on the old Atari Falcon computer," Odom notes. "I was using Cubase, and have stayed with Steinberg products since that time." Currently, Odom works with Steinberg's Nuendo software, which he uses in conjunction with a Mackie D8B console at Rock the Bells.

"I saw Nuendo years ago when it only worked on the SGI platform, and knew that if it was going to be successful, it would have to be rewritten for the Mac, the PC or both, and that's what's happened," says Odom. "Nuendo has features that Cubase lacks. Cubase is for people who have MIDI and want some audio capabilities. Nuendo is much deeper; it lets you manipulate audio in very detailed ways."

Asked for an example, Odom says that the ability to redraw waveforms down to the single sample level is extremely helpful in the R&B recording

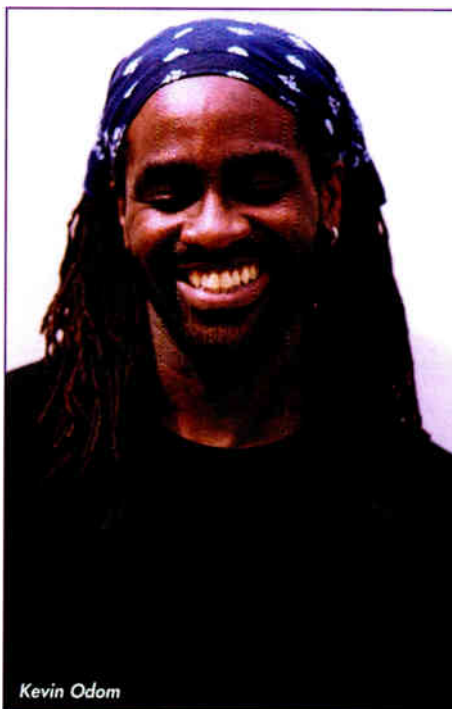
world. "Lots of these artists like to stack vocals, but they don't always nail them," he says. "This style of music demands very tight vocal arrangements. I'll go down and grab a consonant and slide it into place to match the previous pass. Clients love it."

"I've done sessions where I've had over 70 tracks of vocals playing back at one time, and have never had the system hiccup even once! I go right into the computer, and then Lightpipe audio into the digital console using the Nuendo 9652 Lightpipe card. It works great."

"I also think that the Nuendo pitch compression is probably the best

I've heard up to this point, and I like the fact that you can execute this function in real time or offline. You can select a region, and if you want to apply EQ or reverb or compression to it, go offline without using any CPU. However, in order to be able to crunch these kinds of numbers effectively, I've found that you need to have a PC that runs at 700 MHz, at a minimum. I design computer systems for musicians, and I tell them that if you want to use Nuendo or other intense music software, you'll need to optimize your system. Internet apps slow things down. If you want to play games, buy a Sony PlayStation!"

Odom says that Rock the Bells' next round of equipment purchases will include a pair of Tascam MX-2424 hard disk recorders. "I've had lots of experience with Tascam products," he says. "They never break down." These units will be used primarily as digital transporta-



tion devices, for the times when tracks are recorded and pre-mixed in Nuendo but need to go to another studio for overdubs and mixing. LL's and Odom's studio of choice for mixing these days is Lobo Studios on Long Island, which is equipped with a Neve VR. However, Odom notes that Rock the Bells is looking into the purchase of an SSL console so that more work can be kept in-house.

"I'm trying to show LL that you can mix an album in a small, comfortable environment like this one, without going off to a glamorous, larger studio," he says. "Artists like the home atmosphere of a smaller studio—they often tell me that it's easier to write and perform here and that better work comes out of it. We need some more outboard tools to compete with the larger facilities, but otherwise, we've got just about everything we need to track and mix great records right here." ■

Gary Eskow is a Mix contributing editor.

BY GARY ESKOW

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Pictured: Tim Bran, DigiStudio Manager

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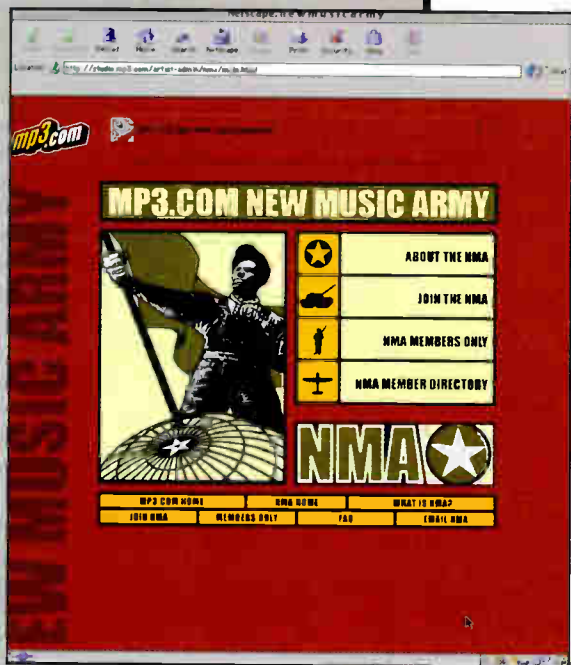
BY PAUL D. LEHRMAN

Editor's note: This article appears in the October issue of Internet Audio magazine. For a free subscription, visit www.mixonline.com.

You use the Web all the time: You download stuff, you send e-mail, you spend time in live chat rooms and post messages to bulletin boards. But, you're ashamed to say, you don't have your own Web-site. Maybe it's because you've been harboring a deathly fear that you'll sink into a mire of complicated programming codes and tools, or that you'll have to deal with shady and unstable hosting companies, or that you'll have to spend a lot of money. Well, let me assure you that it's not that hard to build a site, it's easy to find a good host and it doesn't have to cost much at all. The biggest problem is wading through all the options available—because there are way, way too many of them—and finding one that's right for you.

GETTING STARTED: FINDING AN ISP

If all you want to do is present yourself as a musician and let people learn a little about you and download or listen to some of your



MP3.com's New Music Army is one of the site's new-music promotional programs.



Yahoo's PageBuilder lets you choose from a variety of templates, letting you build a page in minutes.

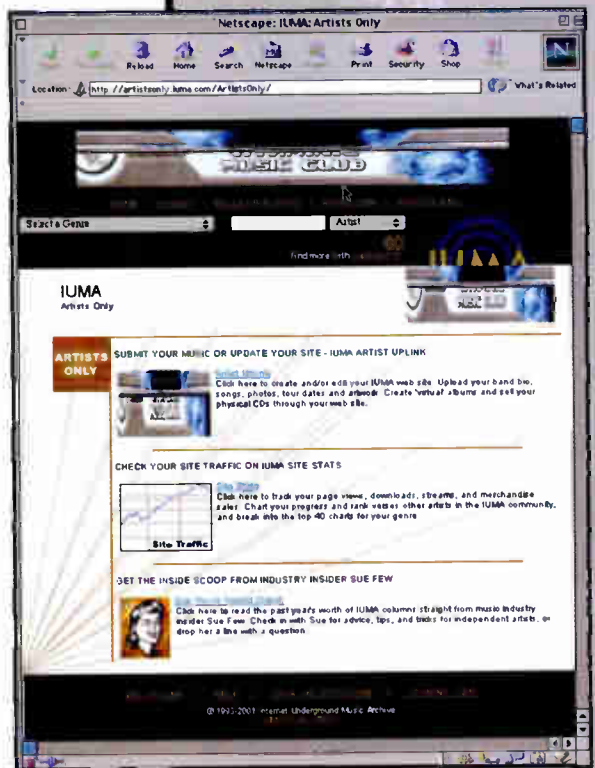
site

IT'S EASIER THAN YOU THINK

music, then your easiest route might be to go to a "new artists" site like MP3.com, broadjam.com or the Internet Underground Music Archives (www.iuma.com) and sign up. You'll be given a page for a bio, a picture or two, and links to your music files.

But if you want a site that's more personal, or one that contains more information, then you have a lot of choices. One of the quickest ways to get started is with an Internet Service Provider (ISP) from whom you are getting your Internet connection. Most likely, your ISP has space on a server (which is nothing more than a computer hooked up to the Internet) set aside for a personal Website for every subscriber, and that means you. America Online, AT&T, Earthlink, Compuserve and smaller regional providers typically will give you 10 MB or so of online disk space for your very own page. (Your personal page is different from a home page, the customizable page that you see when you open your browser.)

Many ISPs offer some simple tools to build your site, as well, and it won't cost you a cent more than what you're already paying for In-



IUMA's ArtistUplink lets you create and edit your IUMA Website, where you can upload bios, songs, photos, tour dates and artwork, create "virtual" albums and sell CDs.

Registrars.com is an example of a site that lets you check if your desired domain name is available.

ternet access. If your ISP does not offer Website space, you can get the same service for free at Yahoo's Geocities: <http://geocities.yahoo.com>. All allow some control over formatting of text, placement of graphics, and links to other pages or Websites.

The tools you get to build your page will most likely be relatively simple templates that you fill in so that your site will look, to one extent or another, like all the other sites on the same service. Also, the address, or URL, will be your ISP's. For example, if my personal site were on my MediaOne account, its address would be <http://people.ne.mediaone.net/lehrman>—not something I can quickly rattle off to someone at a party.

In addition, 10 MB is not very much space, particularly if you are planning to upload samples of your music (stereo MP3 files take almost one megabyte per minute), and often these services won't even let you do that, which we'll get back to in a moment. You can sometimes order extra disk space, but the cost starts to go up pretty quickly. There's also usually a traffic limitation; that is, visitors to your site can download only a certain number of Gigabytes per month. If you have large files on your site and they prove to be popular, you might incur extra charges, which could be significant.

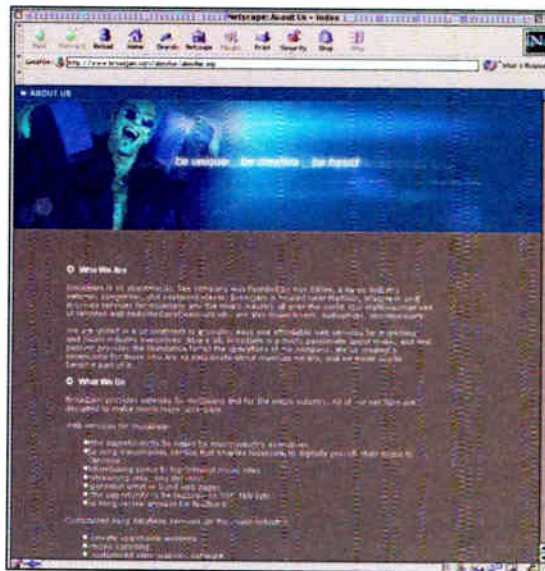
Unfortunately, if you're looking for a place where Net surfers can find your music, then these "cookie-cutter" sites may not be your best bet. Few of them will handle streaming audio, and even fewer will allow you to put MP3 files on the sites. The RIAA and its endless legal efforts against Napster has spooked Internet companies so that, out of fear of getting sued for making music available that they don't have permission to use, few of these sites will accept MP3 files. Most, however, will allow downloadable files in .WAV or QuickTime formats. One workaround would be to upload your music to MP3.com or iuma.com, figure out the exact URL of your music files, and link to it from within your site. For example, if you have a page on IUMA, click on one of your file names and hold down the mouse. A pop-up menu will show "Copy Link to Clipboard." You can then paste this line of text—the URL of the file—into a link on your cookie-cutter page, and people will be able to access your music file right from your personal site.

Despite these limitations, playing

around with the free personal page on your ISP is a good way to learn about how a Website goes together, and to see how the site you build looks on different browsers.

But once you get used to managing your little site, you're going to want more from it. Undoubtedly, the first thing on your agenda will be to get your own domain name, like "paulmusic.com." Securing a domain name is known as "registering" it. A company called Network Solutions used to offer the only place where you could register a domain name, and it charged \$35 per year, but that's changed. Now, there are dozens of companies that can do it for you. (Just make sure the one you choose is registered with ICANN, the Internet Corporation for Assigned Names and Numbers. If it's not, that means the company is acting as a broker for someone else.) Network Solutions, however, is a good place to find out if your desired domain name is available, and it won't cost anything. Go to registrars.com and type the domain name you're interested in into the text box. The site will tell you if the name is available, as well as what related names might be available.

Registering a domain name, however, is only half the job: The domain name and the files associated with it need a physical place—a server—in which to live. Every computer on the Internet has a unique



Broadjam.com hosts music and provides unsigned musicians with access to music industry feedback and Internet distribution services.

numerical identifier, like "216.157.55.51." When you register a domain name, what you are actually doing is telling all of the computers on the planet that keep track of such things—which are known as Domain Name Servers, or DNSs—that you want this particular domain name to live on a particular computer, or "host." So, when you register your domain name, you also have to specify where it is going to be hosted. In order to find that out, you have to sign up with a hosting service.

CHOOSING A HOSTING SERVICE

Hosting services are companies with racks

WEB 101: A FEW TERMS EXPLAINED

Domain Name: A name (for example, mixonline.com) used in a URL to identify a specific Web page. A domain name can identify one or more IP addresses.

FTP: File Transfer Protocol, the protocol used on the Internet for sending files.

Hosting Service: A company that rents Internet-connected server space, hosting domain names and their associated files.

HTML: HyperText Markup Language, the universal language of the World Wide Web.

IP Address: A unique number identifying a computer or device.

ISP: Internet Service Provider, a company providing commercial Internet access. Many ISPs offer free Website-building tools.

Java Applet: A small, cross-platform Internet-based program written in Java, a programming language for the Web. The applet is usually embedded in an HTML page on a Website and can be run from within a browser.

URL: Uniform Resource Locator, the global address of a document on the Web.

Web Browser: A software application that locates and displays Web pages.

MARK ISHAM, M-POWERED.



Photo: www.webersh.com

If you go to the movies, you've heard his work.

He's the man behind the scores for "Blade", "Kiss the Girls", "Quiz Show", "Nell", "A River Runs Through It", "The Moderns" and dozens of other films. Not one to be limited by genres, Mark's compositional palette includes orchestra, electronic, acoustic jazz, and everything in between.

Mark needs a digital audio card as flexible and diverse as his music.

He uses Delta 1010's. The Delta 1010 has become a staple item in pro studios because of its ability to work well in so many environments. Mac or PC, from Gigastudio to Logic, from tracking to soft synth playback, the Delta 1010 is the card behind the scores. To learn more about the Delta 1010 go to www.m-audio.com/mix

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of computers connected to the Internet; they are in the business of hosting domain names and their associated files. You literally rent space on a hosting service's computers, by the month, and the service maintains your site's files, giving you access to them so that you can add, delete, or modify them, and keeps your domain hooked up to the Internet.

It seems that everyone and his brother (including Network Solutions) is doing Web hosting, so how do you choose a service? First of all, it's best to let the service handle both the actual registration of your domain name, as well as putting your site on their servers, so you want to go with a company that can do both tasks. You can find companies that will register your domain name for as little as \$13 per year, and they will host your site for \$15 per month, or even less.

Knowing whether or not a host is reputable is obviously a concern. Almost all hosting companies can do the job they claim, but some have more reliable connections—both to you as the site creator

and to potential viewers—than others, and there are some whose business practices are, frankly, a bit shady. One way to find a good host is to ask around: Find a small-to-medium-size Website for a music-related company—maybe an independent record label, an artist or a production company—that looks good and runs well and has the features you'd like on your site. Contact the site's Webmaster (there's usually an e-mail link somewhere on the site) and ask who the host is and how the Webmaster's experience has been. If the report is good, check into using that host.

To compare features among hosting services, look at the amount of disk space they offer; the quantity of downloadable data they will allow per month; whether they support streaming audio and/or video, and in what formats (RealAudio/Video, MP3, QuickTime, Flash, etc.); whether they will allow MP3 files *at all* (some hosts are pretty squeamish about this); whether they will supply "statistics," so you can see how many visitors your site is getting; and how many e-mail accounts you are allowed, in case you want different folks in your company or family to have their own mailboxes.

Also, see which hosts will handle "domain forwarding" and if they charge for the service (besides the initial registration costs). Domain forwarding is important if you want to control several different domain names, but give all of them access to the same site. For example, if you want your domain name to be "bigstudio.com," you might also want to register the similar names "big-studio.com" and "bigstudios.com," so that no one else can have them; with domain forwarding, anyone typing in *any* of those other URLs will automatically get forwarded to your real URL, "bigstudio.com."

If you want to sell anything through your site, then you may want a host who offers "e-commerce." This can get pretty complicated: You need to offer a "secure shopping cart," which encrypts credit card numbers so they can't be stolen by a third party, and (unless you already have a merchant credit card account) an "Internet Payment Gateway," which is a bank account through which you can accept credit card payments. One way around this is to sign up with a small-business "Web money" service like Paypal.com, which will handle up to \$100 in credit card transactions for you per month at no charge; the money can be transferred directly into your bank account, or you can ask them to send you a check. And if you plan on doing more business than that, you'll have to pay a transaction fee, which on a typical CD purchase works out to about 75 cents.

BEYOND DOT-COM

Should your site use a suffix other than ".com"? Probably not.

URL suffixes are properly known as "Top Level Domains," or "TLDs." Every country has its own two-letter TDL (".uk" for Great Britain, ".ca" for Canada, etc.), while the three-letter TLDs have specific purposes, regardless of their location. ".com" is for commercial sites, ".org" is for non-profit organizations and ".net" is for networks. No one is actually checking to make sure you are, in fact, a network or a non-profit, and if "yourname.com" is not available to you, you may be tempted to register "yourname.net" instead. But if your TLD is ".com," most browsers will find your site when the user just types in the domain without any suffix—type "mixonline" into your browser and see what happens. On the other hand, if your TLD is ".net" or anything else, users will have to type in the whole name. Trust me, this does make a difference.

Recently, many hosting services have started to offer URLs with the suffixes ".cc" or ".tv." These are actually TLDs for two tiny island nations, Cocos Keeling Islands, an Australian territory in the Indian Ocean with fewer than 700 residents; and Tuvalu, in the South Pacific, respectively. These countries have worked out lucrative deals with American Internet brokers to license their TLDs, based on the idea that Americans think it's cool to have "alternative" Web addresses, especially if they have anything to do with television. (I have no idea, however, what the appeal of ".cc" is.) It's not quite a scam, but it's close. Don't bother with them.

Also, there are a number of new TLDs, like ".biz," ".aero," ".museum," etc., which will become active sometime in the next few months. You can "pre-register" and reserve potential domain names with many hosts, but it's very hard to say how those names will behave with common browsers. So I would be cautious about jumping in just yet.

One other thing about names: You don't really need "www" in a domain name anymore. It is still used by large companies that need to distinguish between their internal computer networks and the sites accessible to anyone (the "www" indicates a public site), but except in those cases, Web browsers today don't care whether you type it or not—so you might as well leave it out.

—Paul Lehman

BUILDING THE SITE

When it comes to designing your site, there are a number of ways to go about it. Like ISPs that offer personal-page templates, many Internet hosts have design packages available either for free or for a small monthly charge. If you register your site through Yahoo, for example, they will throw in "Page Wizards" (simple) and "Page Builder" (more flexible) tools for setting up Web pages (website.yahoo.com). These are the same tools, by the way, they offer through their free Geocities service. Again, these are good for starters, and can provide a decent amount of flexibility.

Then there's the option of really learning Web design and using a professional tool to do it. This isn't nearly as hard as it sounds—or as it used to be. There are a number of graphic-oriented page-design programs available that are no harder to use than a desktop-publishing program like Print Shop or Pagemaker.

Best of all, some of them are free. Netscape Communicator comes with its

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World Radio History

own Web page design program called Composer, which does a very credible job. Microsoft's Internet Tools, which is part of Internet Explorer (the Windows version only, alas) is also well-regarded. Heck, even MS Word can create HTML—HyperText Markup Language, the universal language of the Web—automatically: Below the Edit menu is an option called "Save as HTML." For a very simple page, this can be useful, although the program will make up its own mind about

line spacing, fonts and placement of graphics, and anything complex is not going to come out looking very good.

The availability of these tools has meant the demise of low-price commercial Web software, like Claris Home Page and Adobe Page Mill. This is too bad, because even if you only paid \$35 for a product, you could still get technical support, which few companies will do for a free product. Home Page is still available as part of Apple's Web Page Construction Kit (Mac only), and on the Windows side there is the slightly more expensive Net-Objects Fusion. You might also look into several reasonably priced programs avail-

able as shareware, like Internet Design Shop and Visual Site for Windows, and WebDesign for Macs (you can find these on downloads.com).

If you want to get fancier and incorporate features on your site like Java applets (those are the things that change the look of a button when you move the mouse over it, or pop up an annoying ad when you try to close a window), cascading style sheets (a shortcut for doing fancy text formatting) or Flash multimedia presentations, then you'll need a serious Web design program. My favorite is Macromedia's Dreamweaver, for both Mac and Windows, which is now in Version 4. Although it's not cheap, it's a very comprehensive and well-designed program, and lets you get started without having to understand everything that it's doing—but there's plenty of depth to the program, so it should keep you happy for a long time. Another well-respected program is Adobe's GoLive, also available for both Mac and Windows.

Whatever you use, any site you build should be viewed on both common Internet browsers, Internet Explorer and Netscape Communicator, to make sure they come out the way you want. Each has its own quirky ways of displaying Web pages, and you don't want to be surprised by a viewer who tells you that, for example (and this can happen), an image that you've carefully placed in the center of the page is now all the way on the right, and 1,000 pixels wide. If you don't have the latest versions of both programs, they are available as free downloads from Microsoft.com and Netscape.com.

Although it is popular, a Web design program I would stay away from is Microsoft's FrontPage, on either platform. Many people find FrontPage's user interface cumbersome and confusing, and the program tends to take over the site-creation process in ways you might not be comfortable with. But the worst feature is that it creates code for a lot of tasks that is not standard HTML, and therefore can get you into trouble with certain browsers or servers. If you must use it, then make sure your host is set up for "FrontPage Extensions," or else your sites may not work at all.

Finally, you have to deal with how to get your beautiful new Web pages onto your host. This is accomplished using something called "FTP," which stands for "File Transfer Protocol," and does exactly what it sounds like. Every host, in addition to its Internet server, has an FTP server (which could be the same computer) that

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is used to upload files from Website creators that will appear on the site. When you get your site set up, the host will tell you the address of the FTP server, which is going to be something like "ftp.bigstudio.com" or

perhaps "ftp.yourhost.com/bigstudio."

Many Web design programs have a built-in "Publish" feature, which, once you tell the program what your host's FTP address and your passwords are, will au-

tomatically transfer your pages to the host. If your design program doesn't, then you will need special FTP software. Fortunately, the best of these are free (again, check downloads.com) and simple to use: Once you give them all the info, they will show the FTP server as a desktop window, and you can simply move files and even folders from your desktop into the window, and thus onto your site. Mac users will want to get Fetch, while Windows folks should look at CuteFTP or FTP Voyager.

Like anything else, the more work you do on your Website, the better you will get at it. If you find a Website that you admire, there's no shame in imitating its design. (Just don't copy any graphics, unless they're in the public domain.) Netscape and Microsoft browsers have a "View Source" option that lets you look at the actual source code for a page, and once you're even a little fluent with HTML, this can be a great source (pun unavoidable) of ideas and techniques. Have fun, and see you online. ■

Paul D. Lehrman is Web editor for Mix and its four sister magazines. He is also a composer and educator, and does odd things with large numbers of player pianos.

FURTHER READING . . .

Where to learn more about building your Website

The Professional Musician's Internet Guide by Ron Simpson (MixBooks, www.artistpro.com, 2000) helps demystify Web technology for creative types: Musician/Web designer Ron Simpson's fifth book about online audio offers a thorough overview of Web music promotion and distribution, covering everything from MP3 technology to HTML, all explained in lay terms, with step-by-step tutorials. The *Guide* breaks down e-commerce into easy steps and profiles the top sites for music exposure. An accompanying CD-ROM includes tutorials, HTML templates, software demos and soundfile examples, and a companion Website (www.bozangle.com) gives examples of audio do's and don'ts. Now all you need is that hit song...

Written by musician/multimedia producers Josh Beggs and Dylan Thede, *Designing Web Audio* (O'Reilly, 2001) walks through the entire process for putting audio online, from recording techniques to optimizing and encoding files, to designing Websites with interactive sound. The text combines detailed step-by-step instructions with theory, tips and techniques, and audio pros will benefit from the sound design philosophies shared by Gary Rydstrom, Walter Murch and others. Chapters stand on their own as individual tutorials, so readers can quickly hone in on the information they need. The companion Website, www.designingwebaudio.com, offers soundfile examples and 90 free sound effects from Hollywood Edge. List price is \$34.95; visit the publisher's site, www.oreilly.com, to purchase online or to find a store near you.

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Edward Greene, independent audio contractor

"SRS creates width and depth in my recordings that were next to impossible to create before."

Chris Gibson, Micworks



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Everything Else is Only Stereo

Truth is the most valuable thing we

The truth about nothing but the truth.

Today's audio productions contain a variety of sounds that occur naturally or electronically in the lower octaves, and at the bottom range of human hearing. The bass guitar, piano, and bass drum each contain these lower frequencies that are essential to their overall tone and character.

The problem with today's audio monitors is that most of them, especially the affordable ones, simply can't reproduce these lower frequencies from their 8" woofers. So, like many compromises in life, we've learned to do without them.

Size does matter Eugene.

Ever notice how objects that produce really low frequencies are naturally large? Organ pipes, double bass, and Barry White, just to name a few. Today's most common monitors use a 2-way design with 8" woofers to cover the low frequencies-but guess what? It doesn't really work.



Bass drums are larger than tom-toms.

As far back as 1932, speaker designers began putting holes in cabinets to help get them do the job woofers couldn't do on their own. While ports are successful in extending the low frequency capability of a speaker design, this extension comes at a price. A ported cabinet lacks the transient response of a sealed box system, making it less effective for reproducing the sounds of drums, slap bass, and electronic music.

At high levels, turbulent airflow reduces port efficiency and causes annoying high frequency port noise known in the trade as "chuffing." What we really need is a bigger woofer, capable of doing the job on its own. Time to bring out the big twelve inch.

The truth about the "hole" truth.

Recently, audio professionals began to realize the consumer audio market had responded to the need for full range audio years ago, with



Holes belong here.

the addition of a subwoofer to reproduce the lower frequencies found in movies, videos and DVD's. Some resourceful engineers added subwoofers to their existing monitoring systems. But the components weren't designed to work together and it just complicated the problem, particularly for music. The net effect was an audible hole in the sound. Unacceptable!

Introducing the world's first 2.1 system.

The Blue Sky 2.1 System is the first system to deliver full range sound without compromises. It is a true system in every sense. It includes two powered 2-way satellite speakers with 6.5" woofers and 1" tweeters and a powered subwoofer with a 12" driver in a sealed cabinet. 2.1 Bass management circuitry located in the



Some devices are designed to make holes.

subwoofer directs low frequencies to the subwoofer and high frequencies to the satellites and makes the system act as an integrated three-way system. Everybody's

happy and nobody is working too hard.

Your room is a part of the system.

Murphy's first law of speaker placement:

"The better the speaker placement is for imaging, the worse it is for low frequency response." In a Blue Sky 2.1 System the user places the satellite speakers where they provide optimal imaging. The subwoofer is positioned for optimal bass response. The

system design acknowledges the room as a major factor in what we hear.

The system delivers

accurate, full range audio in a real

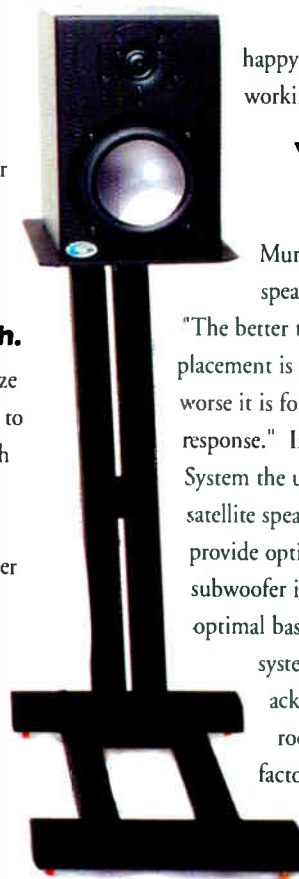
room—*your room*. It reproduces smooth, even bass response throughout the monitoring area.

Boring, yet Important, stuff.

In addition to cabinet designs that are optimized for specific drivers, the Blue Sky 2.1 System is comprised of dozens of other innovative and unique materials and components. Cast aluminum frames add rigidity in the high performance drivers. Mica filled injected polypropylene hemispherical cones maintain their structural integrity even under extreme excursions. Shorting rings further reduce distortion to negligible levels.

Huge motors in the magnet assembly furnish excessive power transfer in insanely high-excursion woofers.

Dual concentric diaphragm tweeters with



have. Let us economize it — *Mark Twain*

integral wave-guides and high-energy neodymium motors provide exceptional definition. Energy absorbing baffles and sealed MDF enclosures with no ports ensure ultra low distortion and accurate transient response. Proprietary, fully discrete power amplifiers with real specifications. There's much, much more. But after all, this is an ad, not a book.

The Blue Sky 2.1 and 5.1 Systems deliver ruler-flat frequency response, a wide listening window, ultra low distortion



and true full-range response (typical in-room response 20Hz-20kHz).

Genetics and the perfect crossover.

When the 2.1 System is set up correctly the transition between subwoofer and satellite is totally seamless. To create such a flat, predictable and seamless crossover, we designed our own custom computer program called BOO® (*for Binary Organic Optimization*).

This proprietary electro-acoustic simulator and

BOO

optimization program is modeled after a genetic algorithm called differential evolution.* We've applied this same strategy

to optimize all the electronic circuits in our 2.1 System.

And the winner is...

The Blue Sky System has been field tested in some of today's most critical listening environments, by the most demanding pros.

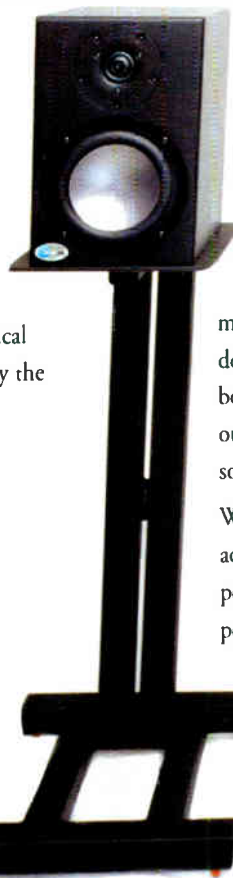
2.1[®]
integrated 3-way system

Gary Fradkin, director of engineering at Hollywood's prestigious Sound Services Inc. said, "Our Blue Sky systems are exceptionally accurate and convey a remarkably unembellished sound stage that translates, without fail, to other reference-mixing environments."

Bernie Becker, of Bernie Becker Mastering & Recording put it this way, "The transition from the subwoofer to the satellite speaker is absolutely seamless. It's



honest, it's full-range and it's totally amazing!" And for the meticulous Denny Purcell, of Nashville's esteemed Georgetown Masters, it was like this, "Nothing but Blue Skies do I hear... I like them." In today's audio business you don't get that type of approval without genuine performance.



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The founders of Blue Sky have many years of experience in professional audio as engineers, designers, and in manufacturing. We're dedicated to developing new audio products that provide better solutions. We will continue to seek out opportunities to improve the process of sound creation and reproduction.

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*A biological process that organisms like bacteria use to mutate and survive in a hostile environment
SAT 6.5 and SUB 12 are approved for use in THX pm3 Certified Studios. The 2.1 symbol and BOO are the property of Blue Sky Intl. THX pm3 is a registered trademark of Lucasfilm Ltd.

THE MUSICIAN

A composite image featuring a human brain with musical notes and a digital interface overlaid on it. The brain is rendered in shades of green and purple, with yellow musical notes floating around it. A digital interface with various icons and text is visible in the lower right corner of the brain image.

W H E R E T H E L E F T B R A I N A N D

Big shifts in the way music is recorded over the past several years have forced major changes upon studios. These shifts have also spawned a new breed of musician. Pressed by declining demand for live players and the proliferation of affordable technology, many artists have added engineering chops of one kind or another to their skill

sets. *Mix* assembled a panel of performers who also track, mix, edit and create sounds for the industry, and asked them to discuss the package of services they offer their clients.

THE PANEL

Sax player Andy Snitzer has been on tour with Paul Simon for the past sev-

eral years. Snitzer has an impressive resume that also includes road work with the Rolling Stones and numerous New York sessions.

Larry Fast is best known for the series of nine electronic music albums he's recorded under the project name Synergy, and for his work in the studio and onstage with Peter Gabriel. He is



AS

ENGINEER

BY GARY ESKOW

T H E R I G H T B R A I N M E E T

currently completing projects for Disney and XM Satellite Radio, and has been touring and recording with the Tony Levin Band.

David Torn (aka "Splattercell") is a composer, guitarist, loopist and texturalist. He is also a member of Human and bills himself as a "freak, geek and sonic saboteur." His studio, Cell Labs,

is located in upstate New York.

Connecticut resident Jim Chapelaine is a guitarist and member of the band Feather Merchants. He owns a Pro Tools-based studio, where he records and mixes projects for outside artists when he's not composing and recording jingles and underscores for local and national clients.

A first-class keyboardist, George Whitty is also an accomplished composer and arranger with excellent mixing chops. He produced Michael Brecker's last CD and is all over smooth jazz artist Dave Mann's successful new release, *Touch*. He recently left his Manhattan apartment and emigrated to Rockland County, N.Y.



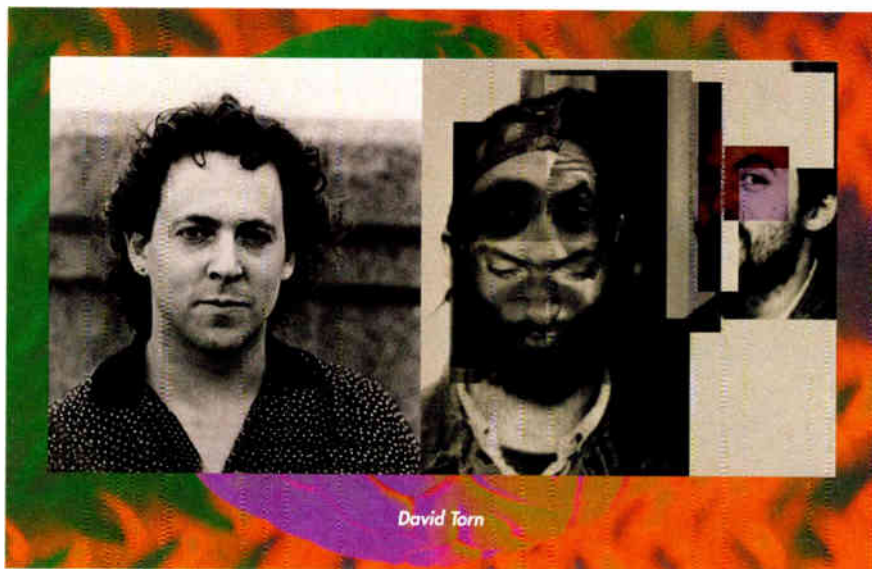
THE MUSICIAN AS ENGINEER

Larry, I know that you've been interested in technology for a long time, so perhaps you can answer this question first: When did you guys first begin to engineer sessions?

Larry Fast: Informally, I'd have to say as far back as my junior high school rock band. I was a hi-fi/recording hobbyist with my own quarter-inch, half-track, mono machine from about 1962 on. I started learning mic technique and audio balancing pretty early. There were transitional semi-pro projects in the early 1970s. My first real credited project for engineering was my first solo album, which was released in 1975.

David Torn: I began engineering, under pressure, in 1994, when I first built Cell Labs, my little home studio—on my own recording project, though. I'm not really an engineer. I've worked with some great engineers—Mike Farrow, Tom Mark, Jan Erik Kongshau, Roger Moutenot, Husky Hoskolds, Walter Quintus, Bruce Calder, Danny Kopelson—so I know the difference. I built the studio around Logic Audio, which was the first affordably available software I knew about that allowed for the manipulation of audio.

George Whitty: For real, about 12 years ago, on a Tascam 808. [It was] part



of my intense curiosity about finding a way to actualize any sound I could conceive, on a recording budget I could afford. I like to experiment, and a certain amount of everything I do is still sort of monkey-with-a-typewriter-and-unlimited-amount-of-time-eventually-types-The-Bible. Buying the gear and learning to engineer was really about availing myself of an unlimited amount of time.

Jim Chapdelaine: I started fooling around with a TEAC 3340 in the mid-'70s. In 1984, I partnered up in an early 16-track project studio, where I learned lots of interesting mistakes as well as happy accidents. I officially got tired of being on the road in 1990 and started to build my own private studio, where I continue to do all kinds of work today.

Andy Snitzer: When I had to do it for my own records. I really don't think of the editing work I do in Pro Tools as engineering; I think of it as music editing, performance massaging, which I do strictly by my musician's ear. [Snitzer's editing clients include Bon Jovi]. When I have to record players for my records, worry about the signal path, levels, EQ, etc., then I'm engineering. I feel pretty good about most aspects of it, save EQ. Having seen real engineers use EQ, I know I'll never really hear it like they do. *Did any of you ever apprentice at an outside facility?*

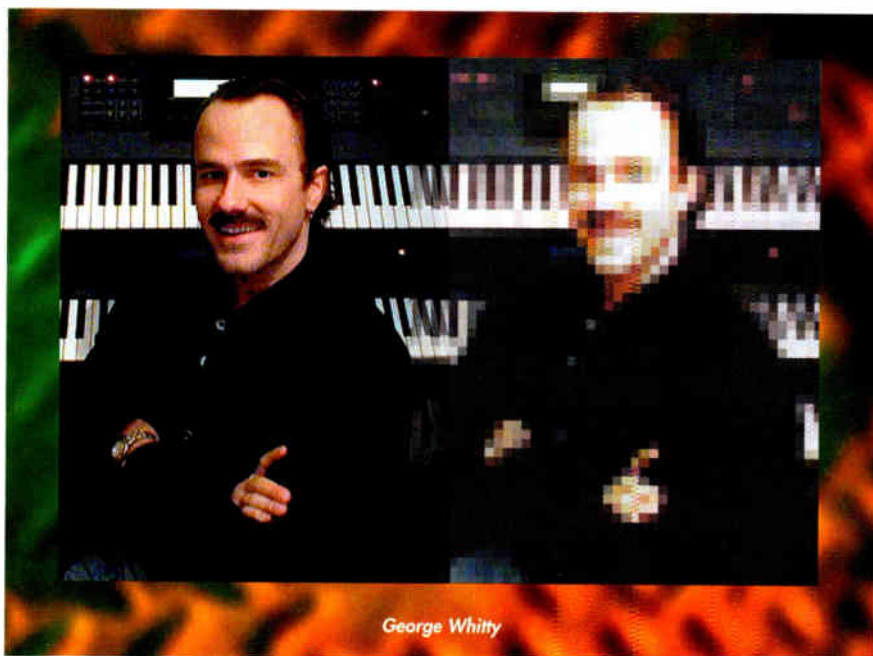
Torn: Absolutely not; I'm merely a musician and composer with a large micro-processed geek factor.

Whitty: Never did, but I got to work with a lot of killer engineers as a producer and player, watched carefully and was a constant pest with questions.

Chapdelaine: Nope.

Snitzer: Nope, just slogged away at home. Naturally, I had a head start from being around the studio environment for many years as a session player, and having very good engineers as friends.

Fast: I didn't formally apprentice, but I was around a lot of sessions absorbing what I could and sometimes helping out when I could contribute. Since I worked at home and at House of Music studios on my solo albums in the '70s and '80s, I was exposed to the "right" way to do things in the studio, which refined my own techniques. Later, I was involved with high-profile projects with Peter Gabriel, Jim Steinman and many others, which brought me to a number of the best world-class studios, where I picked up even more from some of the best producers and engineers.



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THE MUSICIAN AS ENGINEER

In what ways does engineering spring naturally from your playing and writing, and to what degree is it an entirely separate discipline?

Whitty: I think they're both components of a larger picture. I'm always trying to get an end performance that really plays the listener the right way, and providing the right immersion in a great mix is an entire third dimension of the picture.

Chapdelaine: The similarities are many. In both, you need to learn "the rules" or the craft, and in both, the most satisfying moments come when you can forget about the rules and the craft and create something. Both require you not only to focus on what you are doing but to hear the whole picture. The differences for me are that I never get tired of playing or writing music, but there are times when the engineering side can get a little tedious. Fortunately, or not, for



Larry Fast

me, I love playing with toys, so engineering is more often fun than not.

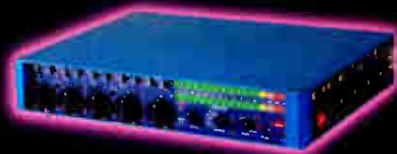
Snitzer: I really relate to compression, both on individual instruments and on the mix bus, as a tool for affecting the way a track grooves. That's been a natural thing that has developed well. Mix levels, panning, effect depth, etc. also come very naturally from being the composer and programmer. The EQ, as I mentioned, the sculpting of each sound, is not so easy for me.

Fast: In my area of electronic music, going back to the Moog days, the two are completely intertwined. I feel very little separation between the two. The same attention to audio detail that goes into crafting a particular patch is used to craft those patches into the sonic tapestry of a complete piece.

Torn: In that my guitar playing and writing have been deeply married to the technologies of live looping and post-processing for most of my life, well...

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recording/engineering is an extremely natural extension of that very process, at least insofar as I might treat my DAW as a compositional tool. However, learning to choose and place microphones seems like a lifetime affair to me; I prefer to use "real" engineers for that, when time and circumstance allow.

How has being a musician affected your mixing?

Chapdelaine: I *always* approach a mix as a listening musician first and a technician second. I think that the musician side will always ask, "Does it feel good or right?" while the engineering side might ask, "Does it sound good or right?" The musician side wins most arguments, except when it comes to compression. The musician side tends to overcompress, so watch out.

Snitzer: My musicianship is my mixing, meaning that I can only approach a mix from the point of view that I understand the various parts and sounds in the production and how they're meant to co-exist. Sometimes I think this causes me to be overly subtle about things, but it's hard not to just go with your sense of what's musical.

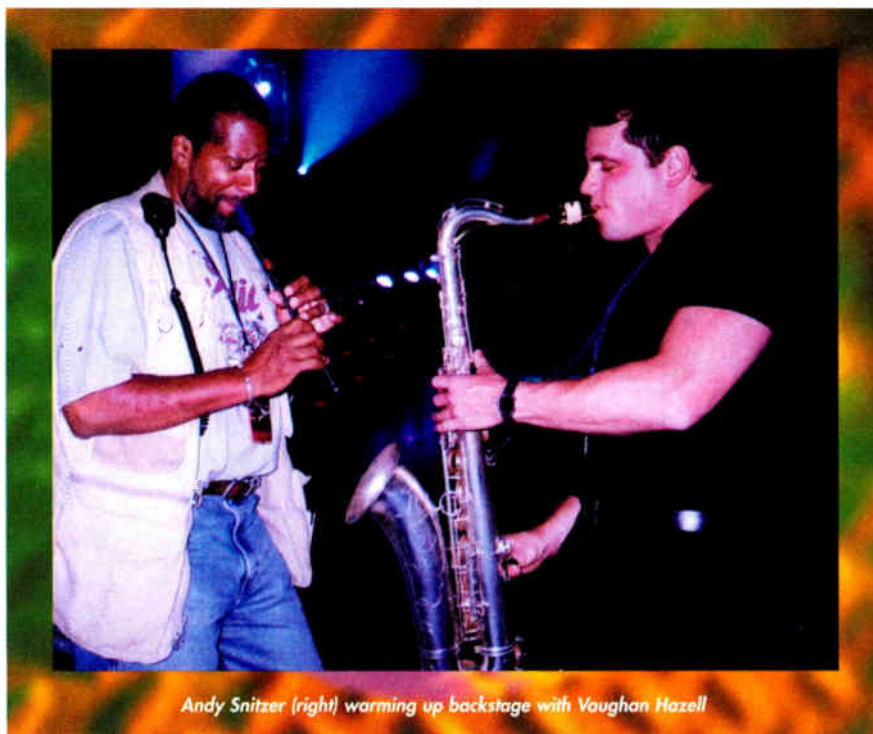
Fast: I'm looking for the musical interplay of the score to fit together in the way that I've been conceptualizing as the piece was being composed. In a way, my mixes only fit together in one correct way for the arrangement. If it won't fit together properly, then something's not yet right with the music itself. With complex MIDI arrangements, I now find myself refining level, placement and ambient environment details that used to be done in the mix during the arrangement stage instead.

Torn: After producing my last four CDs—two as David Torn, two as Splattercell—I think that I've finally admitted that I have difficulty in mixing my own stuff! Some of my mixes are fine, though a bit more musical and idiosyncratic than most "commercial" mixes. Remixing is a mostly musician-ly process. I could not do remixing if I didn't compose.

Whitty: I think all really good engineers are excellent conductors and arrangers by nature, and being a musician definitely developed that side of my thing. I'd say that mixing has definitely done more for my playing than vice versa. It's helped me develop a better sense for what's really needed.

Do you enjoy engineering as much as making music?

Snitzer: I love mixing, I love working compression on the mix bus, I love editing performances in Pro Tools toward taking the groove of the thing to another level. The tracking process, the



Andy Snitzer (right) warming up backstage with Vaughan Hazell

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actual recording process, I could easily leave to someone else.

Fast: I'm an audio gadget and software gadget guy, so I like that techie aspect, but as I mentioned, the engineering is such an integral part of the music creation for me that it's very tough to separate them.

Torn: Actually, there are times I hate

engineering, especially when: A) I'm forced to engineer something for another artist or friend, and B) I'm in the throws of a creative "blast" of my own that requires full performance-oriented concentration. At other times—specifically, when the engineering is woven together with the sonics of the creative process, whether for myself or another artist—I do love it.

Whitty: That's a hard one, because they both satisfy in totally different ways; I think I need to do both to be happy.

Chapdelaine: Not to dodge the question, but hopefully, when I'm engineering I am in some way or form making

music. If I have spare time, I'll always pick up my Rick Turner Baritone 12-string before I fool around in Pro Tools. I love the learning aspect of engineering. With technology, these are actually exciting times to engineer. Now if somebody can settle on a standard format, platform and sampling rate, things will really get fun!

What advice would you give the aspiring musician with regard to the value of learning about the recording process?

Fast: Unless a young musician intends to focus only on live classical performance, I think that at least a basic understanding of the recording process and its pitfalls is essential. Most music today is disseminated through the recorded medium. Not understanding how that works would be a huge handicap.

Torn: There's nothing but value in learning the process, whether from doing, reading or querying the pros, but it's critical for musicians to note that engineering serves the creative urges. We're all subservient to music, and sometimes it's good to break some rules, for the right sound and atmosphere.

Whitty: Unless you're Mozart and born with a gift for the big picture, there's nothing else even close to recording to develop every facet of your musicianship. Even if you never engineer a lick, the musicians I see working the most are the ones who really understand the recording process, who can use the tools there to make some kind of magic happen, rather than the ones with the great lick on a C-sharp 7 flat 9 flat 13 chord—although I have one of those, too!

Chapdelaine: I'm a schooled musician and a self-taught engineer. There are technical aspects of engineering that I wish I had become aware of earlier, instead of stumbling upon them or reading about them later on. Find a mentor or do an internship. As a musician, I wasn't as aware of the kick drum or the EQ on the horns. Now, I listen for those things and they make me a better player.

Snitzer: With every passing day, the industry requires every one of us to be more vertically integrated. If you own Dig Audio gear, or MIDI gear, you will not escape the technical demands of those systems. The better you are at that side, the more freely you can get at your music—writing it, demonstrating it, preserving it. The most important thing is to find a method that works for you, and to get to it. ■

Gary Eskow is a Mix contributing editor.



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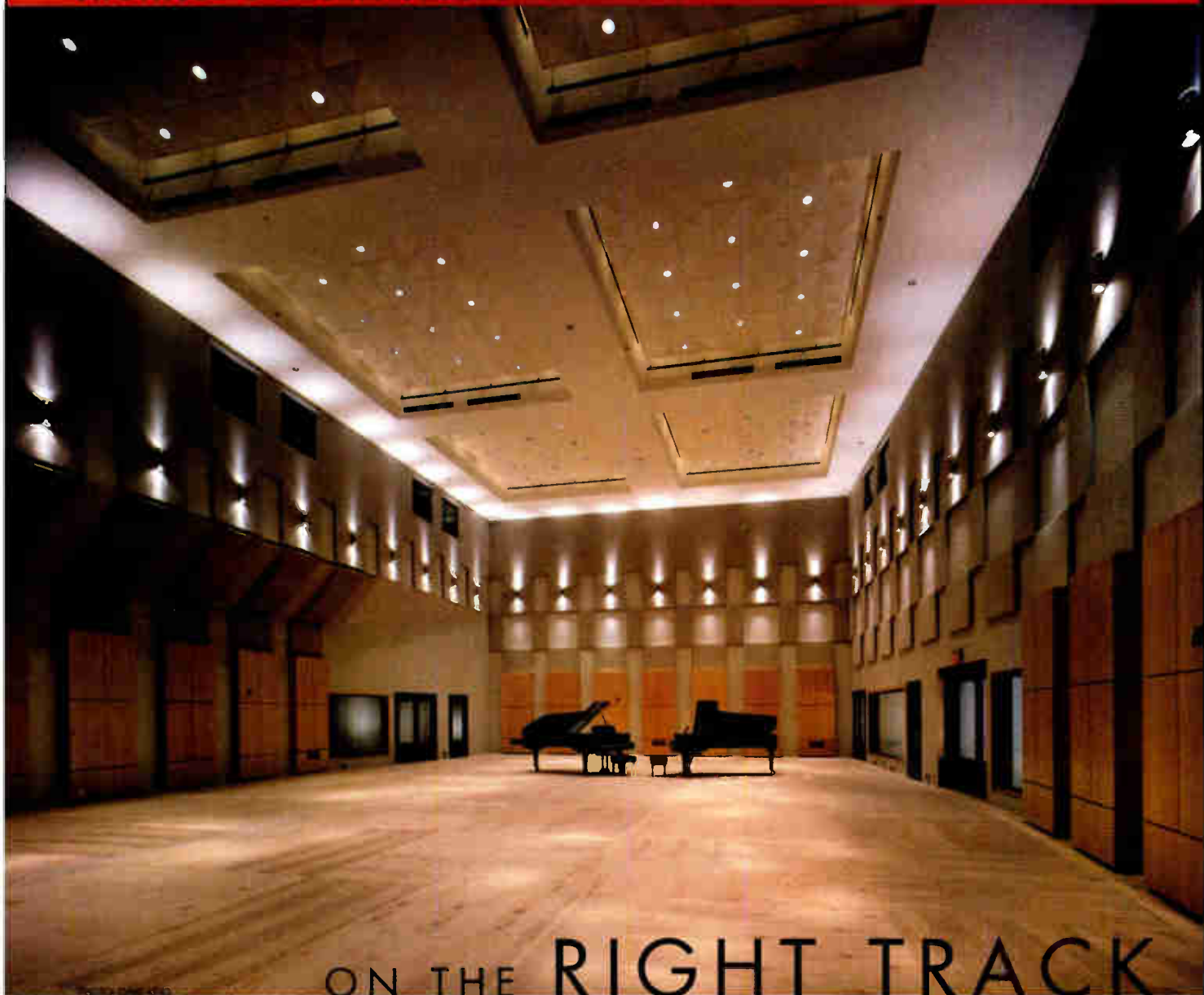
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ON THE RIGHT TRACK

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BY PAUL VERNA

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FRANK FILIPETTI ON THE RIGHT TRACK

"Since the big studios of the '50s, '60s and '70s have left, there hasn't been anything in Midtown Manhattan that didn't involve some sort of compromise," says Filipetti. "After seeing rooms in L.A. and London, I wanted a room that had the kind of mass that's going to allow you to go in there with a symphony and still have the isolation you may want for a Broadway show. I wanted a room that really spoke for itself."

As a long-established independent who has chosen to align himself with an existing facility, Filipetti joins the likes of Chuck Ainlay and Jack Joseph Puig, who have made similar arrangements at Soundstage Studios in Nashville and Ocean Way in Los Angeles, respectively. Filipetti's venture is especially interesting given that he almost went in the opposite direction—establishing his own, personal facility the way mix specialists Bob Clearmountain and Mick Guzauski have done in recent years. "Around 1998, I started entertaining the idea that I'd love to have my own studio," says Filipetti. "I looked at what Bob and Mick had done and started fantasizing about a similar situation. I even found a place I was interested in and had come to a decision that I would purchase it. It was a residential studio with a brilliant tracking room and plenty of space. At that point, 80 percent



PHOTO: DAVE KING

At the SSL 9000 J in Right Track's 1,000-square-foot control room are (from left): Simon Andrews, Frank Filipetti and Barry Bongiovi.

of what I was doing was mixing, so I figured I could do that at my own studio near my home [in a northern suburb of New York City] and use Right Track for tracking and overdubbing."

Concurrently with Filipetti's search for his own studio, however, Andrews had lined up financing to build an unprecedented tracking/mixing room to address the needs of New York's film scoring and theatrical communities, which grew substantially in the '90s. The idea was not new to Filipetti. In fact, he had closely advised Andrews on every major move Right Track had undertaken

since joining in 1980, including the move from its original location on 24th Street to its current site on West 48th Street in Midtown, and the console choices and specifications of all three of its rooms. Along the way, Andrews and Filipetti periodically discussed the possibility of building a large tracking space.

"Simon and I had been talking about this for at least 10 years," says Filipetti. "In the late '80s and early '90s, we had Studios A and B running, and we realized that, without paying too much attention, we had come up with a couple of very successful rooms. Not that we didn't spend a lot of time analyzing things, but our ideas meshed, some by design, some by serendipity. We realized that, between us, we had the ability to put together amazing-sounding rooms, and they were very successful.

"We decided about that time that the only real problem we were facing in the structure of both A and B—the one thing we were missing—was ceiling height," he continues. "We started entertaining the idea of raising the ceiling in Studio A, but it would have entailed shutting down the rooms. Plus, at that time, space became available to build Studio C, so we scrapped the idea of making big architectural changes to the existing rooms and decided to try to find a new location that had ceiling height and floor space. We went through several things from there, including negotiating with people at ex-



PHOTO: DAVE KING

Standing in the main orchestral room is the Right Track team: (L-R) Dominick Costanzo, technical director; Frank Filipetti, producer/engineer and co-owner; Simon Andrews, principal owner; Dennis Janson, studio design architect of the New York-based Janson Design Group; Mark Pollaci, president of Nucor Construction Corporation; and Barry Bongiovi, general manager and director of operations.

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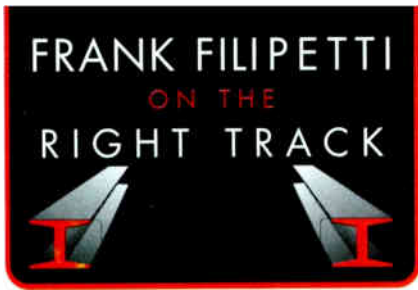
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isting facilities about merging, but none of that worked out. Then we got involved with building Studio C, and it turned into another very successful room.”

Starting in the mid-'90s, Filipetti's career took off with such projects as the Grammy-winning James Taylor album *Hourglass*, the Pavarotti & Friends series,

Hole's *Celebrity Skin*, and projects by Barbra Streisand, Jim Steinman and Carly Simon, among others. With such a demanding schedule, there seemed to be little time left in Filipetti's days to think about building a new studio. On the other hand, his success meant he was doing bigger and bigger projects, including orchestral and cast-album dates, many with longtime associate Phil Ramone. “On some of those projects I did with Phil, like *A Funny Thing Happened on the Way to the Forum* and *Passion*, I started thinking about how great it would be to find a big room to do that sort of stuff,” says Filipetti.

So, faced with a choice between setting up his own shop away from the city or joining Andrews in building a historic tracking/mixing studio, the latter scenario proved too enticing for Filipetti to pass up. “As excited as I was about the prospect of having my own place, this situation gives me even more excitement,” says Filipetti. “This room is something New York hasn't seen in quite a while.”

Another factor that tilted the scales toward joining Right Track for Filipetti is that he already considered the studio his home. Far from being strictly a business venture that happened to work for both parties, Filipetti's relationship with Right Track had always embodied a perfect symbiosis between client and studio. “I started out at Right Track,” says Filipetti, who was an aspiring singer/songwriter before fate turned him into a world-class engineer and producer. “Simon gave me my first opportunity to engineer, and we became fast friends early on. I used to do my songwriter demos for Screen Gems at Right Track and I cut my album there. When all that fell through, I went to Simon and asked him if he would let me engineer for him. I was 30 years old at the time, so I asked him if I could do it without being an assistant, and he let me. So I started engineering gigs for him [circa 1980,] and within six months, I was chief engineer.”

In 1983, Filipetti—along with many up-and-coming engineers at the time—went independent. However, unlike most of his peers, he stayed close to his roots. “I went indie, but Right Track was my home,” he says. “I'd worked with Simon on the design of the first room as well as Studio B, both of which were successful. By the time I left, the two of us had designed a couple of studios together, and they were my favorite rooms. I did most of my work in those rooms, and they reflected a lot of what I thought studios should be. So, even though I wasn't a partner, I was always consulted about what gear to buy. For instance, soon after I went indie, I was in London with Peter Asher at the APRS show and I saw my first Solid State Logic console. I brought the information back to Simon and he put one in Studio B, and it was immediately successful.

Now, almost two decades later, Andrews and Filipetti are preparing to turn heads with their latest creation. With a footprint of 85 feet by 55 feet and a ceiling height of 35 feet, the new Right Track studio will boast dimensions that exceed those of even the largest music tracking rooms in the city. Although there are TV

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- PRO AUDIO REVIEW, MAY 2001

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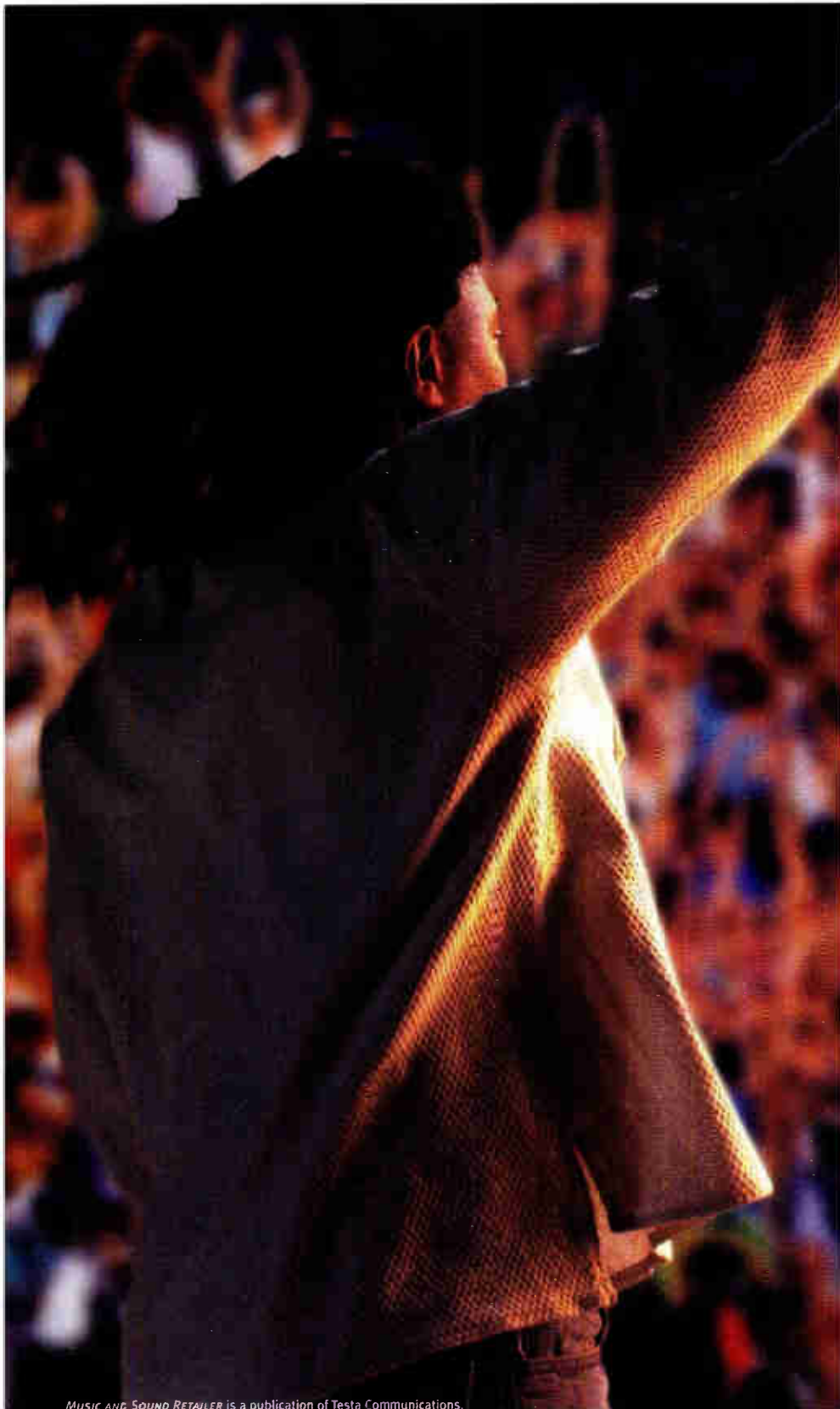
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soundstages that are larger, they are not optimized for music tracking and mixing the way the Right Track room will be. Filipetti estimates that the studio will be able to hold a 60- to 70-person orchestra with a choir. "There have not been any compromises made anywhere," says Filipetti. "Down to some innovative cable interfaces, it will be a first-class facility all the way."

For an engineer who has won tremendous acclaim—and three Grammys—for recordings mixed on the all-digital Neve Capricorn console at Right Track's Studio B, Filipetti's and Right Track's choice of a Solid State Logic 9000 J board for the new room may raise some eyebrows in the industry. Filipetti explains the rationale for investing in analog technology after helping lead the trend toward digital: "Although I've worked almost exclusively on digital consoles for the past several years, digital consoles

are still developing. We now have new standards and new formats, and a large-format console to do this sort of thing is three to four years down the road."

In their quest to find the ideal analog board for their new studio, Filipetti and Right Track manager Barry Bongiovi scouted world-class facilities in Los Angeles and London and returned to New York with a clear vote. "We talked to many engineers, and the consensus was that the 9k with the scoring panel was the way to go," says Filipetti. "It's universally recognized as being a fantastic-sounding console, and it's got the track record in the industry and the ability to do everything we need it to do."

Another of the 9000 J's attributes is its ability to handle 5.1 channel mixing projects, which Filipetti hopes to cultivate at the new facility. "Although we are billing this as an orchestral tracking room, that's not all we want to do there," he says. "We are trying to make this the finest stereo and 5.1 mix room on the planet. We've designed the control room to be a sophisticated mixing environment. Surround sound won't be an add-on—it'll be a full-fledged 5.1 and cinema mixing room, and for the rock and hip hop mixers, we've developed a scor-

ing panel that not only can be bypassed electronically, but can actually be removed from the console entirely."

For smaller, rock 'n' roll sessions that don't need the entire tracking area, the room will be partitioned according to the needs of the client, according to Filipetti. Similarly, the headphone system will be able to be customized for various uses. "Something that always bugs me about a lot of studios is that the headphone system always seems like an afterthought, when in reality the headphones and the communication system are the single most important thing in a studio," says Filipetti. "We've designed the headphone system from the ground up to provide every facility you could ever want."

Hearing Filipetti expound on the virtues of the new Right Track studio, one can't help but sense that the room is the culmination of his lifelong ambition to build a recording paradise where no detail is overlooked and no expense spared.

"This is the kind of studio that you dream about," Filipetti concludes. "With all the renewed interest in Broadway and film, and with the revitalization of New York, the timing seemed right." ■

Paul Verna is Mix's N.Y. editor.


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CHRIS LORD-ALGE

MAKING EVERY MINUTE COUNT

Living in Los Angeles for more than 15 years seems to have had very little effect on Chris Lord-Alge's East Coast style. In case you haven't met the guy, I have to tell you, this is one rapid-action dude. His hallmarks are speed and efficiency, and he is definitely not into wasting time—his or anybody else's.

This elder scion of the Lord-Alge family started his career in his native New Jersey where he was a drummer in local clubs. Today, he is one of the most in-demand mixers around, and speculation about his formula for success runs rampant: How can he do it so fast and so often? That question becomes even more puzzling when you listen to a medley of his mixes, because, unlike the product of some other top mixers currently riding the charts, CLA's mixes all sound different. While listening to Dave Matthews Band, Faith Hill and Melissa Etheridge, you'll be hard pressed to recognize a CLA stamp.

Confident, opinionated, assertive (okay, aggressive!) and extremely



verbal, CLA is also eager to please. Those attributes, along with his inherent musical and technical talents, have created a winning combination and garnered him a long string of hits and two Grammy nominations. Among his Platinum mix credits,



Chris Lord-Alge at the SSL 4000 G Plus board at Image Recording, Hollywood.

Lord-Alge numbers Dave Matthews Band's *Everyday*, Green Day's *Nimrod*, Fastball's *All the Money Pain Can Buy* and Savage Garden's *Savage Garden*. He's frequently brought in to pinch hit on radio mixes; you've heard his work on singles by No Doubt, Everclear, Orgy, Barenaked Ladies, Nine Days and Foo Fighters, among others. Look a little further back in his discography and you'll find some other interesting artists: Collective Soul, Hole, Bad Religion, Meredith Brooks, Joe Cocker, Chris Isaak, Sprung Monkey and B.B. King, to name a few.

So how *does* he do it? I sat down with him one morning at his long-time home base studio in Hollywood, hoping to find out. Day after day, he cranks out the hits there, working on a 60-input SSL 4000 G Plus console in a control room that he has perfectly configured to accommodate his taste. It was a Saturday, around 11 a.m. when I dropped in, and he'd already been working

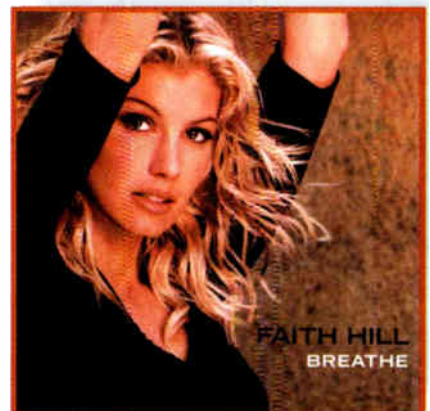
on some P.O.D. remixes for a couple of hours.

So, what time do you usually come in to work?

Well, I leave my house, which is 35 or 40 minutes away, at a quarter to nine.

Mix well, go home early.

Well, we try to get out of here at a reasonable hour. We only work late if we have to. If you do this six, seven days a week, you've got to have balance. I worked 12 hours a



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day when I was starting out, and I still do it if it's necessary, but it's usually not. That's better for everybody. I really don't want people to go out to dinner and then come back here afterward and try to concentrate when they're tired. I just try to make it easy. I find that my clients like it better that way.

Why do you think people come to you to do a mix?

I think record companies look at mixers like baseball players. If they're going to put somebody in to pinch hit, they'd better hit a home run. They don't want to take any chances anymore; you've got to make their song happen. And if, time and again, you're turning in exactly what they want, they're going to come back to you. You can't have them call and say, "Well, I'm not sure about that." Because then you're not going to get hired the next time.

Yeah, but how does one do that?

I guess you just have the ear and the creative talent to pull it together. A big part of it is having the kind of mentality that knows it's not your song. You're making it for the clients and for the people who are going to buy it. If a record you're mixing is for 17- to 21-year-olds, whether it's edgy rock or more hip hop-oriented, you better make sure that's who you're aiming for. Of course, you have to like it; you're mixing it! You make it to where you like it, and you hope that when you like it, they all like it.

Now, I don't mean that all this is easy. It takes years to refine your tools and your talent to make it work for every type of music. But my work ethic is a strict routine—how I work my guys,



Chris Lord-Alge with Stevie Nicks, who called him a "master craftsman" on her most recent CD.

how I work—that I don't waste any time. I'm not sitting around watching TV or taking a long lunch. I just go in there and get it. There's plenty of time to eat, drink and be merry later, off hours. Socializing with the clients is one thing; you've got to make them feel at home. But generally, the clients I work with want to come in here, do a little refining, get a CD and run for the door. They think it's great that when I say it's ready at four, it's ready at four.

You frequently get hired to mix singles for the radio. What's different about doing that vs. mixing for an album?

You look at the album version, figure out what you think is, in your personal opinion, going to make it better and you take it to the next level. It's very competitive out there.

Are you friendly with many radio programmers?

Yeah, I know some programmers at the key stations in town. I know what their equipment does sonically to the record, I know what they're playing and what kind of song makes them jump, based on form or length or style. So I generally have a good idea if a song has even got a shot, and what's going to make it have a shot. Remember, people don't have any patience on the

radio. If they don't get it in like 20 seconds, they're switching stations.

You've mentioned your concern that people may not hear the radio version when they buy an album.

Personally, I think when you're mixing an album, you want to maximize every song. Whatever they thought was not a single, you try to make into a single.

By editing? Changing arrangements?

A lot of the time, it's just how you make it sound. You make it as competitive as possible. Then, if the thing is clocking in at 5½ minutes, you say, "Hey, by the way, I can pull a 3:30- or a 4-minute out of this for radio play." Half the time, they'll decide to use that version on the album.

You trim the fat. I know you guys like it long, you want it six minutes. But if your album is 70 minutes long on the CD, I think that's overkill. I can get the first four Beatles albums on one CD—that's how short they were. Length is important. Make people want to listen to it again! Twenty choruses at the end is just going to make them not want to ever hear it again.

Is it still a part of your technique to bounce tracks to a 3348 and place them where you want them to come up on your console?

Absolutely. Pretty much everything comes in on Pro Tools, and I have my two crack assistants prep it the way I want it and transfer it.

Is that what you did with Dave Matthews Band's latest?

That came in on 48; it was on Pro Tools, and they transferred it themselves. I asked for two copies of each song so that I



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could manipulate one and leave one existing. By manipulate, I just mean parking tracks where I want on the faders digitally, without having to cross-patch. Or comping vocals or other parts that I think should go together. Because, for me, the less faders you have to deal with, the better it sounds. You don't need 90 faders to make it happen.

Do you listen to a rough mix before you start?

Generally, I don't want to hear it until I mix it. If it's what I call a "bug hunt," and the rough mix contains mutes and arrangement issues that are not locked into their tape, then I need the rough mix to find out what's going on. Even if I disagree with their arrangement, I'll make their arrangement happen first, then I'll have an alternate and say, "Here's what I think is better."

But with most of my clients, everything that's on that tape I use; every morsel is eaten. And in that case, I don't listen to their rough mix unless they are so married to it that I have to emulate it. Generally, I don't want to have any concept. I don't even want to know the song title. Put it up, here we go—com-



Chris Lord-Alge's early days.

pletely fresh. If you asked me what song I mixed yesterday; I may not remember the exact song title, but I'll always remember the hook and the vibe. That's what's important.

Because you're so into speed and efficiency, I'm surprised you haven't converted to hard drive random access.

It's not recognized as a professional medium that can be archived. What are you going to do? [What if you] put the hard drive away in some vault, and in 10 years, when they want to resurrect that album, that software is not to be found, or it doesn't work, or those files are corrupted?



Dave Matthews, Glen Ballard and Chris Lord-Alge during the session for the Dave Matthews Band's *Everyday*.

Yeah, that's really helpful. The format is not nailed down as a stand-alone medium that will sit in storage, and right now the 48-track is.

But what about all that wasted rewind time?

You know what? I need the rewind time. You record on the 3348 at the right level, and you set it up so it hits the console at the optimum level, which is something you don't generally see with Pro Tools. Pro Tools is a great recording and editing medium, and maybe at some point they'll have an interface that works with every console and can be put away for archiving. Until then, I want it on a piece of tape.

There have been many times lately that I've been trying to remix a single and they can't find the tape—because there is no tape. The guy with the Pro Tools file is nowhere to be found, and they don't know who edited what. I'll have to get all these different Pro Tools sessions to try to pull together one that makes sense for what they did in their final mix.

The truth is that a lot of guys who are doing it are making a mess of it. They don't notate properly, they don't archive properly, they don't have it pulled together. A record company ends up scrambling to find this record that they paid a million dollars to make.

Until they come out with the ideal medium, I say stick with one that works. People are saying, "Well, it's not 24-bit, it's only 16-bit." And I say, "If it sounds good, what do you care what the word length is?" Let the bits fall where they may. The

system I use works, and it sounds good.

You're known for your opinions on getting rock 'n' roll drum sounds.

Well, a drum kit is a kick, snare, toms and cymbals, but it's really one instrument. So when you're recording, of course you don't want a lot of crap on the kick drum, and you don't want tons of hi-hat in the snare, but you want to record it so that each mic complements the other. I'll EQ the hi-hat track to sound like a snare drum to help the snare if I need to, because the hi-hat is going to come through everything anyway.

Also, there's a disadvantage right off if you're recording the drums to digital. If you record the drums analog, you can make a lot of mistakes, and they're going to automatically sound like something because of what the analog tape does to it. You can't get that out of any kind of digital. A really good engineer can record digital and get away with it; but if you're still fishing around for the perfect drum sound, digital isn't going to complement it.

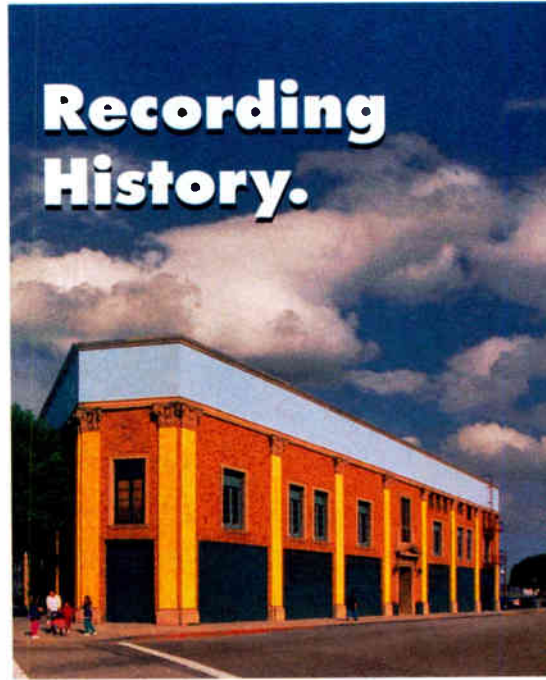
Analog is like one of those low riders driving around with tinted windows; it's got a vibe. You see through it, but not completely. There's a little tint. Digital is like a clear pane of glass that, if you're not looking, you'll walk right into. It doesn't do anything to the sound; if anything, it makes it worse, makes it more clinical. When I get records where I can't stand the drum sound, where it just doesn't feel right, I transfer it to analog and back just so I can bear listening to it. Because as a drummer, it's got to feel right to me.

What compressors do you like on drums? When drums are recorded, my preference

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World Radio History

MIX MASTERS

is to try not to use any compression. Use the old Neve mic pre's, use the good mics, try not to over-EQ and add as much bottom as you can, because the bottom is the thing that's tough to get right. Try to make it so the mic pre's aren't clipping on the kick drum. Which happens all the time—can ya just listen to it, please? There's nothing wrong with the drums being a little plain Jane. If you want to mangle a couple of tracks with these cool compressors at the studio you're recording in, put them on a couple of extra tracks.

I'm not saying make the original drums boring—you try to go for something. Maybe the band's into Led Zep-pelin or that dry, old disco sound. Whatever. But try to do it so it makes sense, where you've got somewhere to go.

Sometimes I get drum tracks and they're so mangled that there's nowhere to go and I have to try to undo what they did. The rooms are distorted, or the snare is so compressed it's just a little "ping." I know you guys all want to experiment and try all these things, but try to leave some of it simple, straight-ahead, clear, because it's a lot easier to mangle it later than to unmangle it.

Compression can be dangerous in the wrong hands. It's like a gun; once you shoot a hole in something, you can't plug it.

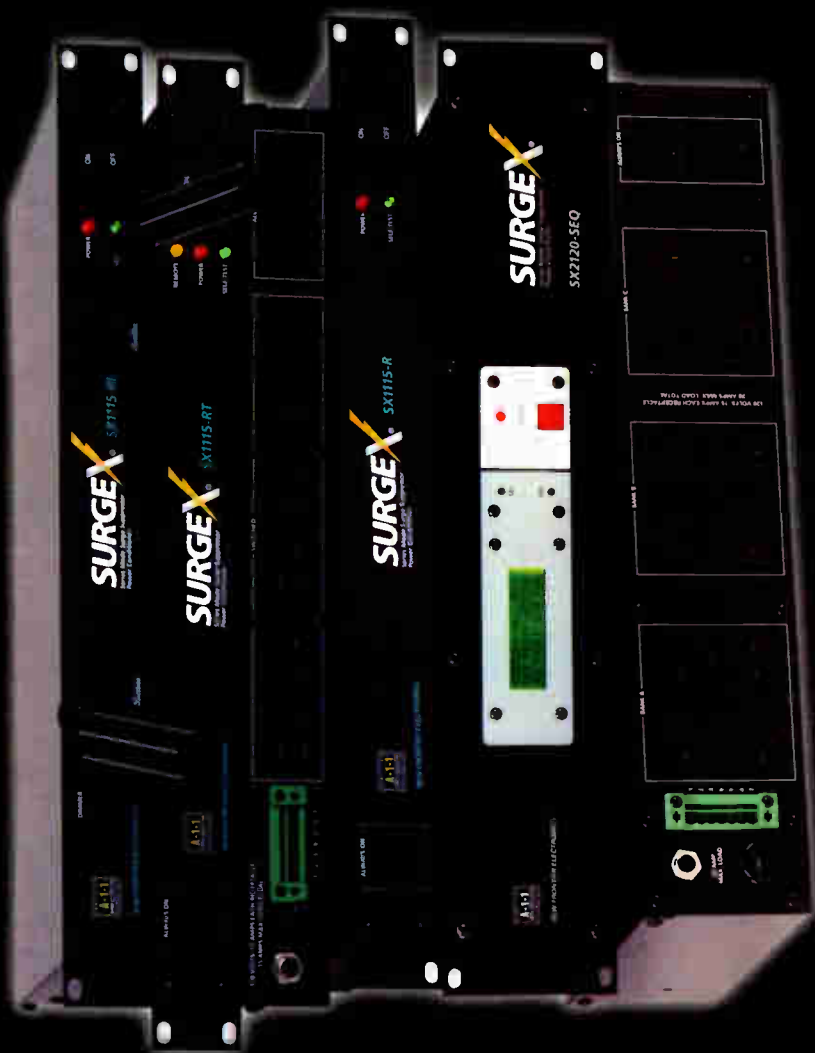
Okay, say you've been given some nice, plain-Jane drum tracks.

On the kick and snare I'll generally end up with some Manley EQs, and I go between Distressors and dbx 160s. A lot of times, the console compressor is perfect for the kick and the snare. Or I'll tinker around between an 1176 or an old Neve compressor—one of the verticals that I have.

A lot of times, I won't even touch the room tracks. If they're uncompressed, it can be even better; I can just ride them. Overheads, if they're kind of lackluster, an 1178 will put them right there.

When you're compressing drums, it depends on how aggressive the song is. If you have two pounds of baloney in a

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**You have to give
everything its
own identity
for the artist.**

**You can't put your
imprint on it.**

one-pound bag, and there's a wall of guitars competing with the drums, you've got to compress more and more to get the drums to stay punchy through the whole song. And if the snare drum isn't too high and it has some depth to it, that gets a lot easier.

I bear you use an oddball pair of Pultecs across the mix bus.

They're 1S3s, with consecutive serial numbers. They're a different bandwidth (than EQP 1As.) So the whole mix goes through tubes. Tube low end really helps the overall picture; it makes it sound more musical.

Listen to the radio. These days, it's all about the low end—getting it clear. Low end is the hardest thing to get right. High end is easy because everybody usually records so bright. And this console—old console that it is—has the sweetest-sounding high end. You crank the knob to the roof, and it's just enough.

It looks like you have two of every piece of gear.

Yeah, it's a little Noah's ark action. You can't go wrong with a pair of everything.



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MIX MASTERS

Like Neve compressors. I've got these 22609s with 2254s built into them; they were from the 8058. The next ones over, from the 8068, are the orange cap 2264Xs. Then, from the 8078 I have the 32264As.

I pretty much have the whole history of the Neve compressor. I have the very first one here—the 2252. Then it went to these 2254s, these 2264Xs, and then they came up with the 33609. I have a Rev A with the metal knobs—the original Class-A ones, very rare. They remade it a few years later with the 33609 C—the Rev C—I have a modified one. I also have a pair of 1073s, in case I have to fix something. *For a diehard SSL guy, you sure know a lot about Neve gear.*

Well yeah, I prefer projects that are recorded on old Neve consoles. Neve/SSL is the big complement.

What's this rumor that you don't like to change settings on your outboard gear?

It's true. On the limiters, that is. Rather than change a setting, I'll just buy another one and set it differently.

You're putting me on.

No, that's what I do. That's why I have so many. I have that one set for a certain sound, this one set for a different sound.



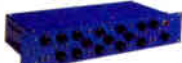
Chris Lord-Alge, the ultra-hip Chris Isaak and producer John Franks

I just power them up, plug them in and they're on the best setting. I change the EQs, but that's it. The limiters stay set to the optimum setting for that limiter. It's part of the gig; it helps the repeatability. *Okay, what's that 1176 set for?*

It's a gain structure thing, really. Each 1176 that I have here has a different sound. This is fatty, this is skinny, and that one is for vocals that are too boomy. I can listen to the vocal for three words and say, "Okay, put number three on



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him." Or number one, usually number one, my old blue, magical-sounding 1176—the first ones they made. Basically, I could put covers on my gear for weeks, and not have to worry about it. I'd just say, "That one's not right, plug in the next one. Okay, that's better."

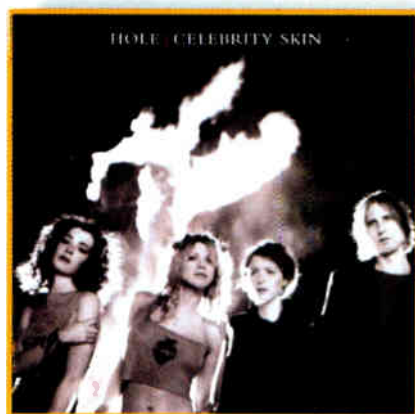
There are certain limiters that just stay patched into certain spots of the console—been there for a long time. And they work great because I always put my tracks in the same place.

One of the most important things about mixing is having a routine. That

may sound boring, but it works. I don't want to think about where the kick drum is on the console, or where the vocal is. They're always going to be in the same place, and I can worry about the song instead. Because it ain't about the gear; it's about the song. If you don't do the song justice, you shouldn't be mixing.

On my way over I was listening to songs you'd mixed for three different artists, and they all sounded completely different. I wouldn't have guessed that they were all mixed by the same person.

You would think, from how I have it set up here, that every mix is going to sound the same, like cookie-cutter mix-



ing. No. It's just convenience. Just because tracks are parked in the same place on the console, and a lot of times are going through the same gear, doesn't mean the music will sound the same. You have to give everything its own identity for the artist. You can't put your imprint on it.

What is it you love about this [SSL 4000 G Plus] console so much?

Bottom line, this console has attitude. In 10 more years, these consoles will be like old Neves. They're classic. This one was

**I would rather
compress a vocal hard
to get some
personality out.
It's like putting a
snazzy jacket on a guy
when he goes out
at night—
it adds attitude.**

installed in about 1985; it's modified as far as you can go, and it's in great shape. And it's got light meters, which I like. I'm all about the meters.

What do you mean?

I've got to see what's going on. I don't do this by ear only! I use the meters to balance things left and right, and to see what's going on with each fader so I can optimize the console.

They're set to show input?

No, the output of the fader—fader to mix—EQ'd and everything. It's all about maximizing the signal strength. You hit the tape machine a certain way, the tape

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MIX MASTERS

machine is hitting the console a certain way, you're hitting the mix bus a certain way. You're at the sweet spot. All consoles have a pretty small sweet spot where it really sounds good.

That's something you don't hear mentioned much lately.

Well, everybody's thinking because they're digital, they don't have to worry about a sweet spot. Well, yeah, you do. Digital craps out so quick it's disgusting. In an all-digital console, the sweet spot is tiny—like a postage stamp. But there's a small window on any console where the headroom is right and where it really sounds the best. That's where I stay, in that window.

So, shouldn't SSL have called the new Classic console the Chris Lord-Alge "Special Edition"? You know, like a guitar.

Well, CLA is in Classic as it is. So they kind of did. Don't get me wrong. There's nothing wrong with new consoles. I'm not an old fogey saying I won't change anything. But when I go into a car race, I want to be in a Ferrari with a shifter, a steering wheel and a gas pedal. I don't want to have so many gauges that it deters me from winning. And I don't want to be here

all night trying to figure out the console or the automation.

The main function I like about the new digital consoles is that, if I have a mix done, and my client is late, I can start the next mix, have it in memory and pick up where I left off. But everything else hasn't



Is it live? Or is it studio?

outweighed this desk yet. What I'd really like is another one of these consoles put back to back with this one. Just think: It's cheaper, I can have mix number one here and mix number two here... If it was up to me, I would have this console hydraulically drop to the floor and have the other one

come up—like A and B stages at a concert. Bottom line, I like the way this rig works, just give me another one.

I'm an SSL guy since day one, and I like the MT, but I think this whole digital thing is in flux. Who knows where it's going to stop? To me, one big problem with a digital console is that this year it's good, next year it's not high enough resolution.

What format do you mix to?

Ampex half-inch 2-track, GP9 plus 6, and to 16-bit DATs with the Apogee PSX converter, and to CDs. I tried a couple of hard drive units, but I haven't had much success with them. I'm sure there are some great units out there, but the one that I had, as soon as it started skipping on the hard drive I gave it back.

Let's talk about vocals.

Vocals are the most important part of the track. And a lot of times they are not recorded as well as they could be, with the right limiter. You'd be surprised at how much compression you need to put on vocals to make them sit right in the track. Sure, you cannot compress it much and ride it, but it ain't going to have the personality that good old compression is going to give it.

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I would rather compress a vocal hard to get some personality out. It's like putting a snazzy jacket on a guy when he goes out at night—it adds attitude. And nothing adds attitude more than 1176s. I have six to choose from. I also like Vac Racs, which you see I have eight channels of.

I've found that these tube Vac limiters are perfect for backgrounds, and a lot of times for rock records they're perfect for the lead vocal. They only have one setting: both knobs all the way to the right. That's the optimum setting.

My vocals are always in the 17-24 bucket, right in the middle, which is important because you also have to send them to a couple of faders to help the level. You don't want the vocal faders to be up too high, where they start to clip and the console is not in that window. So, why not just bus the vocals to two more faders right next to them, just to help the level, and you send your overall effects from those faders.

I generally don't put boatloads of reverb or chorusing on vocals; I just pan them left, right or center. If I have a song where all the backgrounds are mono tracks, I'll pound them up the middle be-

cause that blend may work better. Or I may stereoize them with a little harmonizer. I use an old H3000, or I'll use Early Reflection preset on a REV5 to make it a little stereo and not quite as dry-sounding.

The hardest thing to do is to get the vocal to sit right in the track. And then to de-ess them so they don't sound like they have a lisp, but to keep the sibilance under control.

What de-essers do you use?

dbx 902s. But a lot of times if you pick the right compressor, it kind of de-esses by itself. The tube limiters, especially, knock the esses off pretty good.

What do you monitor on?

NS-10s with an Infinity subwoofer that I got at Fry's for about 300 bucks.

A subwoofer?

You've gotta have a subwoofer; if you can't hear what's going on down there, you can't get it right. I know, some guys mix with subwoofers, they have it too loud, and their mixes end up with no bottom. But if you set it just right so you can hear that lower octave, you'll

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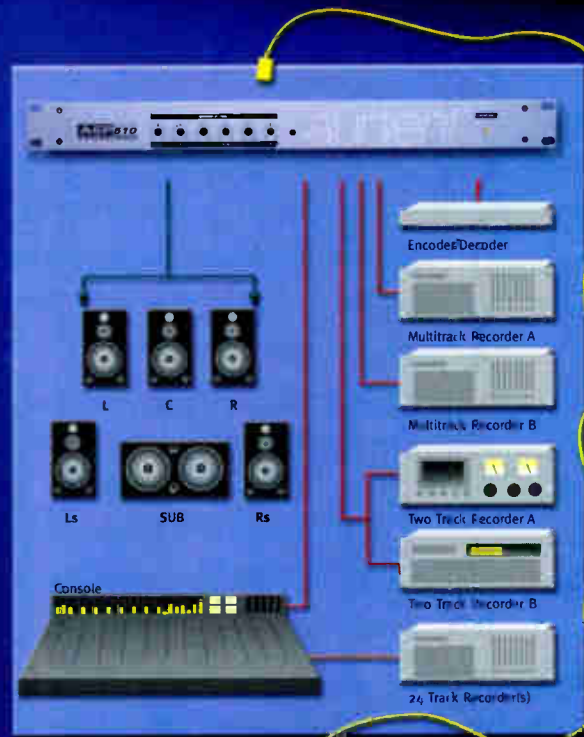
Hole: *Celebrity Skin* (mixed four tracks)

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EXPLORE

sometimes dig for the deeper notes. Especially if you are going to do anything that's R&B- or rap- or hip hop-based, you've got to have the subwoofer so you can get the truck frequency. That low boom that all those guys in the trucks want to hear.

I also have my little Sony blaster. It's rackmounted, and that's the comparison. My little brother Tommy turned me on to it, and every client who comes in here wants to hear their mixes on it. If it doesn't sound good through 2-inch speakers on your little boom box, what's the

point? It's got to sound big on a small speaker. You are trying to make something sound larger than life on the smallest medium possible.

Speaking of your little brother Tommy, when I did an interview with him a few years ago, he spent the first half-hour talking about you.

Well, I did train him! He used to work with me, and I'm glad he's doing great.

On her latest CD, Stevie Nicks called you a "master craftsman."

That was really nice. A lot of what we



do is really crafting. Because sometimes you'll get what's kind of a mess without any real direction or arrangement—everybody playing the whole song. And you've got to weed it out. You try to maximize what they have, and a lot of the time, you're just opening it up where there is too much going on right away.

I do it by instinct. Like a 12-inch; just arrange it, make it slim, make the chorus go bang! Usually, I just do it and the client comes in and goes, "Wow! I like it." The vocal and the groove are standing out a little bit better now; the verses build, and it seems to go somewhere.

What's your advice to someone who wants to get the most out of hiring you to do a mix?

Let the artist and the producer live with the recording, to make sure that they like the arrangement. You don't want to go into the mixing room and say, "I don't know about that keyboard, or that guitar, I don't know about this or that." As soon as you start going "I don't know," you are never going to get done. Indecision shouldn't be in the mixing room. Let me make the record sound good; not try to weed through the arrangement. It's one thing to make a short version or an edit, but if there are parts that you are unsure about, don't even put them on there. Get rid of them. Make a decision.

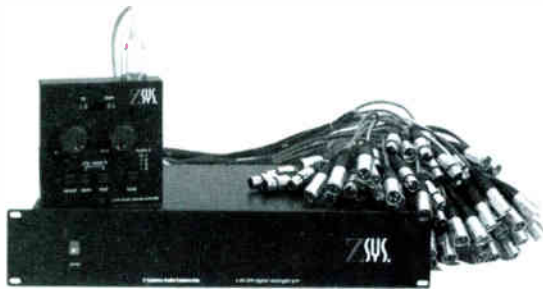
You're in a place to have a unique perspective of our industry and where it's going. What do you see?

We've experimented with techniques and with sounds; I think that we're going to get back to good songs. I would hope that we get more records with character, and not so much stuff that's cookie-cutter. But, at the end of the day, it's the housewife with a two-year-old, sitting in the kitchen with the radio on, or the guy driving his car at the beach with his girlfriend. A cool song comes on the radio, that's all that matters.

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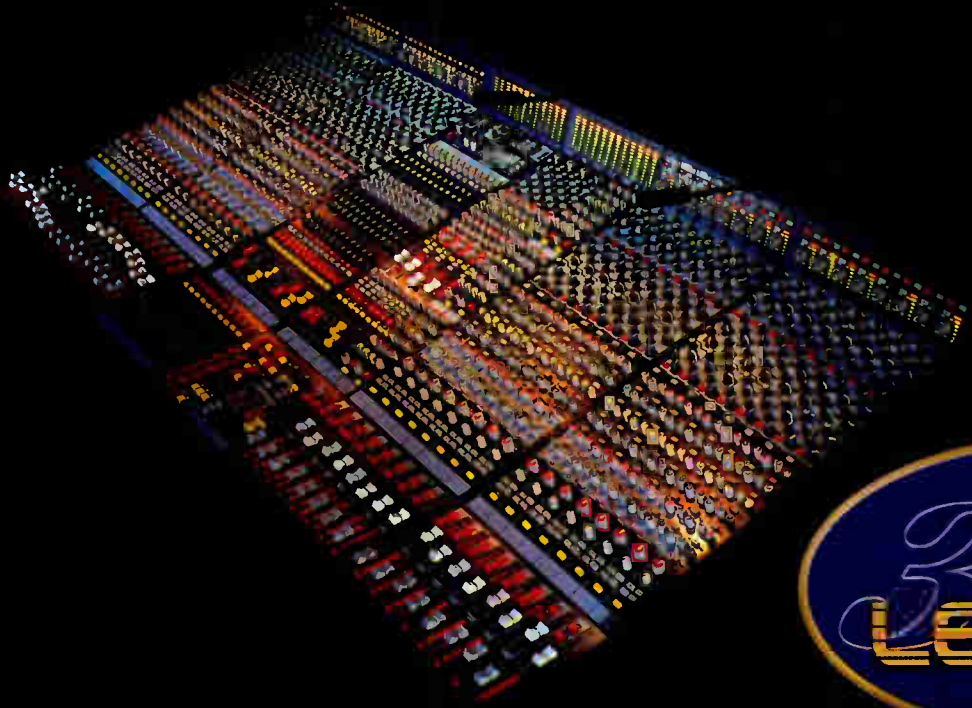
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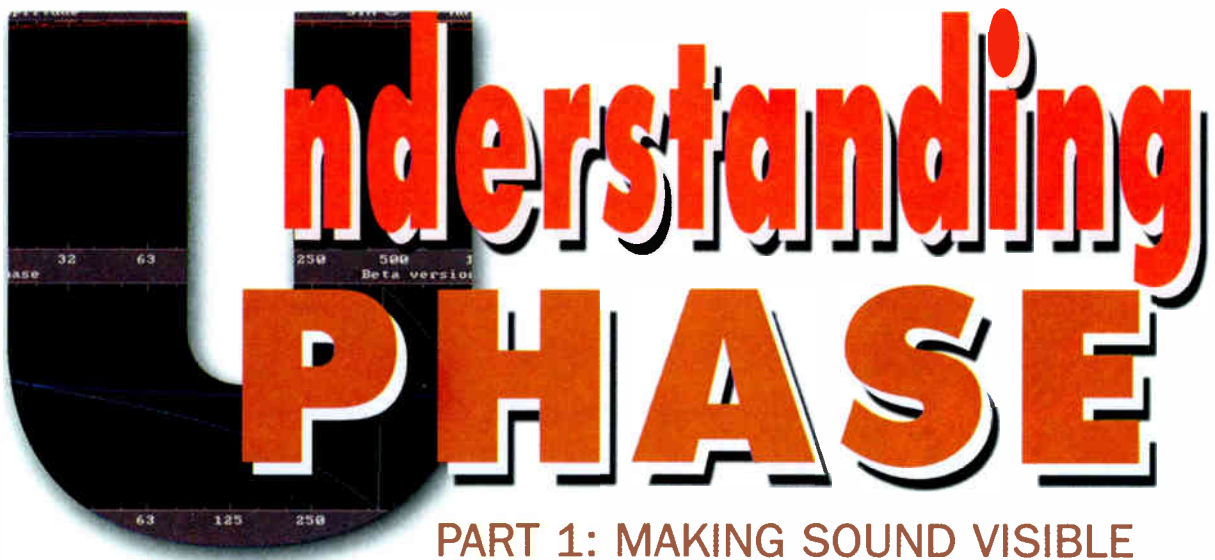
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PART 1: MAKING SOUND VISIBLE

by **Bob McCarthy**

I can see sound. I can look at a speaker array and see the waves coming out of it as clear as the ripples on a pond. I can look at the walls of a room or concert hall and see the reflections.

I am not unique. Anyone can see sound. All you need is an understanding of phase response and how changing phase response over frequency affects the sonic quality of a single speaker, the interaction of multiple speakers and the interaction of the speakers in the room.

The majority of concert system engineers have never seen a phase vs. frequency response of their system. The low cost of dual-channel FFT analysis systems has made this information much more accessible than even just five years ago, but, still, very few know what to do with the results of this information when they get it. And yet not one of us would say it doesn't matter.

The purpose of this two-part series is to present phase in a practical context for system engineers who are anxious to apply the information to improve their decisions regarding speaker selection and alignment. In Part 1, we will explore

three principal avenues:

- How to read a phase response graph.
- How the phase response relates to the sound quality of a single speaker.
- The relationship between phase and polarity.

Part 2 will explore how phase delay can be used to optimize crossovers, maximize array performance and steer subwoofers.

PHASE OVER FREQUENCY

First, let's define phase in a way that makes sense to those of us who don't wear lab coats nor have letters trailing after our names. What we want is a way to visualize phase so that we can relate it to distance. If two speakers are a foot apart, how much phase shift will occur? Will they add or subtract? What will be the effect on the frequency response of reflections from a wall? These are the kinds of questions we can answer if we have a practical grasp of phase.

In order to become conversant about phase, the first step is to realize that relative phase is a circular function and cycles through the same start point like the hands of a clock—360° of phase equals one full rotation or cycle. Because phase describes the relative time difference between two signals, it can be expressed in degrees or radians, which measure the completed portion of a circular period or wavelength. For example, 90° of phase delay is a quarter of a period (wavelength) at any frequency. The amount of time delay it takes to move apart 90°, however, is frequency-dependent. Thus, a given time delay will produce different amounts of phase shift at different frequencies.

Acoustic propagation delay is

directly related to distance, varying slightly over temperature. In air, 1.0 ms of delay corresponds approximately to 1.1 feet of distance traveled by the sound wave. So, if we know the propagation distance, then we know the time delay. If we know the frequency, then we know the period (1/F) and the wavelength. (It helps if you can always think of frequency, period and wavelength together. Don't just think of 100 Hz. Think of 100 Hz, 10 ms, 11 feet.) Once you visualize distance in wavelengths, then you can see how speakers will interact with each other and a room. They will add or subtract depending on the difference in number of wavelengths between the speakers or reflections at a given position. This will be explained later.

Phase delay is the time difference expressed in periods (wavelengths). The practical implications of this are huge.

Example: One ms of delay = 1.1 feet of travel = 11° of phase delay (1/32 wavelength) at 31 Hz. One ms of delay = 1.1 feet of travel = 360° of phase delay (1 wavelength) at 1 kHz. One ms of delay = 1.1 feet of travel = 5,760° of phase delay (16 wavelengths) at 16 kHz. (See Phase Delay Reference table below.)

Now think of all the time you have spent pushing subwoofers a few inches to get them all in a nice line. Aesthetics are important, but don't pretend that 2° of phase shift is going to be worth the backstrain. On the other hand, those same two inches will cause almost 1,000° of phase shift at 16 kHz—it really counts up there.

CALCULATING PHASE DELAY

Let's start with the phase delay formula:

This formula can be used to calculate phase delay at a particular frequency or range of frequencies. Let's

do a single frequency first. For 180° of phase shift at 500 Hz, we get 1 ms as shown below:

$$T(\text{Delay}) = \frac{F \text{ Hi (Deg)} - F \text{ Lo (Deg)}}{360 \text{ Deg}} \\ F \text{ Hi (Hz)} - F \text{ Lo (Hz)}$$

Now let's apply this knowledge to a phase response display, as shown on a modern, complex audio analyzer. These analyzers compute the phase response by comparing the measured signal to a reference signal, which yields a relative phase over frequency response. (The term "relative" is used because we are measuring the difference in phase between two signals, not between one signal and an absolute 0° reference.) The Y-axis ranges a total of 360°, giving a straight-line view of the phase value on the circular phase cycle.

Visualize a racetrack. You can see where each car is on the circle, the difference being their relative phase. However, it can be a challenge to know whether they are on the same lap or not. So it is for these analyzers.

The screen shots shown in Fig. 1 introduce the relative phase over frequency graph. Figure 1a illustrates the response of a delay line with 1 ms of delay. The delay is the same at all frequencies, yet causes a different amount of phase shift at all frequencies. Why? Because 1 ms of delay causes a different percentage of change in the circular phase cycle. At 1 kHz, the 1ms delay is a full 360° cycle. Note that at 1 kHz, the phase response has returned to 0° after going down to -180°, up to +180° and back down. The sudden break in the response at 500 Hz is not a phase anomaly, but rather a visual represen-

Phase Delay Reference	90 Deg Phase Shift		180 Deg Phase Shift		270 Deg Phase Shift		360 Deg Phase Shift	
	Delay (ms)	Distance (ft)	Delay (ms)	Distance (ft)	Delay (ms)	Distance (ft)	Delay (ms)	Distance (ft)
50 Hz	5.00	5.63	10.00	11.27	15.00	16.90	20.00	22.54
100 Hz	2.50	2.82	5.00	5.63	7.50	8.45	10.00	11.27
500 Hz	0.50	0.56	1.00	1.13	1.50	1.69	2.00	2.25
1 kHz	0.25	0.28	0.50	0.56	0.75	0.85	0.25	0.28
5 kHz	0.05	0.06	0.10	0.11	0.15	0.17	0.20	0.23
10 kHz	0.03	0.03	0.05	0.06	0.08	0.08	0.10	0.11

Understanding PHASE

tation of the circular nature of the phase response, where +180 and -180 are the same point on the circle. This is called "wrap-around" and denotes a full cycle of delay when it reaches back to 0°. Going back to the racetrack analogy, the measured response is a lap behind the original signal.

$$T (\text{Delay}) = \frac{180 \text{ Deg}}{360 \text{ Deg}} = 1 \text{ ms}$$

500 Hz

Now let's look at other frequencies. At 500 Hz, the response shows 180° of phase shift, a half-cycle. Because the period (1/F) at 500 Hz = 2 ms, half a cycle is again 1 ms. At 250 Hz, we have 90° of shift, which is [one quarter] of a wavelength of the 4ms period. Same delay. Going upward, you can count two wrap-arounds at 2 kHz. This is 720° of phase shift, i.e., two cycles of a .5ms period. At 10 kHz, there are 10 wraps for a total of 3,600°, which is 10x the 0.1ms period, and once again we have 1 ms of delay. The phase delay formula can be applied at any frequency to the above trace, yielding the same result.

Now we move on to a conventional loudspeaker. Loudspeakers typically exhibit phase delay that changes with frequency due to physics issues beyond the scope of this article. The result is an increase in delay at lower frequencies, unless electronic phase correction circuits are employed to offset it. Figure 1b is typical of uncorrected speakers and shows an ever-increasing amount of delay below 4 kHz, as shown by the downward slope in the phase response. In the phase delay calculations of the delay line, the results were always the same: 1 ms. But here, each octave will give different results for the speaker, ranging from 0 ms at 8 kHz to 16 ms when it reaches 60 Hz. For the listener, this means that the sound it reproduces is smeared over time.

As an example, here is the phase delay calculation of the uncorrected speaker for the range from 4 kHz to 2 kHz:

Figure 1a: Phase response (lower window) of a 1ms delay line

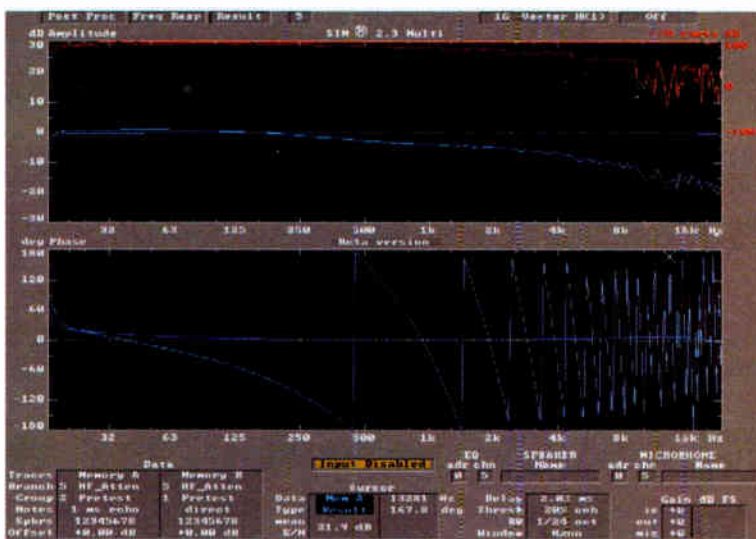
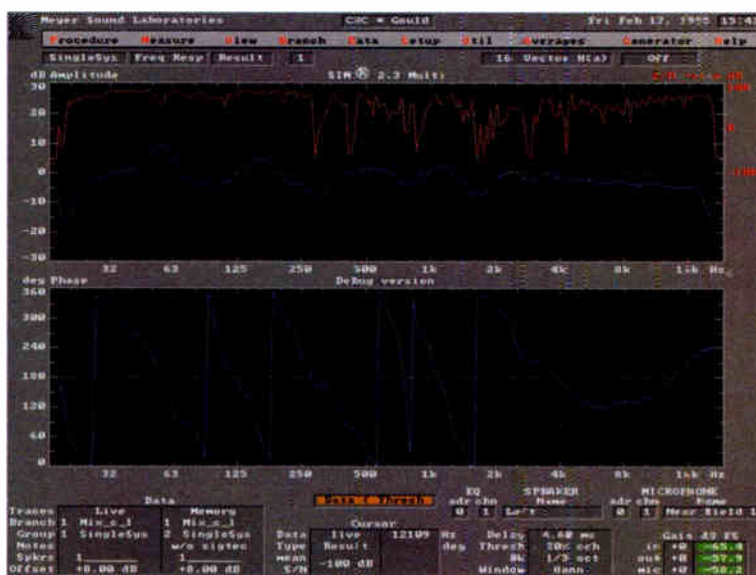


Figure 1b: Phase response of a typical uncorrected loudspeaker system



$$T (\text{Delay}) = \frac{0 \text{ Deg} - 180 \text{ Deg}}{360 \text{ Deg}} = .25 \text{ ms}$$

4000 Hz - 2,000 Hz

A loudspeaker with electronic phase correction is shown in Fig. 1c. Note that the phase response remains flat until around 250 Hz, where delay finally begins to accumulate.

The chart (Fig. 1d) shows the relative delay over frequency for each of the three examples.

Now, let's stop for a moment to consider the ramifications of this phase delay. Our industry is on a never-ending quest to make it more difficult for listeners to answer the question, "Is it live or is it Memorex?" Live sound direct

from an instrument to our ears does not have delay that changes with frequency superimposed on its original response.

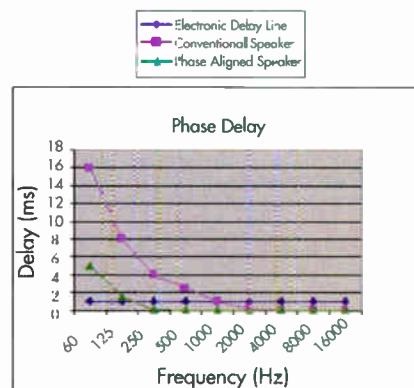


Figure 1d



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Understanding PHASE

It is an artifact of speaker physics. We would not tolerate such phase smear in our consoles or any other piece of gear. As speaker technology improves, the remaining clues that we are listening to speakers, such as distortion, horn signature and other artifacts, are reduced. Phase delay is a subtle but critical clue to our ears, and its reduction puts us closer to the real thing. All other things being equal, the speaker with the flattest

Figure 3a: Coverage pattern of a single speaker

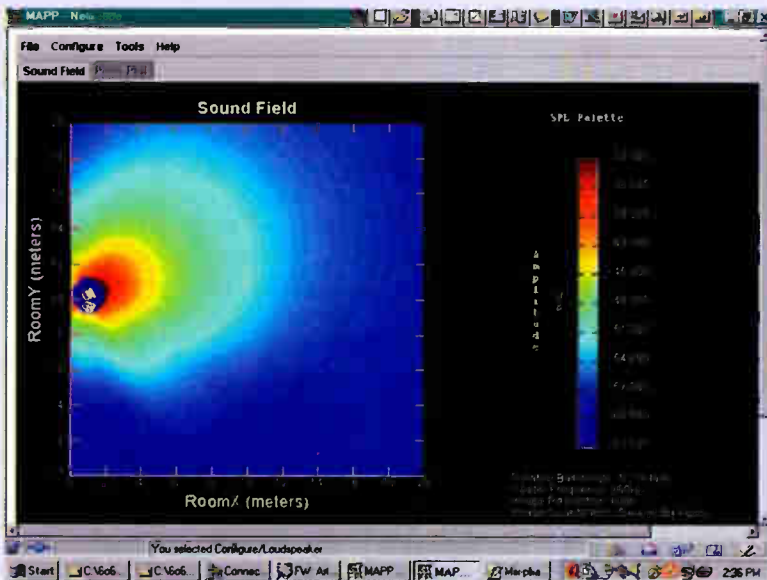


Figure 3b: Combined coverage pattern of two speakers, played at 60°

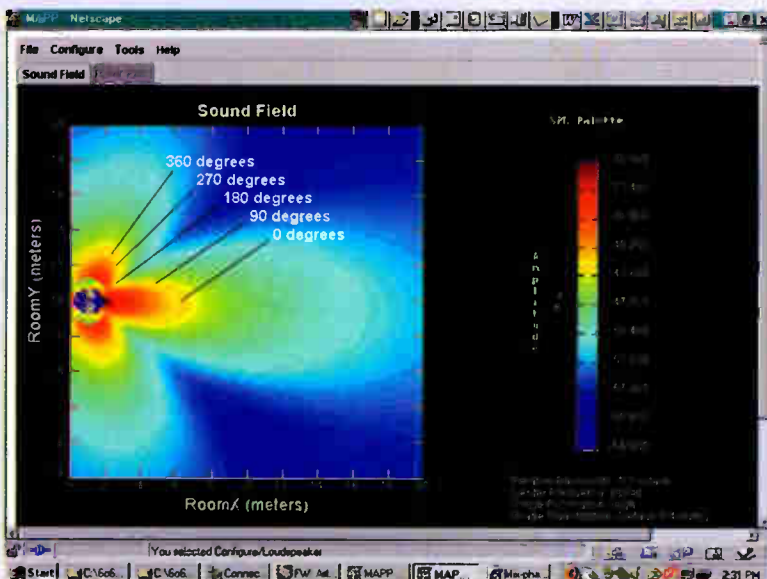


Figure 1c: Phase response of a loudspeaker with electronic phase correction



phase response sounds the closest to being there live. Every time.

PHASE AND POLARITY

Before we move to the next section, time for a pop quiz. How many milliseconds of delay results from 180° of phase shift?

Is that your final answer?

The correct answer is, "That's a trick question." Why? Because a frequency must be specified. So how many milliseconds of delay are equivalent to 180° of phase shift at 250 Hz? The answer is 2 ms.

Now, how much time delay do we get when we put a phase reverser in-line? It reverses all frequencies by 180°, so it must delay each one by a slightly different amount. That is quite a fancy delay circuit there! And I thought it was just swapping two wires! In reality, there is no such thing as a "phase reverser." It is a *polarity* reverser. Polarity reversers do not delay the signal. They invert the voltage or pressure component of the signal. While this does shift the phase, it does not change the phase delay time. That is not to say that a polarity reverse is unimportant. Anything that affects the phase will dramatically affect the way that different signals combine.

When two signals of the same frequency are combined, the summed response may be greater than or less than the original signals, depending on the phase. One plus one equals two, one or zero if summed at 0°, 90° and 180°, respectively. In a speaker array, the amount of addition will depend upon how close to 0° phase difference

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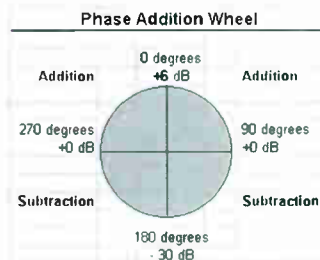
Understanding PHASE

there is in arrival times. The tendency of speakers to add or subtract is shown in Fig. 2, which illustrates the hemispherical nature of combination. Signals that combine on the 90° to 0° to 270° hemisphere will achieve constructive addition. Signals on the 90° to 180° to 270° side will subtract. Constructive addition is easily done at low frequencies where it takes path length differences of several feet to move out the speaker of the addition zone. The

highs, like football, are a game of inches.

The relationship between phase and polarity is illustrated in the series of simulations in Fig. 3. In this series, two speakers are splayed 60° apart, and the response is viewed at 250 Hz. In 3a, the response of a single unit is shown as a directional pattern reference. In 3b, both speakers are enabled, and the response shows a beam at the center of the array where the speakers combined at 0° relative phase, yielding 6 dB of addition over the response of a single unit at that location. The sides of the beam are formed in the area where the speakers are 90° of relative phase apart, creating minimal addition. The nulls are caused as we move into the cancellation hemisphere, with the deepest

Figure 2



spot being 180°. Side lobes appear where the signal is a full cycle (360°) out of time, allowing addition to occur again. At different frequencies, the position of the nulls and side lobes will change. The time between the cabinets stays the same, but the change in frequency causes the relative phase to change.

In Fig. 3c, there has been a polarity reversal in one of the speakers. The amount of energy generated by the speakers is the same as before, yet where it goes has reversed completely. Now, the side areas contain the bulk of the energy, while the on-axis area is in a null.

Finally, in 3d, we have a delay of 2 ms on the lower speaker. This is half a wavelength at 250 Hz. The 2ms delay steers the sound downward toward the delayed speaker in the direction of where the 0° addition area is centered. (This technique can be used to optimize arrays, the subject of Part 2.) Compare this to the polarity reversal above where the signal is flipped 180° (half a wavelength), but the result is quite different.

Figure 3c: Two speakers (60° splay). One speaker has its polarity reversed.

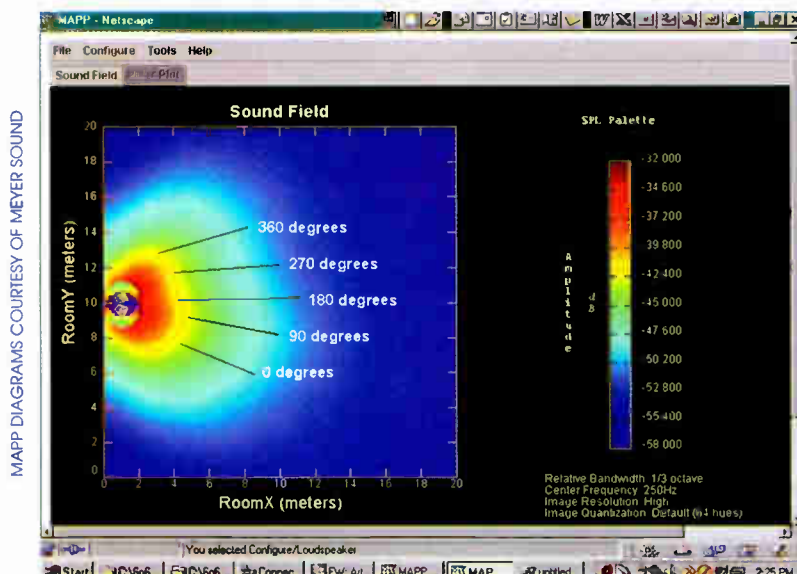
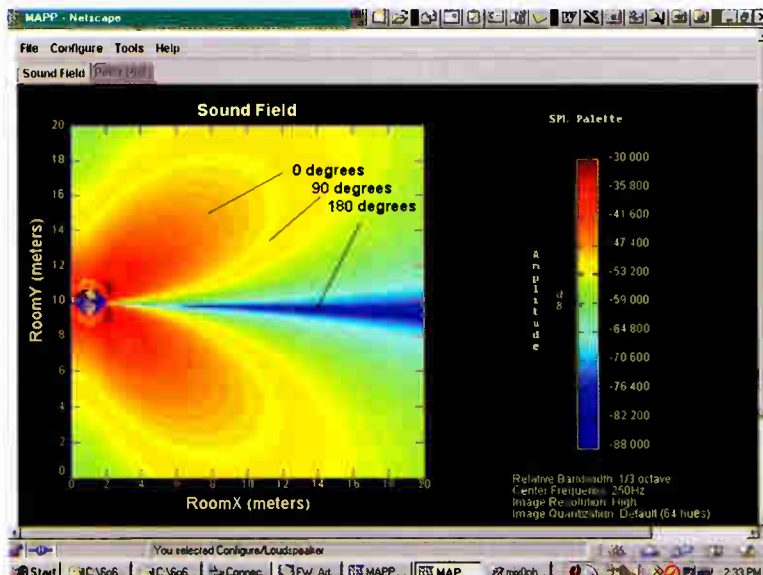


Figure 3d: Two speakers (60° splay). One speaker has a 2ms delay.

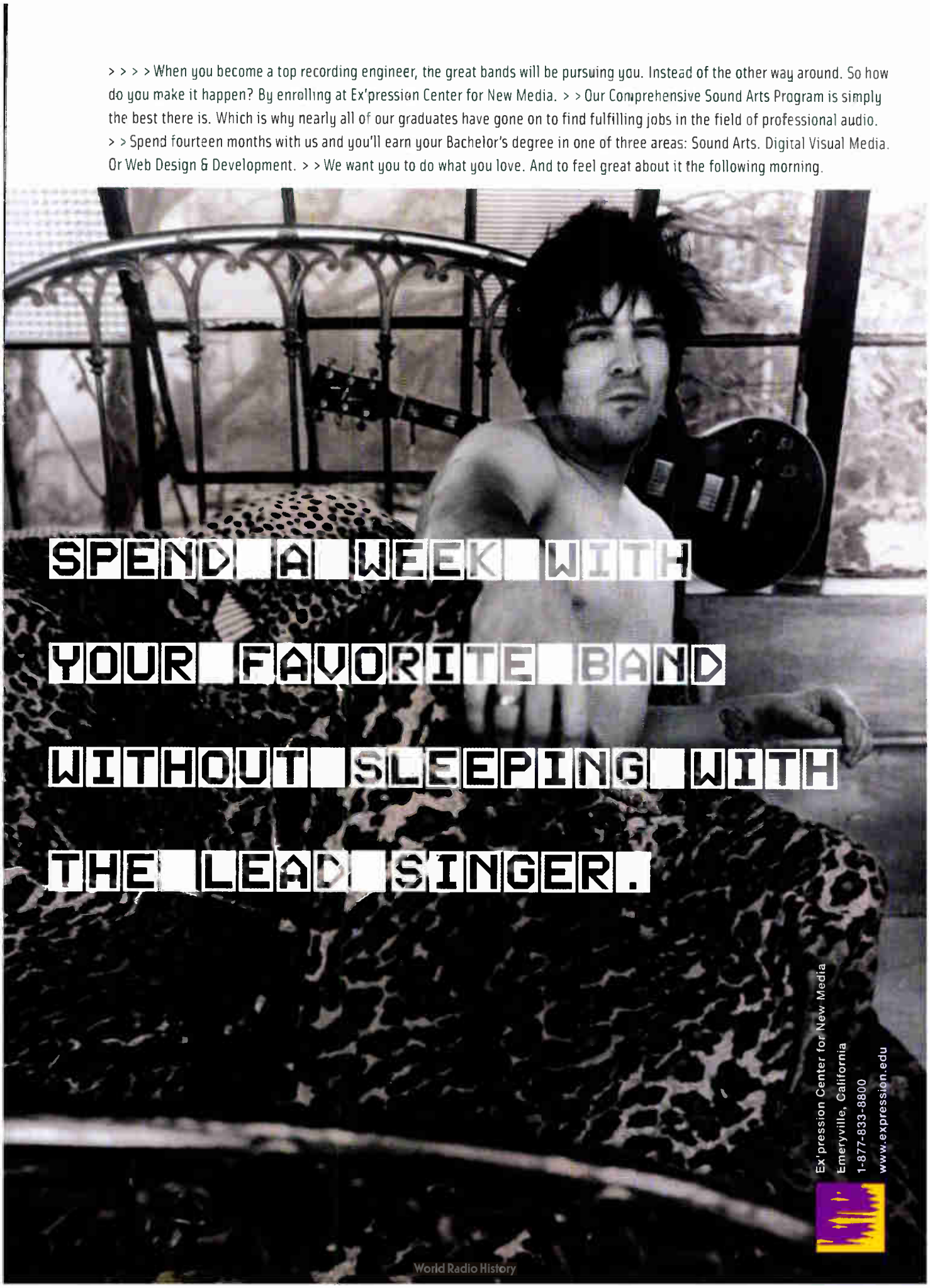


CONCLUSION

We should now be comfortable with the concepts behind a phase response measurement and have a feel for how phase affects our speaker systems. While phase is hard to see, its effects are easy to hear, and with increased understanding of phase, we can begin to harness its power rather than react defensively to its unexpected effects. In Part 2, we will actively use the phase response in the optimization of crossovers, the alignment of arrays and the steering of subwoofers. ■

Bob McCarthy is a contributing editor to Mix.

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Setting Up the

SAN

ADVANCED AUDIO RENTALS PUTS NRG RECORDING ON THE NETWORK PATH

When Wade Norton, chief engineer at NRG Recording Services, describes the old days—before the studio installed a Fibre Channel SAN to link its Pro Tools systems—things sound a bit unstructured in the asset-management department. “We had the studio’s Pro Tools systems and the clients’ Pro Tools systems,” he says, “with hot-swap drives being traded back and forth. There was no procedure for moving data around, no typical project workflow and no *de facto* standard for how things were done.”

The day-to-day operation, Norton recalls, was often chaotic. “The variations were endless,” he says. “Some sessions went flawlessly; some sessions were worse than others. We had multiple versions of projects, with nobody really keeping track or doing file management. Some clients looked to us to back up their material, and some did it themselves. Others would leave at the end of the day with a drive full of new material, when the studio should have held the ‘tapes’ for billing.”

BY PHILIP DE LANCIE

NRG's studios in North Hollywood, Calif., feature large, high-ceilinged rooms with Gothic and Moroccan styling, two full studio/control room combinations—each with four isolation booths—and one mixing room. In addition to the Pro Tools 24|MIXplus systems in every room, the facility is outfitted with SSL and Neve consoles and Studer 24-tracks. Clients include artists such as Beck, Korn, Sugar Ray, Linkin Park, Papa Roach and Staind.

Recognizing the importance of bringing order and coherence to the way Pro Tools projects were handled at the facility, Norton and owner Jay Baumgardner consulted with Paul Levy, owner of North Hollywood's Advanced Audio Rentals. AAR specializes in digital audio rentals for post-production and music recording, while subsidiary BuyAudioGear.com is focused on hardware sales for high-tech audio applications.

Advanced Audio Rentals' portable Fibre Channel system, essentially a duplicate of the system installed at NRG. Specs: 512 GB of 36GB/10k Seagate Cheetah drives, with a 16-port Vixel fabric switch handling the routing. A Qualstar AIT2 auto-loading tape library can back up as much as 1 TB of data, unattended.



The main studio at NRG, currently under construction

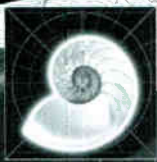
FOCUSING ON FIBRE

"The studio's plan was to offer Pro Tools as a no-charge extra included in the studio's daily rate," says Levy. "Using Fibre Channel was Jay's idea. He wanted to get all of the noise from the hard drive bays out of the rooms. Using SCSI to do this was not practical because of SCSI's cable-length limitations."

Fibre Channel is both a data-transfer protocol used between network devices and a serial data interface. To confirm accurate data transmission, the protocol provides error-checking and data-reception notification. The primary burden of implementing these features is placed on the network hardware rather than the connected hosts and servers, so the throughput of a Fibre Channel network is actually higher than that of an Ethernet LAN (Local Area Network) with the same nominal transfer rate.

The Fibre Channel protocol is also designed to avoid the "data collisions" that can drag down the performance of Ethernet. Ethernet LANs are fine in a production environment for non-real-time data transfers, but Fibre Channel is designed to better handle real-time playback of time-based information such as audio and video. The downside is that a Fibre Channel setup is generally much more costly than Ethernet.

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Fibre Channel is typically used in a network configuration called a SAN (Storage Area Network). Each workstation on the network is equipped with a Fibre Channel Host Bus Adapter (HBA) PCI card, which is directly connected to a Fibre Channel switch. The switch, in turn, connects to the system's storage drives.



Studio manager Kit Rebhun with producer Eddie Kramer, working on a Jimi Hendrix project

What's unique about a SAN is that each host (workstation) on the system sees the storage as if it were a local drive (hooked directly to that computer) rather than a remote drive on a network. This greatly simplifies issues of version control. In a LAN with a central server, each user downloads files to a local drive, modifies them and then uploads them at the end of the session. With multiple users creating different versions, the potential for confusion is clear. But with a SAN, everyone with permission to access a given file works from and on the same version, stored on the same common storage.

DRIVING AWAY NOISE

Levy says that as far as NRG was concerned, the fact that a Fibre Channel SAN would allow sharing of files between workstations—as well as unattended tape backup—was initially just a bonus to the primary objective of reducing noise by removing drive bays from the control rooms.

"Fibre Channel was the only protocol that allowed the needed throughput at the distances required," Norton confirms. "No other options were really considered.

We knew of video post houses that were already using it. It just hadn't been used in an audio environment yet, that we knew of."

In addition to the cable runs supported by Fibre Channel—up to 500 meters—Norton was drawn to the flexibility of the system. "Since it's a very open architecture," he says, "expandability is just a matter of adding more hardware. Need more seats, but the switch is full? Add another switch. Need more drives? Add another drive bay. You don't need to re-

place your old hardware with new. You just add more."

Norton says NRG decided on a 16-seat switch to start. "Because of the ease of expandability, we knew that we could always add more later. So we only had to buy enough to cover what we wanted to do at that time. We dropped a Fibre line into every control room, and into every iso booth that was big enough to accommodate a full rig, monitoring and an operator."

The bulk of the system, Levy says, was designed around a configuration utilizing products from Rorke Data, for whom Levy's company is a dealer. Norton adds that Rorke's package included technical support for both software and hardware.

Summing up the system, Norton says it includes a Vixel 16-seat fabric switch, a 12-bay Rorke JBOD chassis populated with 12 36GB Rorke hard drives, a Rorke AIT2 tape backup with 10-slot autoloader, StudioNet volume management and network software, and a Macintosh G4 for backups, administration and transfers. The entire rack is powered through a Fenton UPS.

Levy says the 16-port Vixel fabric switch

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was chosen for its "proven field-worthiness. Once you connect your JBOD chassis, the Mac G4 for admin and an uplink for another switch, you have 10 ports left."

Regarding system capacity, Norton says, "We're running 12 of the biggest drives we could get at the time: 36 GB. There's plenty of storage to go around, plus a samples drive and a couple of spares." The complete set of Seagate 10,000 rpm drives adds up to 512 GB of online storage capacity.

"The system is open-ended," Levy adds. "If you want more storage, you can install 73GB Fibre Channel drives, or daisy-chain another 12-bay chassis to add drives that way. The switch can uplink to other switches in the network—you don't have to throw anything away. Once Seagate releases their 36GB 15,000 rpm drives, we'll go over to those, as the performance is really incredible."

The storage is configured as a non-redundant JBOD (Just a Bunch Of Disks) rather than a RAID (Redundant Array of Independent Drives). "Jay and I decided that RAID redundancy was not worth the extra cost," Levy says, "or managing the extra complexity. NRG has been up for over a year with this system, and I haven't seen the switch or drive-rack fail yet."

While a JBOD provides less security than a RAID for a session in progress if there is a drive failure, the tape drive allows NRG to back up the data for every session. "The tape library has a native capacity of 500 GB," Levy says, "enough to back up the entire JBOD if needed. You can run the ALT2 tape drive at 2:1 compression all day, no problem, increasing the capacity to 1 terabyte. If that's not enough, the library can be upgraded to a 20-slot capacity, for a 2:1 capacity of 2 terabytes. And, if necessary, you can add multiple drives and magazines to push the capacity even further."

UP AND RUNNING

Rorke did the initial setup of the hardware, and trained Norton on the administration and maintenance of the equipment. "It was pretty straight-ahead," he says. "The part we had to do ourselves was to run the fiber-optic cable. Since fiber is optical, there is no interference to or from any other equipment. So we were pretty much open to putting fiber anywhere we thought necessary—and then some. Since I'd already run an Ethernet

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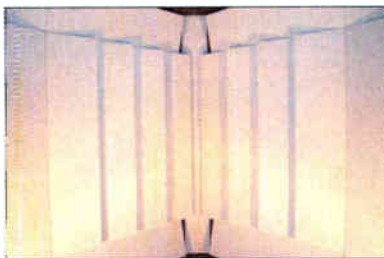
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network in the building, the pathways were defined. But the equipment to prep fiber optics is expensive, so we chose to sub that out to another company."

Once the system was up and running, NRG was able to reorganize its approach to the use of Pro Tools in the rooms. "Users are assigned drives that only they have access to," Norton says, "so their data is secure from others. The data is backed up every morning. If there's a problem, we can restore any file, project or drive, from any given day during their session."

By now, Norton continues, clients have pretty much come to rely on the system. "Clients can go to any station and have access to their material. If there are any problems, the studio is fully involved. Instead of the client's rig being 'his problem,' it's now our equipment and 'our problem.'"

Levy says that as NRG began to use Fibre Channel on a daily basis, the studio started to realize that there were additional benefits to the approach, such as added security of a client's master source material. "When a client leaves the facility, they can take their session on hard drive, AIT or CD," Norton explains. "But we also keep a copy archived in our backup that can be restored at any time. So clients can always request additional backups."

Another benefit, Fibre Channel's expandability, is also making a big difference now that the NRG facility itself is growing. "The studio will be expanding into a second building a block away," Levy says. "It will be relatively easy to link multiple SANs via telco fibers." As a result, people at the two sites will be able to work together as if they were housed in one structure.

Overall, the SAN has brought a more structured approach to NRG's management of files and hard drive media, which have increasingly replaced tapes as the physical embodiment of a session's many long hours of trial and toil. The system also puts NRG firmly in the driver's seat.

"We now service and maintain all our own Pro Tools rigs," Norton says. "All studio staff are trained in their operation. The hard drives are routinely optimized and maintained. The session files are in the studio's possession at all times, and nothing is released until management okays it. The SAN lets the studio be in control." ■

Philip De Lancie is the new-technologies editor at Mix.

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THE STORAGE SLAM

WHEN TECHNOLOGIES COLLIDE

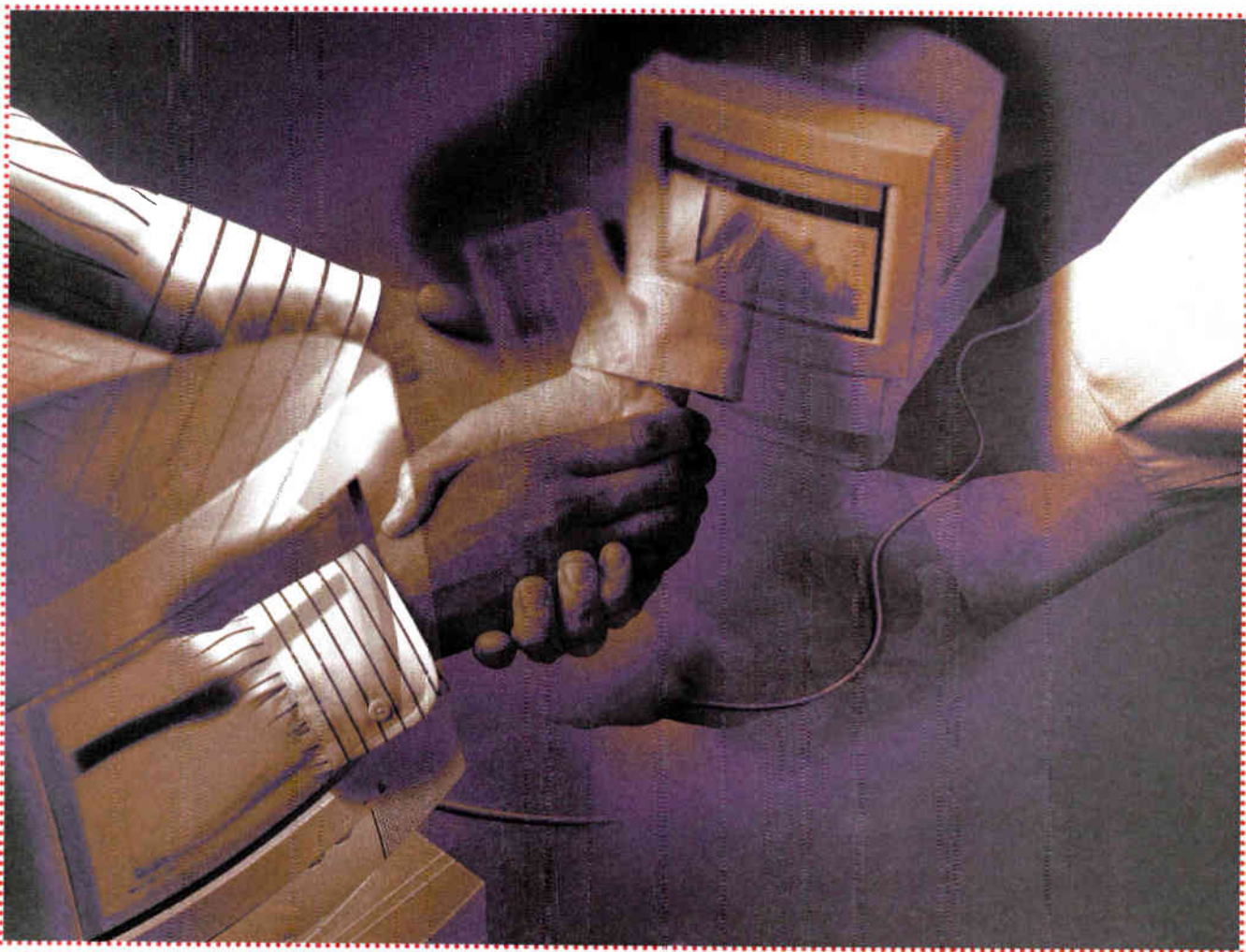


ILLUSTRATION: MAE LAROCBS

If you've been reading "The Bitstream," then you know I try to cover technology that, while not explicitly audio, nonetheless impacts your production environment now or in the near future. The slant for this column is convergence, and this month, the stars are assembled into a rare alignment that permits me to address the converging of several disciplines toward a potent prognostication.

Here are the facts:

- Brocade has debuted the 1200 switch,
- Cisco has debuted the SN 5420 router,
- SNIA has proposed a common HBA API,
- Fibre Channel on the motherboard has arrived,
- I have actually seen FibreToTheHome.

Let's detangle this jargon and see why these five events are important to you. First, the top two items: You have two industry leaders introducing products that promise to support wider ranges of protocols in single boxes than have been seen up to this point. Brocade's 1200 is a director-class switch that just happens to support 1, 2 and 10GB versions of Fibre Channel (FC), but also iSCSI and InfiniBand. A fabric connection from anything to anything: That's radical! Scalability, availability and forward compatibility via modular design means that, like everything else mentioned this month, you'll pay through

the nose for it; but we're talking a tsunami-class sea change comin' over the bow.

Cisco's contribution is, on the face of it, just another (yawn) router. But wait, look closely, and ye shall see that it supports iSCSI along with traditional IP traffic. This means that you can now route your storage traffic with the low cost and ease of management that you'd expect from TCP/IP and the QoS (Quality of Service) you'd typically get from Fibre Channel. Security, long a weakness of basic FC, should improve. However, although iSCSI will, in the long run, win in the storage arena because of reduced cost, FC is the current performance king for storage, and the DVD family is still the broadband

BY OLIVER MASCIAROTTE



SREV1 Remote



SREV1



Time to reflect on reverberation.

In the past, reverbs used IIR (Infinite Impulse Response) algorithms to recreate acoustic environments. They had limited memory and processing power and some did a pretty good job.

But using a FIR (Finite Impulse Response) filter algorithm can more accurately reproduce all the complexities of natural reverberation. The concept is not new but an enormous amount of processing power is required to manage the impulse (sampled) data.

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I don't know about you, but I spend way too much time managing IT resources, and we all like to cut management expenditures. Well, SNIA, the open industry watchdog for networked storage, has proposed a common HBA, or Host Bus Adapter, API that can be shared by the industry. This translates into different HBAs from various vendors all appearing as peers in an IT manager's management application of choice, which is not currently the case. (Each vendor uses some subset of open or proprietary protocols for monitoring and control of its HBAs, so you never know what method will work for a particular product.)

This initiative assumes that, in the long term, vendors will realize that working for their customers is more profitable than working exclusively for their investors [insert OMas mantra here: Open Is Good]. We'll see if the industry embraces the open approach to management, but we can dream, can't we?

For demanding storage applications, like high-density, multi-user media production, networked storage makes fiscal sense. But initial expenditure and reoccurring costs can be daunting. Now, manufacturers have taken a subtle but important step, moving their controller technologies from a plug-in HBA direct-

ly onto the motherboard of workstations and servers. This will reduce cost and power draw while improving reliability. Along with SATA, eliminating an HBA will further shrink the form factor as well.

The last bit of information I'll offer up to you concerns a recent visit to the South of Market Area (SOMA) in San Francisco. I was on my way home from a meeting when I was lured into the lobby of a new condo here in SOMA. To my amazement, the sales mantra included two Cat 5 wires, two coaxial cables and one fiber-optic line. Ye Gods, fiber to the home—think of the bandwidth! This augurs well for the eventual appearance of fiber in every metro area. Granted, this crib was priced in the mid-\$400k range; it damn well better have fiber for that price.

As I said before, you gotta pay to play while the tech is new, but all this stuff will trickle down to you-and-me levels in a surprisingly short time. So, save your newly inflated dollars and stand ready to catch any flying bits when storage technologies collide.

OMas has had a welcome break from attending conferences. He is pleased. This column was created while under the influence of Traffic's classic eponymous work and Marillion's Anoraknophobia. For links, back articles and occasional commentary, visit <http://seneschal.net>.

PEDANT IN A BOX

HBA: Hardware that provides interface services, both at the physical layer and the software or logical layer, between some communication standard and a computer's operating system. Examples are the common PCI or ISA cards that allow you to add Ethernet, 1394/USB, Fibre Channel or RS-422 ports to your existing computer.

API: Application Programming Interface, a set of prebuilt code that allows programmers to circumvent getting their hands dirty with the inner workings of some complex, low-level mechanism. This approach allows communication with the mechanism as an abstract, idealized object with a common, predetermined set of building blocks instead of non-standard, idiosyncratic syntax that changes as the mechanism evolves. An API provides both a vocabulary and syntactical framework over which remote fly-by-wire interaction can occur. APIs are usually provided by vendors to third-party developers so the developer can talk to the vendor's product. Meanwhile, the vendor is free to modify the product, confident that the abstraction layer or translation overlay that the API provides will maintain communication with the third-party product.

Director-class: There are all sorts of interconnect devices for Fibre Channel, ranging from inexpensive, 8-port dumb hubs with spotty QoS and poor availability, to massive, 128-port switches with excellent QoS and bulletproof, 7/24/365 availability. Director-class describes the latter, at the apex of the FC food chain and ready to take on the largest of storage network fabrics.

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STUDIO PROJECTS C1

CARDIOID CONDENSER MICROPHONE

PMI Audio, the USA distributors of JoeMeek and Trident-MTA gear, now offers a new family of studio mics. The line's rather unassuming "Studio Projects" name may be a bit misleading. While the SP mics are inexpensive, their sound and construction quality belie the low price.

All Studio Projects mics are side-address, large-diaphragm condensers of similar construction, and include the cardioid-only C1, the multiple pattern C3 and the T3—a multipattern tube mic.

The C1 is attractive and housed in a heavy cylindrical aluminum case about eight inches long and a little over two inches wide. No roll-off or pad switches are provided. (They are included in the C3 and T3 models.) The mic has a serviceable—if not ultra-rugged—elastic band shock-mount and a nice "flight"-type case. My main complaint with the latter is the rather ugly and irregular cutting of the foam padding in the flight case.

Center electrode microphones with gold-sputtered membranes and transformerless FET circuitry have become almost a de facto standard for this type of microphone. The folks at Studio Projects have wisely stayed with this tried-and-true recipe. Frequency response is listed at 20-20k Hz, self-noise at 17 dB (A-weighted) and sensitivity at -37 dB. Again, typical measurements for a mic of this class. The C1 can handle SPL levels of over 130 dB, a little better than most mics in this category. This allows the C1 to be used in situations that would overload other microphones of this type.

I plugged the C1 into a PreSonus MP20 preamp and recorded a male vocal. My initial reaction was, "I've heard this sound before." What I didn't realize at first was that I was hearing the mic without the usual touch of broadband, upper-end tweak that I typically apply to add a bit of "air"

to lead vocals. Without any tweaking at all, I achieved the desired timbre. Curious about this, I asked my friend Morgan Pettinato at Eastcoast Music Mall to run a TEF analysis on a C1 he had in stock. The resulting graph revealed a smooth, broad and rising curve in the 10 to 12kHz range. The C1 was inherently adding the "air" that is sometimes needed with some other large-diaphragm condenser mics. Lest I leave you with the impression that this mic is overly colored, that is not the case at all. The small upper-range bump is subtle and pleasing—a definite plus in many applications.

An overdub session with a tenor sax let me try the mic on higher SPL sources. Saxophones are often recorded with ribbon mics, but the C1's extended high end and high-SPL handling had me curious. This time, I ran the mic through the JoeMeek Studio Channel VC1QCS, but used the unit's insert jack to bypass its compression/EQ sections to track with the preamp section alone. The VC1QCS utilizes Ted Fletcher's new "current sensing" technology, which matches the mic's impedance to the pre, previously done with transformers.

I placed the C1 about three feet away from the sax, slightly lower than head level, in about the same position I would normally place a ribbon mic. The result was immediately gratifying. The sax came through with outstanding warmth and clarity, and, again, no EQ was needed. Next I tried the mic about six inches from the bell. This produced a biting sound that would be great on rock sessions. Even with this close proximity to a wailing sax, the mic never came close to overloading. The saxophonist—a veteran player in the New Orleans recording scene—repeatedly asked me if he could borrow or buy my C1 test unit!

The Studio Projects C1 lists for



\$300. I purposely saved that bit of information 'til the end of this article. It would be too easy for some people to dismiss this mic based solely on price. On price alone, the C1 is an obvious choice for a small studio on a budget, but more importantly, its excellent sonic quality and high-SPL handling make it a great choice for any studio looking for a quality, large-diaphragm condenser mic—or several.

Dist. by the PMI Audio Group, 23773 Madison Street, Torrance, CA 90505; 877/563-6335 (toll-free); fax 310/373-4714; www.pmiaudio.com. ■

Pete Leoni is the technical director at QPerformance, a division of Eastcoast Music Mall. He can be reached at demotech@qperformance.com.

BY PETE LEONI

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UNIVERSAL AUDIO

LEXICON 960L

MULTICHANNEL DIGITAL EFFECTS SYSTEM, VERSION 3.0

The best thing about software-based effects systems is that they're, well...software-based. By updating software via a new disk, data cart or the occasional download, existing customers can add fresh sounds or new features and keep their equipment up to date without major hardware modifications. Lexicon first implemented the software-based strategy back in the days of the first 224, and the tradition was well-established by 1986 when the 480L arrived; 15 years later, Lexicon still offers updates for its former flagship reverb.

At last year's AES show in Paris, Lexicon unveiled its new champion, the 960L. An impressive performer, both in terms of its powerful, new surround-capable algorithms, the 960L offers an advanced LARC2™ remote and a 24-bit, 8-in/8-out architecture that supports stereo and surround production at up to 96 kHz for broadcast, film, audio post and music applications.

In January of 2001, barely a year after the product was first shown, Lexicon released Version 2 software, which offers support for an additional reverb card (effectively doubling the system's DSP horsepower), along with mappable I/O and 16 I/O support. Additional features include Machine Global Mix and Global I/O control, dual LARC2 support, 4x4 configurations, cascading operations and enhanced input metering—all from a free upgrade CD.

A month ago, Lexicon released V. 2.5 software—another free update distributed on CD—with 100 new factory programs boasting seven newly developed stereo and multichannel delay algorithms. The new software also includes new 96kHz reverbs, surround plate and chamber sounds, and a selection of interesting, useful multichannel and stereo delays—seven banks of new effects in all.

At the 2001 AES show in New York City, Lexicon will unveil Version 3 software—perhaps the most ambitious 960L upgrade to date. Whereas previous updates for the unit focused on routings, hardware support functionality and new sounds, Version 3 significantly ups the ante on the 960L's automation capability, while adding the power of LOGIC7 surround processing.

Developed by Lexicon, LOGIC7 is a sophisticated DSP encode (and consumer playback) system that provides improved multichannel reproduction from matrix-encoded and 2-channel stereo recordings. Beyond the left/right front channels and matrixed center channel, LOGIC7 can offer full bandwidth, stereo rear channels from either surround-encoded or 2-channel sources, as opposed to the mono-only surround derived from Dolby Pro Logic processing on surround-encoded sources. As its "LOGIC7" name implies, the playback process can expand both 5.1 and 2-channel soundtracks for 7.1 and virtual 7.1 channel playback. Pros will appreciate LOGIC7's ability to easily upmix a 2-channel master to 5.1 channels and to downmix a surround master to encoded stereo for playback on any stereo or surround system. This surround-to-stereo-to-surround process is commonly referred to as 5:2:5 or 5:2:7, and offers a useful tool for surround production.

Since Lexicon first unveiled the 960L, with the touch-sensitive moving faders and joystick on its snazzy LARC2 controller, people have wondered why these controllers only exist for editing parameters. In fact, the 960L's automation capability was



limited to receiving MIDI program change messages—hardly impressive from the company that developed pioneering products such as the PCM 70, which offered Dynamic MIDI™ real-time control of effects parameters back in 1985. However, this all changes with the Version 3 software release; the 960L now offers full-blown automation control of all effects parameters, including panning within the surround programs, and the moving faders track moves in real time. The joystick does not move, but any moves are tracked by the cursor within the panning window on the 960L's large display.

Currently, no offline automation data editing is available, but to make automation changes, one merely makes another pass, enters Update mode, redoes the move and simply picks up at the "out" point with the motorized faders, precisely repeating earlier moves. As with all 960L presets and user data, automation moves—defined as SMPTE timecode events, translated via the unit's MIDI Time Code (MTC) input—are stored directly to the 960's internal hard drive as session data and can be archived to floppy disk for long-term storage or moving to other systems.

Version 3 software for the Lexicon 960L debuts at AES; initial deliveries are expected to begin Q/1 of 2002.

Lexicon, 3 Oak Park, Bedford, MA 01730; 781/280-0300; fax 781/280-0490; www.lexicon.com. ■

BY GEORGE PETERSEN



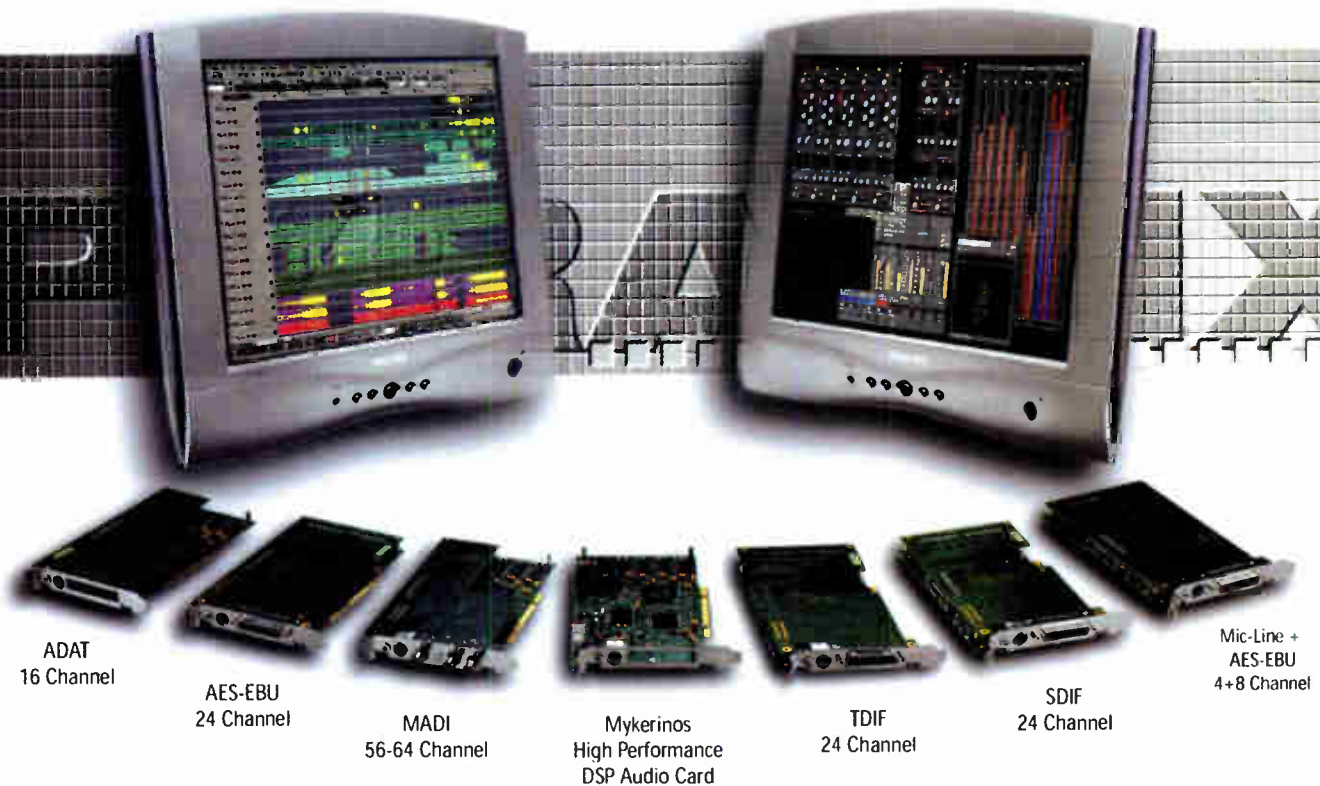
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World Radio History

SONY DRE-S777/PAC

SAMPLING DIGITAL REVERB

There's something very different about this one. A first glance at the classic lines of the Sony DRE-S777's cherry wood veneer front panel—which looks like the dashboard of an old Jaguar (great choice, by the way)—tells you that you're in for a special ride.

Though the DRE-S777 is a digital reverb, the feature that makes it stand out is that it uses real sampled halls and spaces, as opposed to digitally simulated environments. It also offers a sampling option so that users can capture favorite acoustic spaces of their own. A newly developed DSP allows Real Impulse Response (RIR) processing, providing high-speed calculations that re-create natural reverb based on actual acoustic spaces.

The DRE-S777 is a software-dependent unit. Using the front panel CD-ROM drive, users can load a variety of existing acoustic spaces, and user-sampled environments can be loaded from Memory Stick removable media via a front panel card slot. Included with the unit is a CD-ROM with some very good sampled spaces to work with: two halls, two churches, a studio and two plate reverbs.

For more variety, an optional series of sampled halls and spaces from around the world is available. The DASK-S700 Complete World Sample CD-ROM Library (\$930) includes three sampled reverb software packages: European Acoustic Spaces (DASK-S701), American Acoustic Spaces (DASK-S702) and Japanese Acoustic Spaces (DASK-S703). The library offers reverb sample algorithms for a diverse collection of pre-recorded spaces, including well-known recording studios (e.g., New York City's Avatar and Ocean Way in L.A.), concert halls and cathedrals from around the world, some interesting utility spaces (try the Goto Planetarium or Tokyo's Tamanoyu Bathhouse for some "different" sounds) and natural environments, such as Japan's



Kamaishi iron mine and even the Grand Canyon—the latter captured with the help of Paul Winter.

THE HARDWARE

The DRE-S777 is now offered in two versions to suit various user needs. The \$9,000 DRE-S777/2 is a digital-only I/O model (2 channels in/4 channels out, both in AES/EBU track-pair format on XLRs), and is intended for applications where analog interfacing is not required, such as studios with digital consoles. The \$11,500 DRE-S777/PAC features analog I/Os (2 in/4 out) with high-quality 24-bit A/D and D/A conversion, and is ideal for traveling engineers who work on a variety of consoles. The DRE-S777/PAC should also appeal to rental companies, studios with analog boards, and hybrid facilities with both analog and digital mixers that need to move the DRE-S777 between rooms. The DASK-S704 sampling hardware/software option that allows users to sample their own spaces is \$930.

Both the DRE-S777/2 and DRE-S777/PAC models now include the (previously optional) DABK-S703 DSP expansion card, which allows the normally mono-in/stereo-out unit to operate in different modes: stereo in/stereo out; mono in/4-channel out; mono in/stereo out (at 88.2 or 96 kHz); and split in/4-channel out (two sets of mono inputs are output as two sets of stereo outputs). My personal favorite is the split-mode feature whereby two mono inputs drive two sets of stereo outputs (the

popular Lexicon 480 configuration), which allows you to run two different reverbs. You get twice the reverb for the buck.

Other features include 24-bit resolution, 4-band EQ, 92 user preset memories, self-diagnostics, MIDI control, Memory Stick storage and silent (fan-free!) operation. On the rear panel are the digital and/or analog inputs/outputs, word sync in/out on BNC connectors, MIDI In and Out/Thru jacks, AC cord socket, a chassis ground lug and an RS-232 port for maintenance/servicing.

IN SESSION

Loading up the DRE-S777 software from CD-ROM reminds me a lot of a Sony PlayStation. However, the unit does take a while to load: three minutes to be exact! If you're unsure which parameter to hit and accidentally press Load, then you'll have three minutes of waiting while you hold that thought and retain the creativity of the moment. This is the DRE-S777's major downside, but—like a PlayStation—once you're used to the parameters and can navigate around, you are definitely in for an ear candy treat.

The two-rackspace front panel is simply laid out, with one knob for entering parameter data values or selecting presets, four soft keys and a large display window. The window display is easy to use and extremely intuitive. You don't even need a manual to use it. (Not a suggestion, just an example of the unit's user-friendliness.)

The DRE-S777 is well-thought out, and it doesn't have a thousand pa-

BY JIMMY DOUGLASS

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rameters or bells and whistles (like some other digital units), but it has just enough truly useful parameters, like input trim, reverb decay time (variable from 0.3 to 5.5 seconds), up to 500 ms of predelay, peak hold meter settings, wet/dry levels, bypass, mutes and 4-band equalization (with fully parametric mid bands) available for each sampled venue. One reason for the DRE-S777's limited parameter control for adjusting reverbs is that it's based on actual sampled environments, which can be made smaller—useful for keeping large spaces under control—but can't be made

larger. Along with various cute icon images of stages, halls, churches, spaces, etc., the display shows a diagram of the mic and speaker (sound source) placement for each sampled reverb. Users are given the ability to change and adjust these different speaker/microphone placement perspectives: very clever, very useful.

SAMPLING!

Other than the fact that it sounds great, the DRE-S777's self-sampling feature—its ability to actually sample your own favorite spaces—really sets this box apart from any other unit I've used. The sampling option includes a 64MB Memory

Stick, which is used to store reverbs sampled by the user. In addition, this Memory Stick (which is encrypted with a special key) also allows nine "cached" presets to be stored permanently on the stick for quick access. It's actually possible to store from 10 to 15 samples on a Memory Stick, depending on the file size of the parameters used when sampling the room.

One of the DRE-S777's odd redundancies is that it requires Memory Sticks for user storage, yet the front panel has a PC card slot, so the Memory Stick must be placed in a PC card adapter (included with the unit), which slides into the slot. Buy lots of sticks and have fun experimenting.

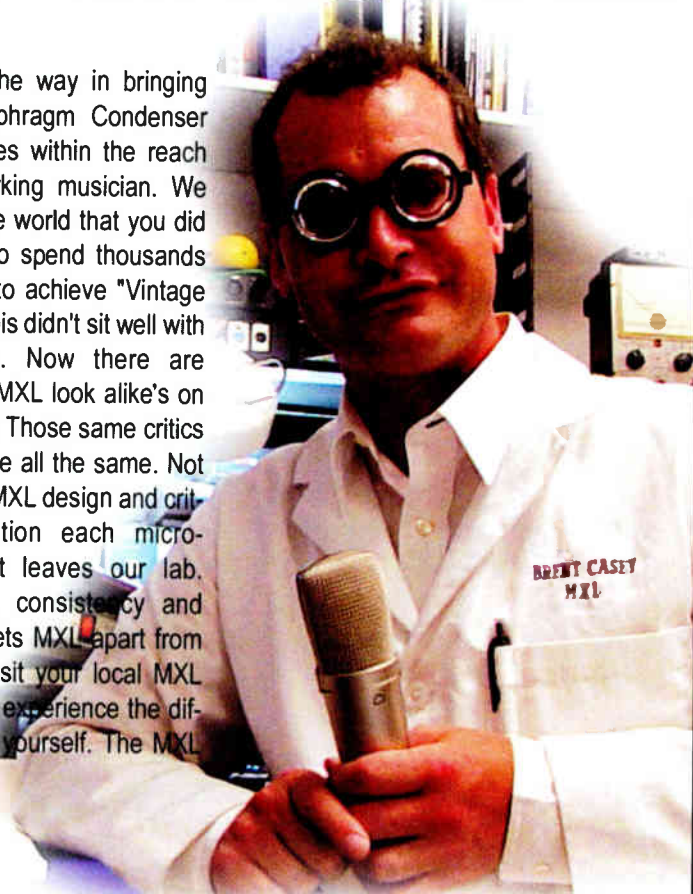
In concept, the sampling process is easy but requires a fair amount of time, some loud SPLs and more time (and pa-

MXL

"YES, THERE IS A DIFFERENCE!"

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Spaces: The Final Frontier

A Sony engineering team traveled the globe to sample actual acoustic signatures from legendary venues. Using a unique "convolution" technique that converts a sweep tone generated at a sampling site into millions of frequency-dependent pulse tones, the team collected a well-defined acoustical footprint for each sampled space, and they are now stored on various CD-ROMs. Priced at \$930 (or \$500/CD separately), the DASK-S700 Complete World Sample CD-ROM Library features three sampling reverb software collections:

DASK-S701: European Acoustic Spaces

- Concertgebouw, Amsterdam
- Grosser Musikvereinsaal, Vienna
- Konzerthaus, Berlin
- Westerkerk, Amsterdam
- Jesus-Christus-Kirche, Berlin
- St. Vincent de Cardona, Cardona

DASK-S702: American Acoustic Spaces

- Avatar Studio A, New York City
- Ocean Way Studio B, Los Angeles
- Enterprise E2, Los Angeles
- Giandomenico Studios, New Jersey
- St. John the Divine Church, New York City
- Grand Canyon, Arizona

DASK-S703 Japanese Acoustic Spaces

- Sedic Audio Studio, Tokyo
- Yokohama Nohgaku-dou Noh Hall, Kanagawa
- Tamanoyu Bathhouse, Tokyo
- Ohya Shiryokan Stone Quarry, Tochigi
- Kamaishi Iron Mine, Iwate
- Goto Planetarium Dome, Tokyo
- Hotaka Mountain Range, Nagano

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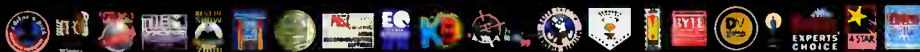
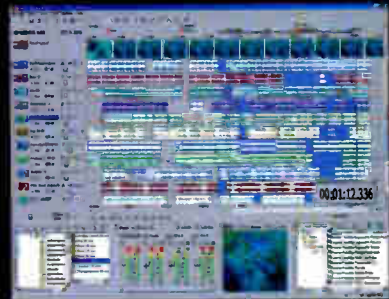
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David Torn - a.k.a. SPLaTTeRcELl - composer, guitarist, producer, and remix artist, is one of the most talented individuals working in music today. His brilliant resume includes solo releases and session work with an amazing assortment of artists - Charlie Clouser (Nine Inch Nails), k.d. lang, Me'shell Ndegéocello, Ryuichi Sakamoto, David Sylvian and Laurie Anderson, just to name a few. David's sounds have also added drama and texture to many feature films, including Traffic, Three Kings, A Knight's Tale and The Score being among his most recent. Learn more about David and SPLaTTeRcELl at: www.galore.com/davidthorn.nsf



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tience) to experiment. I tried to sample the Hammerstein Ballroom in New York City, but between the room's heavy booking schedule and my availability, I didn't have enough time to get exactly what I wanted. Hammerstein would be a good arena to add to the collection of other halls available for the DRE-S777, and once I finish some of my current West Coast projects, I plan to spend a little more time and get it right. However, I do have something sampled on my disk, and even though it wasn't what I would consider the sweet part of Hammerstein, it's, nonetheless, still a

useful space and I now have a sampled space that no one else has.

TAIL OUT

There are plenty of useful spaces in the CD-ROM library (see sidebar for complete list), but I fell in love with the Giandomenico Studio. Originally a movie house in the 1920s and 1930s, it was later turned into a photographic studio but was a popular site for recording classical music, with a full, fairly bright ambience. I understand the building has since been torn down, but its ambience is now preserved forever on disk in the DRE-S777.

Will the DRE-S777 change your life?

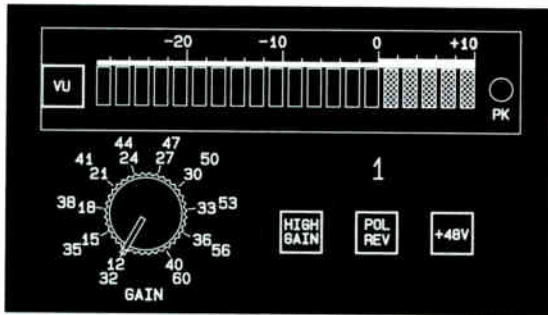
Probably not, but it does make you want to go and find more things to use reverb on. With this machine, the old days of smooth, round, warm reverb have returned. Did I mention that it sounds great? Well, it sounds awesome. It is amazingly quiet—no complaints here. The sound of the halls and churches is supreme. To an old-skool fool like myself, if I hadn't seen it with my own eyes, you couldn't have convinced me with my own ears. The algorithms are so smooth. The sound is warm—yet clean—without any of that digital brittleness usually associated with digital reverbs.

Now that I've used this box for a while, I don't think Sony will ever be able to get it back from me. This one's a keeper!

Sony Professional Audio, 1 Sony Drive, Park Ridge, NJ 07656; 201/930-1000; fax 201/358-4907; www.sony.com/proaudio. ■

Jimmy Douglass is a New York-based producer/engineer whose recent projects include Gimwine and Missy Elliott in 5.1.

**M-1
MICROPHONE PREAMPLIFIER**



(Actual size)

Excellence

Since 1987 the M-1 mic preamp has been impressing artists, engineers and listeners around the world. Typical comments: "Whoa!" "Even the producer could tell the difference." The audio circuitry is simple, elegant and superior:

- **Jensen JT-16-B mic-input transformer**, Jensen's best mic-input model. If you thought transformers were a compromise, you haven't heard this one!
- **990C discrete op-amp** provides extremely low input noise, excellent output characteristics and superior sonic performance. Class-A operation.
- **No coupling capacitors in the signal path.** Capacitors degrade the signal. Transformerless circuits need them. Cheaper circuits use them. Not the M-1.
- **VU-1 LED meter option** (shown) provides great metering where you really need it.
- **Jensen JT-11-BMQ line-output transformer option** (Jensen's best).
- All push-buttons are LED backlit, dimly when off, brightly when on. Channels and options can be added later. Much more. 15-day trial period. Experience **excellence!**



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Ask about the Jensen Twin Servo® 990 mic preamp!

Phone: 847-864-8060 P.O. Box AA631 Evanston, IL 60204 Fax: 847-864-8076

**Spec Sheet:
Sony DRE-S777/PAC**

DSP

Reverb Algorithm: Real Impulse Response
Reverb Time: 0.3 to 5.5 seconds
Reverb Predelay: 0 to 500 ms
EQ Type: 4-band, ±12 dB

HF Shelving, 2 to 19 kHz
MHF Parametric, 640 to 12.4k Hz (Q=0.1-4)
MLF Parametric, 52.6 to 1k Hz (Q=0.1-4)
LF Shelving, 5.1 to 420 Hz

DABK-S701 A/D Converter

Input Impedance: 10k or 600 ohms
Dynamic Range: 110 dB
Signal/Noise Ratio: 110 dB
THD: 0.005% (-20 dBFS)
Nominal/Max Input: +4/+24 dBu
Crosstalk (@ 8 kHz): 90 dB
Bandwidth (44.1/48 kHz): 20 to 20k Hz (+0.2/-0.3 dB)
Bandwidth (88.2/96 kHz): 20 to 40k Hz (+0.2/-0.3 dB)

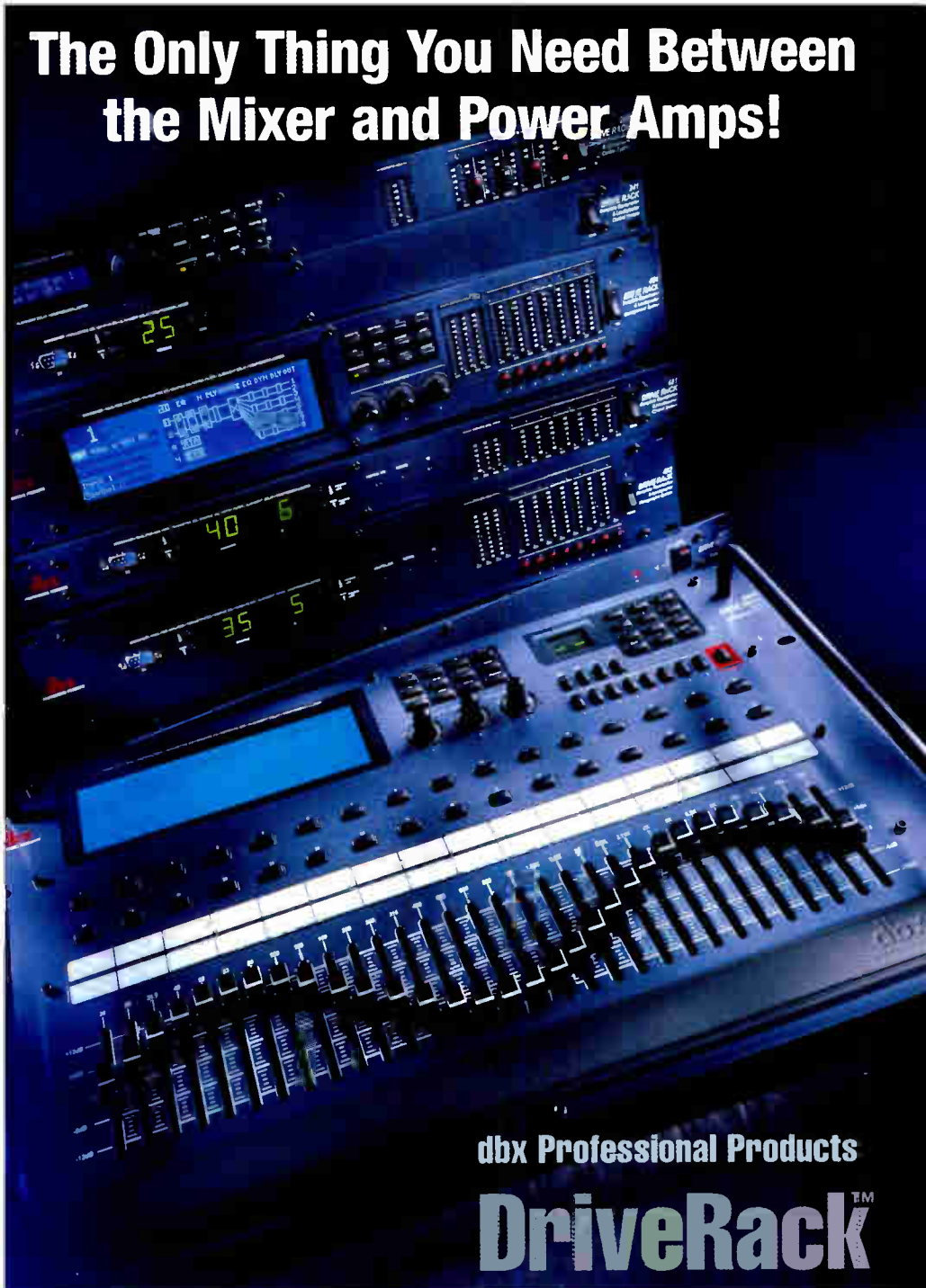
DABK-S702 D/A Converter

Output Impedance: under 50 ohms
Dynamic Range: 110 dB
Signal/Noise Ratio: 110 dB
THD: 0.015% (-20 dBFS)
Nominal/Max Output: +4/+24 dBu
Crosstalk (@ 8 kHz): 90 dB
Bandwidth (44.1/48 kHz): 20 to 20k Hz (+0.2/-0.3 dB)
Bandwidth (88.2/96 kHz): 20 to 40k Hz (+0.5/-0.6 dB)

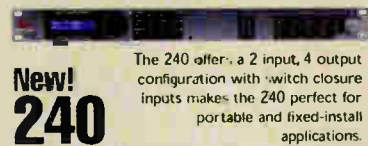
Dimensions

Size (in inches): 19x3.5x20.4 (WxHxD)
Weight: 33 lbs., loaded

The Only Thing You Need Between the Mixer and Power Amps!

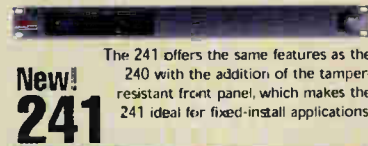


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New!
240

The 240 offers a 2 input, 4 output configuration with switch closure inputs makes the 240 perfect for portable and fixed-install applications.



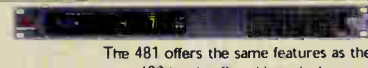
New!
241

The 241 offers the same features as the 240 with the addition of the tamper-resistant front panel, which makes the 241 ideal for fixed-install applications.



480

The 480 is the flagship piece in the DriveRack line. Its 4 Input, 8 Output XLR configuration and full network capabilities allows it to manage virtually any loudspeaker system.



481

The 481 offers the same features as the 480 but is offered in a single-space chassis with Euroblock connectors and a tamper-resistant front panel.



482

The 482 offers the same features as the 480 with a tamper-resistant front panel, making it ideal for permanent install applications.



480R

The 480R is the master remote controller for the 480 Series DriveRack products. All aspects of any 480, 481 or 482 can be controlled by the 480R.

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480 Series DriveRack™ Features

- 4 Inputs and 8 Outputs
- 31-band graphic or 9-band parametric equalizer on every input (pre-crossover)
- Dual Real Time Audio Analyzers (on inputs 3&4)
- Butterworth, Bessel or Linkwitz-Riley crossover filters
- Multiple Crossover Configurations
- Time Alignment and Transducer Alignment Delays
- Compressor/Limiter on every output
- Speaker Compensation EQ (post crossover)
- Multi-level Security System
- Separate House and Show EQ with individual lockouts
- Triple redundant back up of all parameters when running network, 480R or PC GUI
- TYPE IV™ A/D Conversion System

240 Series DriveRack™ Features

- 2 Inputs and 4 Outputs
- 31-band graphic or 9-band parametric equalizer on every input (pre-crossover)
- Butterworth, Bessel or Linkwitz-Riley crossover filters
- Multiple Crossover Configurations
- Time Alignment and Transducer Alignment Delays
- Compressor/Limiter on every output
- Speaker Compensation EQ (post crossover)
- Multi-level Security System
- TYPE IV™ A/D Conversion System
- Switch Closure Inputs

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 World Radio History

APOGEE ELECTRONICS TRAK2

MIC PREAMP/DIGITAL CONVERTER SYSTEM

Since its very beginnings, Apogee Electronics has been on the leading edge of pro audio. More recently, the company has become a premier supplier of outboard converters for discriminating users.

Apogee has included preamps in stereo A/D converter boxes for at least a decade, but with Trak2—its latest offering—Apogee has delivered a world-class stereo preamp paired with an

standard are wordclock/video sync I/O and a com port with a breakout cable for serial communications, and MIDI In/Out/Thru for remote control via a free Trak2 Remote Control application for Mac computers running OMS. In addition to the onboard AES-S/PDIF output, two Apogee Multimedia Bus (AMBus) slots accommodate a variety of cards for directly interfacing with Digidesign Pro Tools, Alesis ADAT,

you've set preamp parameters (gain/pad, phantom in/out, polarity reverse, HP filter, desired routing, DSP options, etc.), operation is mostly set-and-forget, and users can store frequently used settings in memory.

The built-in, high-output headphone amp is useful, and will especially be appreciated in location recording situations where you need to make sure everything's flowing



equally amazing 24-bit/96kHz ADC. Retailing at \$3,995, Trak2 also includes a host of signal processing functions: Soft Limit™ overload protection, Soft Saturate™ analog tape compression effect, the Apogee low-jitter master clock, and Apogee's industry-standard UV22HR™ bit reduction for retaining the punch of 24-bit signals when storing audio at 20 or 16 bits. Going a step further, Trak2 offers more I/O and routing options than some digital consoles on the market.

The front panel has a backlit LED menu display, simple cursor key/datawheel entry, LED status indicators, two ¼-inch/XLR Neutrik Combo aux inputs (line- or instrument level) that doubles as a hi-Z stereo direct box, a headphone output and 22-segment LED meters.

On the rear panel are two XLR mic "send" jacks that route the analog output from the preamp to external devices such as a tube limiter. Two XLR line inputs can either receive outputs from a console or act as returns from the preamp sends above. Also stan-

Tascam TDIF, SDIF-II, SSL HiWay and others. Another option is a 2- or 8-channel D/A card expansion slot, providing high-quality D/A conversion for mixing/monitoring from any source connected to the AMBus slot. Connectivity is *not* an issue here.

This is no ordinary preamp, and using the Trak2 requires a brief adjustment time. However, despite its menu-driven operation, navigating through the function pages is a straightforward process that can be mastered in minutes. Four cursor keys and a push-to-click datawheel take the user through various setup and operation menus. Navigation is easy, although some moves require a lot of button pushes. With this in mind, Apogee provides two Quick Keys for jumping to frequently used screens, and there are some hidden shortcuts (various presses of multiple cursor keys) that speed things along—assuming you can remember the shortcut. Fortunately, once

properly. Unfortunately, the only way to get to its volume is via the headphone menu, so rapid changes aren't its forté, but on the plus side, pushing both Quick Keys takes you right to the headphone menu.

IN USE

Over a period of months, on all sorts of sessions, Trak2's versatility and impeccable audio performance impressed me. The preamps are clean and transparent, with tons of headroom and a 90dB gain range that was an ideal match for my low-output Royer ribbon mics. The preamp's response is uncolored, but if you want a little more personality, the Soft Saturate analog tape emulation adds smooth, warm compression without being overbearing. I really liked the Soft Saturate for laying bass guitar tracks to disk using the auto-input-sensing, front panel DI inputs. The Soft Limit feature does a great job of removing the worry from digital overloads, particularly when tracking unpredictable sources (like all the

BY GEORGE PETERSEN

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TSM-300 Near Field Studio Monitor

In keeping with our philosophy of providing state of the art speaker technology for today's uncompromising professionals, TAD/Pioneer introduces the next step in the evolution of Near Field Studio Monitoring Systems... models TSM-300.

Utilizing Linear Power Response design woofers (edgeless) and a titanium HF driver with tractrix "AFAST" horn, the TSM-300 reproduces sound with clarity and imaging not thought possible in a compact size speaker system.



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World Radio History

FIELD TEST

bands I work with), but it's just amazing when creating huge, in-your-face pop or rock mixes.

Clearly, Trak2 is no lightweight—especially in terms of its 14-inch depth and massive heft. Even after extended periods, the unit runs fairly cool, thanks to massive heat sinks and a small internal fan, which is barely discernible in the quietest of control rooms. The meters are fast-acting and switchable to various ballistics, scales and peak hold options. They can also be selected to operate as phase meters, which is a great resource for tracking stereo sources

or mixing. Nice!

Apogee is best known for its digital converters, and Trak2 does not disappoint. The 24-bit A/D (117dB dynamic range) converter can run at 44.1, 48, 88.2 and 96 kHz, while its noise floor is absolutely nonexistent. This, combined with its versatile routing to any of its digital outs, award-winning UV22HR processing, low-jitter clocking and high-performance preamp, makes this a studio powerhouse for the small or large facility.

Apogee Electronics, 3145 Donald Douglas Loop South, Santa Monica, CA 90405; 310/915-1000, fax 310/391-6262; www.apogeedigital.com. ■

If your tuner could talk:

"Oooops!
A little flat...
Now a little sharp...
Yeah!... NO, wait...
Flat again...uh...
Still flat...
Nope, back to sharp...
...Aw, that's close enough."



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The affordable new Peterson VS-1™ tuner with *Virtual Strobe Technology™* gives you the clear, instantaneous response you need to quickly achieve perfect tuning...and the great sound that comes with it. The inaccuracies, overshooting, and jittery displays of other digital tuners are *history!*

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SPEC SHEET: APOGEE TRAK2

Preamp

Gain/attenuation range:

-90 to +90 dB

Gain steps:

0.5/1/2/3/4 dB (user defined)

Inputs:

mic/line/instrument
(switchable)

Phantom power:

+48VDC, auto sensing

Tweaks:

-20dB pad, phase
40/90Hz HPF

Sends:

balanced/unbalanced,
+28dBu gain adjust

Returns:

balanced/unbalanced,
+4 dBu or -10 dBV

Digital I/O

ADC Connections:

Built-in AES-S/PDIF out with two AMBus slots supporting multiple formats, including Pro Tools, ADAT, TDFI, SDIF-II, etc.

Sampling:

44.1/48/88.2/96 kHz

Output:

24-bit, with 16/20-bit support via UV22HR

Optional DAC:

2- or 8-channel
24-bit/96kHz

Crystal:

44.1 to 96 kHz

Wordclock I/O:

44.1 to 96 kHz

Internal Clock:

Apogee Ultra-Low Jitter circuit

General

Headphone amp:

40-watt

Video:

optional sync to NTSC,
PAL and B&W video

Control:

MIDI In/Out/Thru and
RS-232 serial

DSP:

Soft Limit, Soft Saturate,
DC removal from
digital inputs

Dimensions:

19x1.75x14 inches (WxHxD)

DPS24 Digital Personal Studio



24 reasons why it's the professional choice

1. 24-track digital audio workstation
 2. 16/20/24 bit recording for CD and DVD-A applications
 3. 32 to 96kHz sampling rates for variable bandwidth
 4. No data compression for artifact-free recording
 5. Sample-accurate, multi-channel graphic waveform editing
 6. Intuitive, multi-mode edit suite features time-stretch, pitch-shift, normalize, reverse, BPM matching & fast transport/edit control
 7. 44-channel/20-bus digital audio mixer with 8 subgroups & 4 stereo FX returns
 8. 28 balanced analog inputs
 9. Balanced inserts on inputs 1-4 enable direct A/D converter connection for external mic pre's
 10. Dynamics processor (compressor, limiter, and noise gate) for all 44 mixer inputs plus L/R master
 11. Q-channel™ automated multi-function channel strip
 12. 100mm motorized Q-touch™ capacitive-touch faders controlling 5 fader banks
 13. Built-in dynamic & scene mixer automation.
 14. Q-Link Navigation™ for fast, one-step movement to all major functions
 15. Powerful 56-bit/4 channel multi-FX processor with realtime vocal pitch-corrector
 16. Multi-angle LCD pod with 6 Q-knobs™ for realtime FX auditioning & control
 17. FX library stores custom presets for instant recall
 18. Talkback mic enables uninterrupted headphone & studio bus monitoring
 19. Footswitch port supports ADAT™ LRC remote
 20. 30 Gb internal IDE HD plus built-in 5.25" drive bay with CD recorder option
 21. Wide-SCSI option for external data storage devices
 22. Three expansion slots for high-speed interface & control capability
 23. 5.1 surround mixing* and monitoring
 24. USB interface for PC running Akai ak.Sys control & networking software with TrackView display
- *Future software upgrade



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World Radio History

NEUMANN D-01 SOLUTION D

DIGITAL MICROPHONE SYSTEM

At last, the final component in the recording chain is digital. However, in order to realize the dream of a digital microphone, two major problems had to be solved, and that has taken some time. The first requirement was a converter capable of doing justice to a mic capsule. It was 70 years ago when Georg Neumann perfected the condenser capsule and at once eliminated the mic as the weak link in the recording chain—at least in terms of dynamic range. That remains true today, even in digital systems. The industry also required standards for creating, controlling and transmitting digital signals. Now it appears that both of these problems have been solved, and Neumann is again leading the way with what they call “Solution D.”

There have been previous digital microphone attempts; some of them started before the ink was dry on the AES/EBU digital signal transmission standard. The method is obvious: Place a preamp and A/D converter inside the mic body. There are several reasons why this does not work well.

First, mic capsules have a dynamic range of at least 125 to 135 dB, while 16-bit converters are capable of only 98 dB at best. Just which portion of the capsule's range needs to be converted depends on the sound source. A preamp gain setting that works for distant pickup of a classical trio will overload when the mic is placed near the bell of a trumpet. This is why recording consoles have a mic preamp gain trim—a control not available on the preamp in previous digital mics.

Second, there is a clocking problem. All the converters need to be synchronous. This usually requires some sort of house clock, but there was no way to send that upstream

to the mic. It would be possible to have all other components in the system sync to the mic, but this only works if there was just one mic. Alternatively, we could resample at the console end and let the sources run asynchronously, but that is a lossy step with some sonic penalties, and, even worse, it requires a certain amount of latency, which adds phasing and delays that we would rather not deal with.

Finally, we end up with a mic that is not truly digital. The preamp

and converter have imperfect analog stages, especially the high-gain mic preamp. Generally, as the gain boosting increases, a preamp's sonic fingerprint becomes more audible. Mic preamps tend to be the most-colored stages in a recording console and typically have gains from 30 to 60 dB. These circuits would have to be even less than ideal when you consider that they're designed to work within the voltage and current limitations of a remote power source. On top of that, current converters have 24 bits of resolution at best, and that is usually



BY JOHN MONFORTE

M3D

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Control the vertical
Control the horizontal



**...right to the outer limits
of sound reproduction.**

**Introducing Meyer Sound's new M3D Line Array Loudspeaker System –
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BroadbandQ™ Directivity Control marries a remarkable new high-frequency REM™ (Ribbon Emulation Manifold) and Constant-Q horn with our award-winning low-frequency directional control technology. The result is consistent 90-degree horizontal coverage from 35 Hz to 18 kHz with more low-frequency power than any other line array system.

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Self-Powered Integration – Meyer's proven 4,800-watt four-channel amplifier with proprietary, phase-corrected processing powers the M3D. RMS™ (Remote Monitoring System) interface is fitted as standard.

Interested? Call us for a brochure and the name of your local representative. And check out www.meyersound.com/m3d. There's lots of information there...

**The M3D with BroadbandQ technology.
Taking the line array to the outer limits of sound reproduction.**

- Self-powered, quick to set up
- Arrayable vertically and horizontally in multiple columns
- Captive QuickFly™ rigging with custom CamLink system
- RMS™ (Remote Monitoring System) standard
- Immensely powerful

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Berkeley, CA 94702
Phone: 510-486-1166
Fax: 510-486-8356

**Meyer
Sound**
www.meyersound.com/m3d

only on paper anyway. Practical products available today have a range that is around 100 to 115 dB, not nearly enough to pass along the extraordinary range of a condenser capsule.

HOW IT WORKS

With its Solution D system, Neumann proposed a revolutionary approach to converting a capsule's signal that does not rely on intermediate analog stages and is not limited to present-day PCM standards. In order to capture the full dynamic range of the capsule, two delta sigma converters are employed that share the dynamic range of the capsule, as shown in Fig. 1. The capsule feeds one converter through a nonlinear network that is transparent to high-level signals. The capsule also feeds an amplifier that boosts the signal 24 dB for detection by a second converter dedicated to the low-level portions of the signal. The amplifier and nonlinear network are incorporated in a feedback loop that ensures that, no matter how imprecise this network may be, whatever portion of the signal that is not sifted out to the high-level converter will be unconditionally sent to the low-level converter. Figure 2 shows the resulting wave shapes and what they look like once combined.

Once in the digital domain, the two converter outputs are summed, with the high-level converter's noise gated out. Both converters are in play the entire time. The advantage of this approach is providing a seamless hand-off between the two paths, while avoiding any distortions that would result from switching between two converters. The resulting signal has an astonishing resolution of 28 bits.

Figure 3 shows the spectra of the component signals and the net result. While each component is highly distorted, this distortion is fully predictable and completely canceled after summation.

THE DIGITAL ADVANTAGE

Besides eliminating the sonic colorations

Figure 1: How signal passes through the Solution D system.

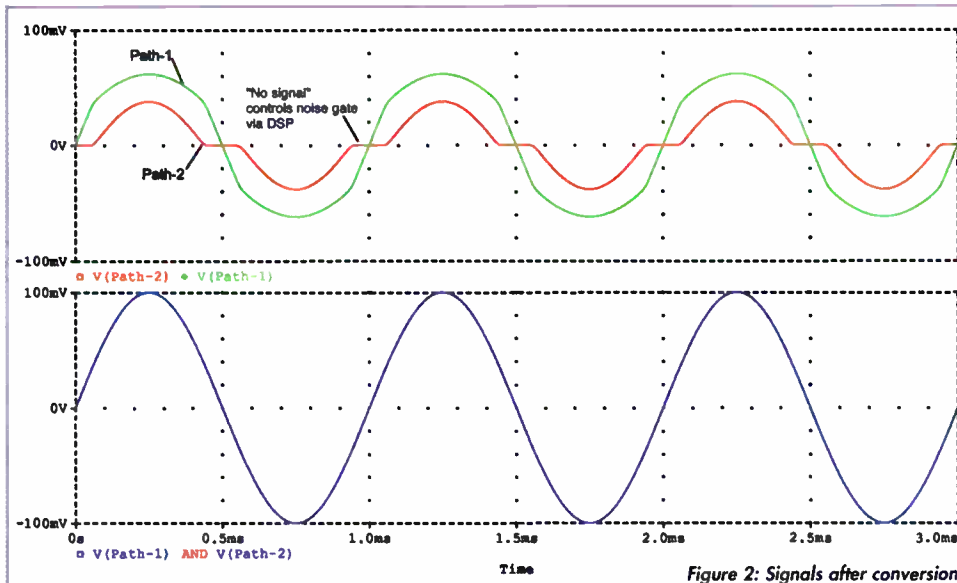
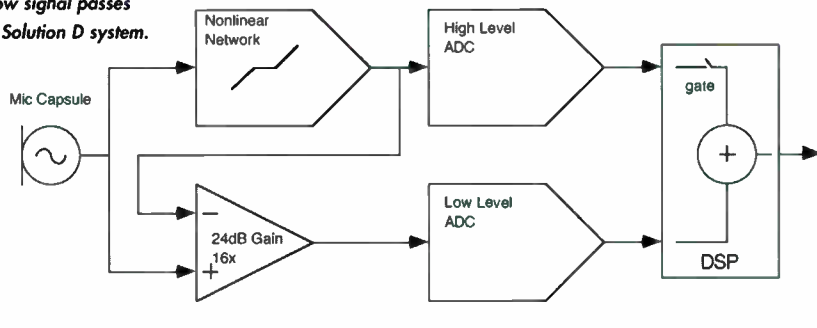


Figure 2: Signals after conversion

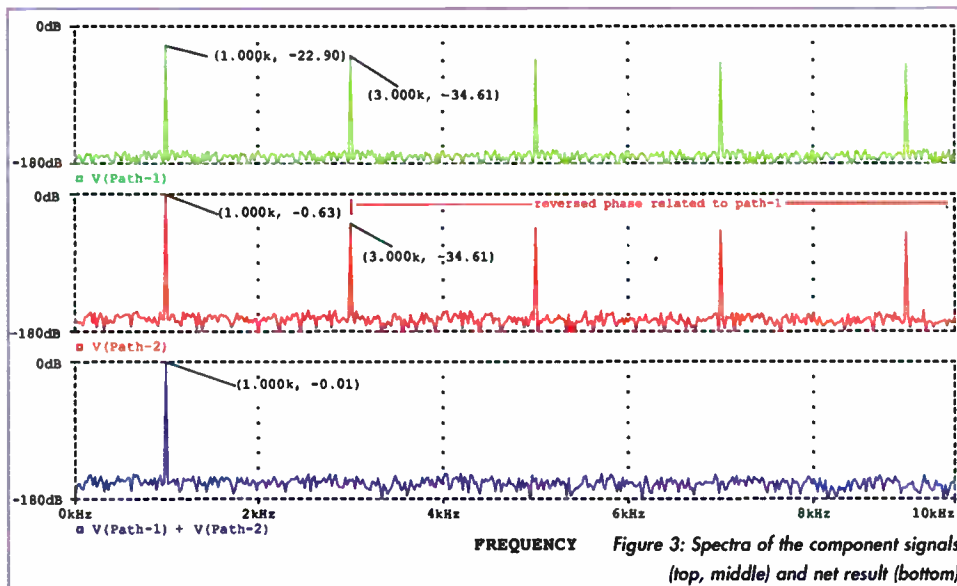


Figure 3: Spectra of the component signals (top, middle) and net result (bottom)

of a mic preamp and removing the possibility of noise pickup in the interconnections, there are other benefits to a digital mic. Most obvious are the cost savings from eliminating mic preamps and A/D converters in the console. Depending on the specific console architecture, this could represent a significant savings.

Another useful feature is the ability to include some simple DSP functions in the microphone itself. Certainly, the standard features such as gain, low cut and pattern selection could be implemented. The processing can also include a signature response curve designed for a particular broadcast station or talent. It would also

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be possible, with a dual-diaphragm capsule, to derive a polar pattern that is, say, omni at low frequencies but gradually changes to cardioid at high frequencies. I sure could use that one! Peak limiting or compression could be inserted there, and anyone who records live would be interested in a clip-proof channel. Other applications are possible outside of music recording. A noise-canceling mic can be derived with much more control than has previously been possible, for instance.

Stereo mics can include M-S processing. Ambisonic arrays (such as in the Soundfield mic) can be realized inexpensively and with greater accuracy. As with any new technology, we may not yet be aware of the "killer app," but the hooks are there to implement ideas we have not yet considered.

The AES 42-2001 standard (which Neumann participated in creating) offers other advantages as well. The signal sent downstream is in the familiar AES/EBU signal (aka AES3) format—a stereo signal containing status and user bits. These bits can be utilized to tell the receiver what mic is present. This tells the console what sort of control is available in that particular model of mic. From this data, the console knows what the mic's set-

tings are. The bits can also indicate if the mic is synched and ready. Because the data is stereo, a mono mic could send pre- and post-processed signal versions to separate inputs, or deliver each side of a dual-diaphragm capsule to independent tracks, allowing its pattern to be adjusted after recording.

The AES 42 standard provides for powering the mic and its circuitry with a common-mode DC voltage that is placed on the cable. Also included is a common-mode AC signal, which consists of data that can be used to control the mic from the console end and even provide a tally that indicates when the mic is live.

Contained in this upstream data is the signal that allows the mic to sync with the recording system. Rather than send the actual clock itself, which could be significantly degraded after passing through the cabling, an 8-bit data word is sent that describes the amount of error in the mic's clock. The microphone then interprets this to adjust its own clock accordingly. This allows for very low jitter—less than 1 picosecond in the audio range. Figure 4 shows one possible implementation of the standard.

Although the capacity of the upstream channel is limited, it is possible to use it when the mic is off-line to program spe-

cialized DSP functions in the mic. The specialized functions mentioned previously can be sent to the mic, as long as they are within the processing capability designed into that particular microphone model.

THINGS TO COME

Release of the D-01 mic is imminent. In addition to implementing the digital technology, its all-new capsule design represents the cutting edge in dual-diaphragm mics. Other digital models are sure to follow. Neumann is also providing an AES 42 interface (the DMI-2) and remote-control software (RCS), which will be necessary until compatible console inputs become available.

Clearly, the D-01 represents an important first step in advancing digital microphone technology, offering the promise of powerful, new tools that could change the way we record.

Neumann USA, 1 Enterprise Drive, Old Lyme, CT 06371; 860/434-5220; www.neumannusa.com. ■

John Monforte lives in the virtual world at www.personal.umich.edu/~monforte/, where you can find audio, semiconductor design, holography, vintage tractors and more.

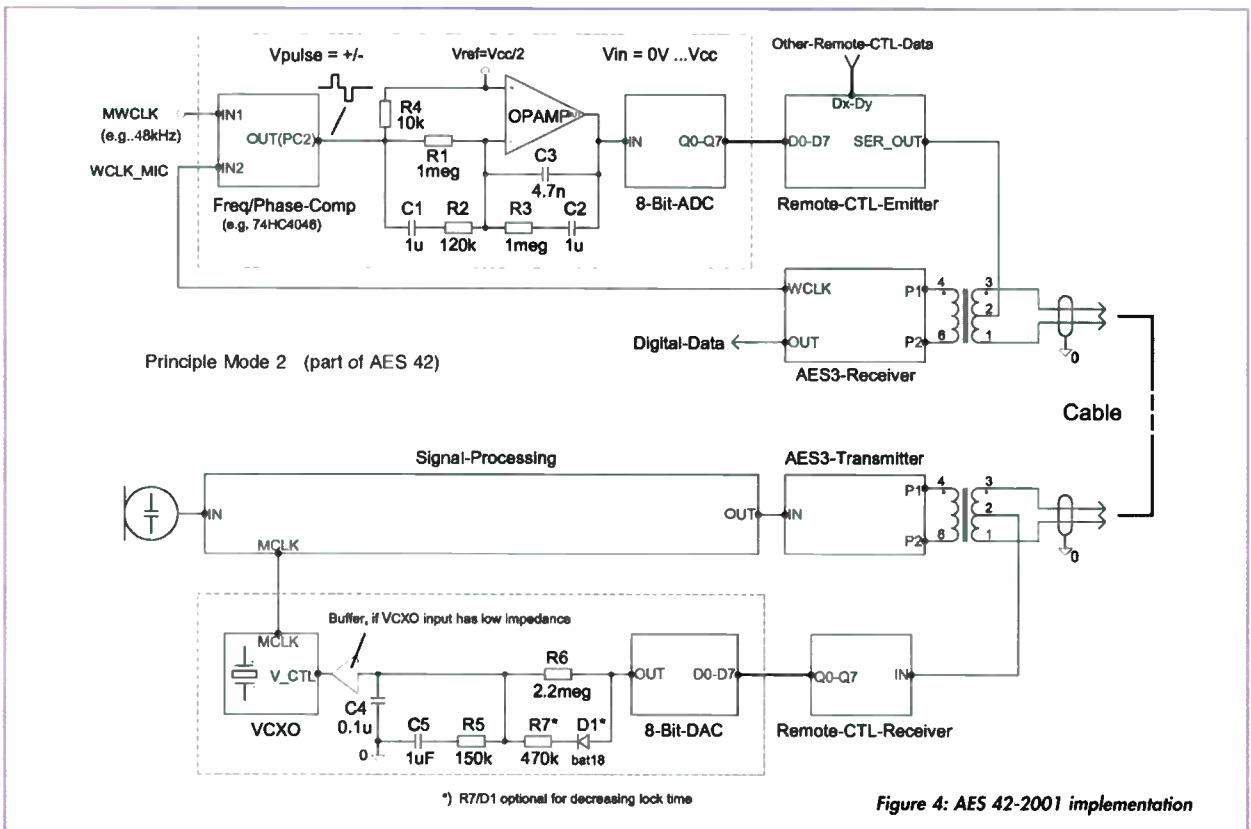


Figure 4: AES 42-2001 implementation

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World Radio History

YAMAHA SREV1

MULTICHANNEL DIGITAL SAMPLING REVERB

The rapidly decreasing cost of DSP power over the past few years has allowed for the evolution of a new breed of reverb: the digital sampling reverb. The technology is called "convolution processing" and entails taking sonic "fingerprints" of acoustic spaces by measuring the impulse response of the environment, similar to "shooting" a room for acoustic measurement. Time-stretched pulses are recorded via carefully placed microphones, and the resultant impulse-response data is used to "convolve" the characteristics of the recorded environment onto any audio signal. This way, in theory, the reverberant tone of any previously measured space—from the Taj Mahal to a Gold Star echo chamber—can be made available for use in a recording studio environment. The SREV1, Yamaha's first offering in the brave new world of sampling reverbs, ships with a CD-ROM containing preset reverb programs of some well-known venues from around the world. These include the Concertgebouw in Amsterdam, King's College Chapel at Cambridge, Avatar Studios in New York, and Cello in L.A., among others. Yamaha has plans for a CD-ROM library to be released in the near future.

A 3U rackmount unit, the SREV1 can be used as a stereo reverb or as two fully independent 2-channel reverbs with separate inputs, outputs and program settings. The unit also has a 4-channel mode for surround applications. Thirty-two of Yamaha's new convolution chips provide the necessary horsepower for the unit, allowing for a maximum of 5.46 seconds of reverb time per channel in 2-channel mode, or 2.73 seconds in 4-channel or 2-channel x2 mode. Yamaha also makes an optional expansion board (DB-SREV1 DSP) that doubles the reverb times in all modes.

The SREV1 features 24-bit I/O, 32-bit internal processing with 48kHz internal wordclock. External wordclocks of 44.1 kHz and 48 kHz are



supported and can be sourced via the dedicated BNC wordclock input, AES inputs or card slot inputs. Unfortunately, the SREV1 is not 96kHz-capable, a definite strike against it for potential users now working in a 96kHz environment or those looking to enter that realm in the near future.

Up to four SREV1s can be linked serially and controlled using the optional RC-SREV1 remote controller, which features a 320x240-dot graphical display with fluorescent backlight, adjustable brightness and contrast, and four motorized faders for parameter editing. Two AES/EBU inputs and outputs are built in, and two mini YGDAL (Yamaha General Digital Audio Interface) slots offer various analog and digital I/O options (AES/EBU, ADAT, Tascam). Inputs can be assigned to channels individually, allowing various input/output configurations.

Measured impulse-response data are combined with variable parameters, such as reverb time and initial delay, to form reverb programs, which can be stored either in Quick memories or on the Internal Card or PC Card. Up to six programs can be stored in Quick memory in 2-channel or 4-channel mode; 12 in 2-channel x2 mode. Programs in Quick memory can be recalled instantly via the RC-SREV1 remote or by MIDI program changes. Projects, which contain all of the Quick memory programs and the

current program settings, provide a convenient way to manage programs and settings for a particular job. Projects can be stored on the Internal Card or PC Card.

Program editing is handled at two levels: Main parameters and Fine parameters. In the Main parameter mode, channel parameters, such as reverb time, initial delay, reverb balance and EQ, are grouped so that main parameters can be tweaked simultaneously. Fine parameter editing adds pre-convolution 4-band PEQ, post-convolution 4-band PEQ and impulse-response data loading. Reverb parameters can be edited individually or grouped. Reverb balance and reverb level parameters for each channel can be controlled individually via MIDI control data.

THE ARCHITECTURE

The architecture of the SREV1 is pretty straightforward and intuitive. The RC-SREV1 control surface displays the various program, parameter and utility pages, along with system status and signal level meters. In addition to showing parameter values numerically, reverb and EQ parameters are displayed graphically. The program title is displayed prominently, and each page is divided via tabs. In 2-channel x2 mode, two numbers and titles are displayed: one for program A and one for program B. Program numbers appear only when programs are recalled or stored in Quick memory

BY WALT SZALVA

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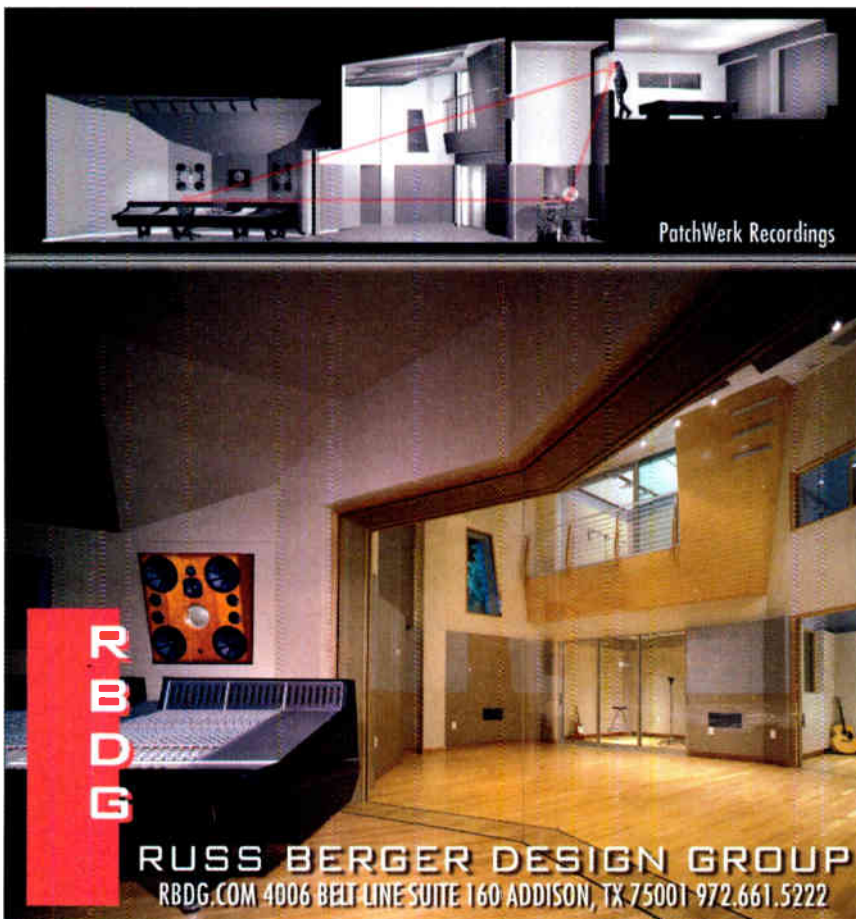


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and do not appear when they are loaded externally from a drive.

The various pages can be scrolled through with up/down and left/right cursor keys. Parameters can either be adjusted by the four faders (as assigned to their respective parameters) or with a shuttle wheel. Buttons marked +1/-1 located close to the shuttle wheel allow for incremental fine adjustments. Lately, I've been using a couple of pieces of gear with touch screens, so when I first powered the SREVI up, I began by touching the various menu tabs; at the top of my wish list would be a touch screen interface. However, I found the control surface to be very responsive and easy to use. The graphic representations of curves and slopes were clear, and parameter changes were visually updated very quickly. Within a few minutes of setting the unit up, I was effortlessly cruising through the menu hierarchy.

Pages are grouped as Program, Parameter Main, Parameter Fine and Utility pages, and tabs show the titles of the pages available in each group. The Utility page contains the controls for the reverb mode (2CH, 4CH, 2CHx2), I/O routing, input and output metering, and MIDI. Other parameters include the sampling rate at which the unit is operating, Bypass On/Off and Selected SREVI. (This displays which SREVI is being addressed in a multi-unit environment.) The obligatory Edit Status indicator shows whether or not the current reverb program has been edited since it was last recalled. The status of each of the four faders appears along the bottom of the display.

Input and output signal levels can be set on two different pages: either the Main 2 page (within the Main Parameter page) or the Meter I/O section of the Utility page. On the Main 2 page, levels are adjusted for all channels simultaneously as a group, while the Meter I/O page allows for separate control of each channel. Meters displayed on the RC-SREVI remote include the 14-segment meters on the remote display pages, and the 11-segment meters on the Meter I/O page. The SREVI has signal and clip meters as well, and a Peak Hold function works with all of the meters. In 2-channel mode, input and output signal levels can be metered simultaneously. In 4-channel or 2-channel x2 mode, however, either the input or output levels can be metered, but not simultaneously.

The Parameter Main section contains the controls for the Main 1 and Main 2 pa-

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- Bruce Richardson

Bruce Richardson - ProRec Recording Magazine
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"In every situation, both the NT1000 and NTK had lower self noise than either U87."

- Ty Ford

Ty Ford - Mix Magazine
The complete test report is available at www.mixonline.com
and in the June 2001 Issue of MIX magazine.

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World Radio History

rameters. Basic parameters, including Reverb Time, Initial Delay, Pre EQ Low Gain and Pre EQ High Gain, can all be adjusted on the Main 1 pages. The Main 2 pages contain the controls for Reverb Balance, Input Level, Output Level and Pre EQ HPF frequency. Channels in the Main 1 and 2 pages are grouped, so adjusting any one parameter in one of the Main pages affects all of them simultaneously. Parameters can be adjusted for each channel individually on the Fine parameter pages.

In the Fine parameter section, the Reverb Time, Initial Delay, Reverb Balance and Reverb Level parameters can be adjusted for each channel individually or grouped. Pre EQ parameters, which can be adjusted for each channel individually, consist of a variable frequency HPF and fully parametric 3-band EQ. Post EQ parameters can also be adjusted for each channel individually and consist of a fully parametric 3-band EQ. In 4-channel mode and 2-channel x2 mode, two Pre EQ and Post EQ pages are available, so adjusting parameters in a surround or dual reverb environment is fully enabled.

THE SOUND OF CONVOLUTION

On the macro level, the idea of being able to dial up various reverberant spaces is an appealing alternative in a world governed by the predictable (albeit very numerous) algorithmic options offered by some of the high-end reverbs that I've used over the past few years. You can't afford to book a session at Avatar? No problem, we can bring a little Avatar to a studio near you. Of course, it's not the same, but in terms of having various reverb "signatures" available as options, the SREV1 has a lot to offer. Even with the relatively small library that ships with the unit (as mentioned above, Yamaha is planning to release more "spaces" in the near future), there is a wide variety of choice, and the overall sound of the unit was downright amazing. The textures run the gamut from bright and plate-like to gooey and wooden. I used the unit in a number of mix situations and it was a pleasing change from my usual reverb options. I suspect that it's only a matter of time before sampling reverbs such as the SREV1 are a common element in nearly every studio.

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ADK A-51TC

LARGE-DIAPHRAGM TUBE CONDENSER MICROPHONE

ADK made waves a few years ago with the debut of its A-51 (Area 51) Series of affordable—around \$400—large-diaphragm FET condenser mics. Following on that success, ADK introduced a series of tube condensers, including the model A-51TC reviewed here, and the flagship Area 51TT.

The A-51TC sports a, um, “classic” appearance and is solid and well-built. Its aluminum casing measures 6.5 inches long and 2.1 inches in diameter, and the mic weighs 18.5 ounces. Inside, there’s a 1-inch diameter capsule with a cardioid polar pattern—the more expensive 51TT has dual 1-inch diaphragms and nine polar patterns, and a 6072 vacuum tube. Sensitivity is given as 14 mV/Pa \approx -37 dBV (0 dBV), with a frequency response of 20 to 20k Hz and a max SPL of 125 dB (1% THD @ 1 kHz). Retailing at \$999, the mic includes a power supply, shockmount and hard case.

I used the A-51TC in my project studio over a two-month period. I tested it using a variety of mic pre-amps, both tube and solid-state, but mostly I used the onboard mic pre’s in my Yamaha 03D digital mixer. The 03D’s mic pre’s are clean and were a good match for the A-51TC’s tube-driven character. By extrapolation, it is reasonable to assume that the mic would perform well in combination with most digital systems.

My first experience using the A-51TC was a poetry reading session. The previous night we had used another large-diaphragm tube mic—that costs twice as much as the ADK—with mixed results. The A-51TC had considerably more richness and character, handled the sibilants and plosives much more smoothly, and was easier for the (male) talent to “work” closely without bumping up against the proximity effect. It also sucked in the faint, unwanted background sounds with greater definition and clarity, but that wasn’t the microphone’s fault.

I also used the A-51TC to record acoustic guitar and Dobro. In both cases, I placed the mic slightly off-axis, about 18 inches away from the playing area of the instrument, and got a full sound, with the right touch of crispness in the top end. The lower frequencies on the Dobro were rendered particularly effectively, in balance with the highs, which is not the case with many mics, even large-diaphragm condensers.

The A-51TC handles a variety of percussion instruments. It captured both the low boom and the high “tok” sounds of a long-throated dombra while at the same time picking up the most subtle hand sounds—all in perfect balance. Placed just inside the bottom of a small conga, the ADK delivered a tight, punchy sound. When it was used to record a set of car keys on a ring (used as a percussion instrument), there was no excessive



kHz—but it was a pleasant fuzziness.

Placed directly in front of a blaring guitar amp, the A-51TC easily held its own, enriching the sound with a throaty warmth, making the relatively small amp sound huge, particularly on heavily distorted settings. Finally, the A-51TC did an excellent job on a male blues vocalist, capturing the richness and gritty complexity in great detail. The vocalist *loved* the sound of the mic and asked if it could be used for a live performance.

Overall, the ADK A-51TC has a large and likable sound, and the coloration it does impart was a good match for a variety of sources, especially those with complex harmonics and overtones. If you are searching for a large-diaphragm tube condenser in the \$1,000 range, then you should give the A-51TC an attentive listen.

ADK Microphones, 10816 N.W. 69th Ave., Ridgefield, WA 98642; 360/566-9400; fax 360/566-1282; www.adkmic.com. ■

The associate editor of Onstage magazine, Barry Cleveland also plays guitar in the improvisational quintet Cloud Chamber (www.innerviews.org/inner/cloud.html) and is the author of Creative Music Production: Joe Meek’s Bold Techniques (www.artistpro.com).

ADK A-51TC Spec Sheet

Type: Condenser Pressure Gradient
 Vacuum Tube: 6072
 Sensitivity: 14 mV/Pa \approx -37 dBV
 (0 dBV=1v/Pa)
 Bandwidth: 20 to 20k Hz
 Impedance: <250 ohms
 Max SPL: 125 dB (1% THD @ 1 kHz)
 EIN (DIN 45405 CCIR 468-2): 28 dB
 EIN (IEC 268-4, A-weighted): 18 dBA
 S/N ratio @ 1 Pa: 76 dB
 Connector: 7-pin XLR
 Body Size: 6.5x2.1 inches
 Body Weight: 18.5 ounces

scratchiness. In short, the mic basically reproduced the full range of sounds present, without overly emphasizing any particular frequency. That’s not to say that there was no personality imparted to the sound, because in all cases there was a tiny bit of (tube) fuzziness at around 8

BY BARRY CLEVELAND

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DISK-BASED DIGITAL MULTITRACK

Disk-based digital multitracks keep becoming more affordable. No strangers to building low-cost/high-performance gear, Mackie now breaks the oxide ceiling with its MDR24/96, a 24-bit, 24-track disk recorder at a rock-bottom street price of \$1,999.

The new MDR24/96 is essentially similar to Mackie's acclaimed \$4,999 HDR24/96—without the sophisticated editing features and keyboard/mouse/screen-based GUI. Although the MDR24/96 lacks large-screen editing/control, it includes basic, nondestructive cut/copy/paste editing functions with up to 999 levels of undo, which is certainly enough for most studio tasks, including comps, vocal or solo takes, and basic arranging. According to Mackie's Scott Garside, the new recorder "provides a perfect recorder alternative for users who don't require the advanced graphical editing capabilities of the HDR24/96, but would still like a 'plug-and-play' machine—essentially, people who are more interested in making music than reading manuals."

Like its well-known sibling, the MDR24/96 is a stand-alone (no computer required) 24-bit/24-track recorder housed in a four-rackspace chassis. From the front panel, the two machines look similar—with good reason. By having the two products share common parts and technologies, Mackie was able to keep the MDR24/96's quality up and the price down. Fully compatible with Mackie's HDR24/96, the MDR24/96 includes an internal 20GB Ultra-DMA hard disk, providing more than 100 minutes of 24-track recording at 48 kHz, and a second bay accepts interchangeable media, such as Mackie's M90 22GB removable hard drives or 2.2GB Mackie PROJECT cartridges.

With a few exceptions, the



MDR24/96 looks and operates a lot like most MDMs, so most users can begin recording minutes after unpacking the unit. Familiar-looking, tape recorder-style keys (RW/FF/Stop/Play/Record) handle basic transport functions, along with a bank of 24 (selectable) peak/VU meters with track-arming lights and buttons beneath each track.

A large, bright, numerical LED shows locations in hours/minutes/seconds/frames or bars/beats/ticks, and includes status LEDs indicating clock and bit status. A floppy drive allows users to load software updates, tempo maps or re-install the system software, should the user later install a larger internal hard disk. (A 20GB drive is included as standard equipment.)

The MDR24/96 uses the same card format as the HDR24/96 and Mackie's D8B digital console, and the new unit ships with its three card slots filled with 8-channel, 24-bit, 48kHz analog I/O cards. Each analog card has eight analog inputs and eight analog outputs (all are +4dB line-level), terminated as two 25-pin D-sub connectors that are pin-compatible with the Tascam DA-88 connectors, so all the user needs to do is connect some DB25-to-XLR (or TRS) snakes and start tracking.

Alternatively, users can mix and match from a variety of optional cards, such as the \$450 DIO-8 (eight

channels of Tascam TDIF and ADAT Lightpipe digital I/O); the \$399 PDI-8 (eight channels of AES/EBU digital I/O on a single DB25 connector); or the bargain-priced OPT-8 (\$99), with eight channels of I/O in ADAT Lightpipe format. The recorder also supports 96kHz recording (which halves the number of tracks to 12) by using three of the PDI-8 AES cards in Double-Wide (double-wide) mode, fed from external third-party 96kHz A/D converters.

Standard sync and clocking capabilities include MID IMMC/MTC, SMPTE, video black burst and wordclock. A standard 100BaseT Ethernet port for connection to PCs and networks is included. The recorder also stores audio in standard .WAV format, making DAW transfers to/from the MDR24/96 a snap. The MDR24/96 is also compatible with Mackie's \$1,499 Remote 48 Pro remote control, a comprehensive autolocator/remote/synchronizer that can operate two Mackie hard disk recorders from a single control surface, allowing an MDR24/96 and a HDR24/96 to function seamlessly as a full 48-track digital recording system.

The MDR24/96, with a street price of \$1,999, is slated to begin shipping by the time you read this.

Mackie Designs, 16220 Wood-Red Road N.E., Woodinville, WA 98072; 425/487-4333, fax 425/487-4337; www.mackie.com. ■

BY GEORGE PETERSEN

12 ms



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Hear the EMI 2|6 now...

Latency

A live feel and superb audio quality are vital, especially when playing software instruments. You want to hear the music as you play it. Now, with the EMI 2|6, you can. With other USB audio interfaces, it's often a case of too little, too late, because latency between the computer and the interface results in a disturbing signal delay. Not so with the EMI 2|6. Thanks to a unique driver architecture, it's the USB audio

interface with the lowest latency currently available. And the only one with 6, 24 Bit, analog outputs. Zero Latency Monitoring and S/PDIF digital connectors round out a professional mobile audio interface that's ideal for both live and recording situations. Regardless of whether you use it with a laptop on stage, in the studio or for DVD 5.1 Surround playback, the EMI 2|6 is definitely the right choice.



STUDIO NETWORK SOLUTIONS

A/V NET DISK STORAGE SYSTEM

Studio Network Solutions is a system design/facilitator company specializing in networking systems for the audio and video production industries. The main focus of SNS is on Fibre Channel technology, which offers data transfers over wire or fiber-optic cables at rates in the gigabit/second range—fast enough to handle even the most demanding production chores.

SNS made a major splash at this year's NAB convention, where it unveiled A/V SAN PRO, a Storage Area Networking (SAN) solution for the audio, broadcast and video post communities. A/V SAN PRO offers both scalability and large storage capacity, but what really turned heads was its seamless integration with Digidesign Pro Tools MixPlus systems and simultaneous access by multiple users, followed by the development of rock-solid device drivers and software interfaces supporting Mac and NT workstations and even Tascam machines. Partnering with leading-edge companies—such as AITO Technology, JMI, JMR/Fortra, Vixel and Seagate—SNS can create systems from the best available suppliers, without having to reinvent the wheel or depend too much on esoteric, proprietary components. For example, in the storage department, SNS exclusively uses Seagate drives. "They're the best drives available and the only drives that have passed our interrupt tests," says SNS chief systems designer Gary Holladay.

At AES, SNS will debut its next generation of cross-platform (PC and/or Mac), multi-user networking products. Partnering with Lucent and Vixel, SNS has developed A/V NET, a wide-area Fibre

Channel system that allows users to network within a 250-mile radius, securely mounting and utilizing hard disks in remote locations in real time with performance superior to that of SCSI. The physical interface is essentially an A/V SAN PRO on a Lucent backbone. "This is a dedicated point-to-point private network—it's *not* the Internet and it's as secure as a bank transaction," Holladay explains.

In addition to file-sharing, the SNS network provides numerous other solutions, such as off-site backup, storage, maintenance and archiving services. Performance is also an issue. Aside from the obvious connectivity benefits, A/V NET delivers the performance required to take full advantage of applications like Pro Tools and Avid, without having to deal with SCSI's inherent throughput issues.

SNS will demonstrate A/V NET on the AES show floor by interconnecting DAWs from different manufacturers, connecting various locations around the exhibit hall to a central SAN at the SNS booth via of fiber-optic cable. "People have been needing something like A/V NET for a while," Holladay adds. "It's not like this is brand-new technology—the difference today is that we now have the bandwidth and the speed of Fibre Channel. It's certainly fast enough to work on files in real time. You can mount the hard drive from up to 250 miles away, and you can record 64 tracks of 24-bit/48kHz on one drive in a Pro Tools system. With Nuendo, we've been getting even better results—with up to 120 tracks of playback from one drive. Also, A/V NET can be a RAID solu-

tion if redundancy is necessary, but for most of the audio and video applications we deal with, the technology and throughput of our networks are faster than workstation users need.

"The 250-mile figure is a physical limitation," Holladay admits. "Fibre Channel is theoretically capable of carrying data to longer distances, but I believe the 250-mile limitation is a function of the Lucent hardware. However, we are constantly looking at ways of extending this, and eventually we'll hit the 800- and 2,000-mile marks."

SNS has designed several products that cater to the ever-changing audio industry. The first is a single-rackspace Fibre Channel storage enclosure offering the same performance as A/V SAN PRO, but at a lower price and intended for users who need better performance than SCSI but don't necessarily need a network. Priced a few hundred dollars more than an SCSI system, the newly released A/V SAN can record and playback 64 tracks of 24-bit/48kHz on one drive. Exact pricing for the 4-drive-capable unit—shortloaded with two 72GB drives (144 GB total), host bus adapter, cables and two empty bays for future expansion—would list around \$5,999.

Holladay is optimistic about the new unit. "Once people get this single-rackspace product, it will spell the end of SCSI-based solutions. And with FireWire backup systems—which everybody is moving toward—there won't be a need for SCSI at all."

Studio Network Solutions, 1919 Innerbelt Business Center Dr., St. Louis, MO 63114; 314/423-4787; fax 314/423-4867; www.studionetworksolutions.com. ■

BY GEORGE PETERSEN

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SEE US AT AES BOOTH #1036

dB TECHNOLOGIES 4496

MODULAR DIGITAL CONVERSION SYSTEM

Anyone who has spent any time dealing with audio in the digital domain has learned that below the "perfectly" calm surface lies a breeding ground for trouble that, upon occasion, makes one wish for the return of simpler analog days. One thing that we have all learned is that it's all about money. We don't expect the 16 preamps in a \$3k console to sound as good as preamps that cost \$1k each. Likewise, we don't expect a set of D/A converters in a \$1k studio-in-a-box to sound as good as a stand-alone converter that costs \$5k. The only question, really, is, where do we throw the money?

Throwing your cash at D/A converters is a good idea if you need a pristine monitoring environment. Maybe you've just opened a 5.1 room and you really want to impress your clients. While surround mixing, you want to hear every low-level detail to make sure it's where you want it to be. However, until the consumer base ponies up for equally spiffy converters, the audio will probably never sound better than it does in your studio. More to the point, great D/A converters also only make sense if you need or want to take a trip to the analog world—to that great-sounding analog mixing desk to any "old faithful" analog processors you may still like, or to a high-quality analog archive.

If those aren't your concerns, then toss the money at the A/D converters with higher sample and bit rates first. You'll hear the difference immediately, and the truth is painfully undeniable: It's much better to know that your work could sound better through better A/Ds than to know you're losing something right off the bat with "average" A/D conversion.

It is with that awareness that I approached the dB Technologies Conversion System, a system comprising individual modules that can be loaded a la carte into one or more single-rackspace power chassis. These

are not vaporous software plug-ins; these are flesh-and-blood, rack-mounted hardware modules that accomplish a variety of analog and digital chores. Multiple chassis can be chained to provide a synchronized multi-channel system.

The single-rackspace 4496 power chassis (\$895) provides power, fan and I/O connectors. (The fan can be disconnected in most cases.) Into that five-slot frame, you can load any of six modules: M•SYNC-1 (\$369), sync module; M•AD-824 (\$1,495), a 2-channel A/D converter; M•DA-824 (\$1,345), a 2-channel D/A converter; M•DD 1-2 (\$495), a single-to-dual AES translator; M•DD 2-1 (\$495), a dual-to-single AES translator; and M•BY2 (\$695), an up-sample/down-sample converter.

The M•SYNC-1 module, with a pair of rear-mounted I/O BNC connectors and 2x frequency switch, provides internal, AES or wordclock sync options. The front panel of the M•SYNC module offers switching for 44.1, 48, 88.2 and 96 kHz. There's also a Wide/Narrow toggle switch; Wide for varispeed operations, Narrow for locking to signals within ± 150 ppm. Narrow lock results in reduced jitter when operating with a single sample rate. A M•SYNC module must be used if a M•AD-824 converter is in the rack, or to sync a series of racks. When reading an external source through its rear-mounted BNC connector, the M•SYNC-1 can read varispeed sample rates between 40 to 54 kHz or 80 to 100 kHz.

The M•AD-824 2-channel A/D module was the most interesting to me. Analog connections, via XLR, can be balanced or unbalanced, and internal jumpers allow modification for pin 2 or pin 3 high connections. The M•AD-824 operates at 24, 20 or 16-bit modes. The LED meters are very pre-



cise at the top. A separate LED represents each dB from -9 to 0 dB. The reference level is also adjustable from -10, -12, -14, -16, -18 or -20 dBFs. Front panel 20-turn pots are used to align the audio with the reference levels. For systems with more than two A/D modules, one must be set as master and the others as slaves via internal jumpers. Masters are easy to identify during startup because their -9dB LEDs flash, while the slaves do not.

The A/D module also features both analog hardware-based soft saturation and non-overloadable digital software saturation, and a choice among dither or two flavors of Acoustic Bit psycho-acoustic enhancement. The analog and digital saturation circuits, with their adjustable thresholds, provide a wide variety of the same sort of density and squeeze I'd normally associate with analog tape compression. So if you've been clinging to analog because you and your clients really enjoy smacking analog tape, you now have a worthy digital alternative.

The analog saturation circuit has an internal jumper that moves the threshold from -3 to -6 dBFs. Lower the threshold and the saturation circuitry has more effect on the audio. The digital soft saturation can be set to provide +6 dB of loudness, each of which has slightly different transfer curves. Whereas a typical compressor reduces gain changes in attack and release envelopes, the digital soft saturation algorithm works on each sample. All samples below threshold are

BY TY FORD

NAB 2001
Las Vegas

The making of a “real-world” cinema

This year at the National Association of Broadcasters (NAB) Conference and Trade Show, Waskul Entertainment, a leading content creation company based in Southern California, created a high-definition electronic cinema that received rave reviews. The theater was packed with standing room only during all performances. When it came to choosing a storage solution for the cinema, Waskul Entertainment relied on the StorCase InfoStation™, a rugged and versatile 9-bay back-plane RAID-ready enclosure.

“We wanted to show the NAB audience a truly affordable, high-definition production solution that they could depend on in the real-world. With a performance scheduled every hour, reliable storage was a must. Throughout the NAB show, the InfoStation performed flawlessly and provided the sustained data rates that we needed to play back our high-definition content. It’s a great product that can be easily integrated into today’s demanding production environments”, said Steve Waskul, President of Waskul Entertainment.

“When you’re as serious as we are about creating exciting content that will entertain and inspire an audience, you want the best tools available for the job – tools that give you an edge in expressing yourself creatively while making the most of the finite amount of time available. You also want cost-effective solutions that provide an excellent return on your investment. We found the StorCase InfoStation to meet all of these criteria,” added Waskul.



For more information regarding the InfoStation, log onto the StorCase Web site at www.storcase.com and take the virtual InfoStation tour, or contact StorCase at (800) 435-0068.

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“We wanted to show the NAB audience a truly affordable high-definition production solution that they could depend on in the “real-world.”

— Steve Waskul
Waskul Entertainment



FIELD TEST

amplified by +6 dB.

The M•DA-824 D/A converter has XLR outputs with balancing jumpers similar to those on the A/D module. A toggle switch on the front panel allows pin 2 or pin 3 operation. LEDs consist of a Lock light and indicators for 44.1, 48, 88.2 and 96kHz operation. A three-way Wide, Narrow and CrystalLock™ switch can be set Wide for varispeed operation—which comes in very handy when working on any film or video projects with pull-up or pull-down issues—and Narrow for reduced jitter.

CrystalLock™ activates a temporary buffer and special DSP to further reduce jitter on 2-channel sources. Got some old DATs that are getting funky? Try CrystalLock™. As CrystalLock™ looks at an incoming AES stream, its DSP measures the sample rate. The internal buffer captures the signal for about six samples. The DSP circuit changes the rate of the internal crystal to the exact frequency of the AES stream. Then the stream is relocked to the crystal.

Output gain for each channel is front panel-adjustable from 0 to +24 dBu for balanced, and -6 to +18 dBu for unbalanced operation. A maximum of +27dBu balanced (for those situations where levels are hot and the next stage can handle it, like some Dolby encoders) can be achieved by removing two resistors from the board.

OTHER MODULES

In addition to the A/D and D/A converters and Sync module, dB Technologies has bidirectional solutions for those pesky two-wire AES/EBU, 88.2/96kHz bit-split situations where you want the higher sample rate, but your system tops out at 44.1 or 48 kHz. What the M•DD I-2 splits in two, the M•DD 2-1 recombines. The M•BY2 synchronous upsample/downsample converter does 2:1 or 1:2 conversion for those 44.1 to 88.2 and 48 to 96kHz chores with a filter to get rid of frequencies above the Nyquist limits. It also comes in handy for people mixing at 96 kHz who need AC-3 files at 48 kHz and don't want to make a second pass. The module has one input and two outputs, so it can also act as a digital distribution amp.

THE SOUND

At the head end, I used a Schoeps MK41 hypercardioid mic into an Aphex 1100 preamp with both analog and 48kHz, 24-bit AES outputs (and recently upgraded the op amp chips in front of the 1100 A/D converter). I then ran line out to the dB Technologies M•AD-824 analog input, and digitally out through a Graham Patten AES-

DATS impedance and level converter to the S/PDIF (IEC) input of a Digidesign Digi 001 operating at 24-bit, 48kHz. A call to the local Digidesign rep confirmed that the S/PDIF TOSLINK ports and the rest of the Digi 001 could handle the 24 bits. This gave me the opportunity to compare the dB Technologies A/D converters with the Aphex 1100 and Digi 001 converters.

I used a Martin D28S acoustic guitar and recorded six separate tracks using the Aphex 1100 preamp. From the analog outs of the preamp, I first routed through the dB A/D with no effects, then with its Analog Saturation, then with Digital Saturation, then through the Aphex 1100 24-bit, 48kHz converter, with and without the Aphex MicLim feature. Finally, I plugged the Schoeps right into the Digi 001 preamp to test the Digi preamp and converters.

I monitored playback directly from the Digi 001 analog output, which, of course, meant its D/A converters. The Martin sounded very nice through the straight dB Technologies A/D converters. With Analog Saturation on, the top end got slightly softer—silky. With Digital Saturation, the sig-

Spec Sheet: dB 4496 System

4496 PSU/Rack

Capacity: up to 4 modules (2/4/6/8 channels)
Input voltage: 90 to 264 VAC

M•AD-824 Stereo ADC

Noise: -118 dBFS ±1 dB (A-weighted)
Distortion: 0.00125% FS typical (1 kHz @ -1 dBFS)
Sample rate: 44.1/48/88.2/96 kHz
Varispeed range: 38 to 51kHz and 76 to 98 kHz
Channel separation: -100 dBFS (@ 1 kHz)
Flatness (±0.05dB) response: 10 to 20k Hz
Phase linearity: 2° (10 to 20k Hz)
Digital output: 16/20/24 bits, 110-ohm AES/EBU
Analog inputs: Balanced/unbalanced 12 to 24 dBu FS
Gain adjust range: +12 dB

M•DA-824 Stereo D/A

Noise: -110 dBFS (20 to 22k Hz unweighted)
Distortion: 0.002% FS (1 kHz @ -1 dBFS)
Sample rate: 44.1/48/88.2/96 kHz
Varispeed range: 32 to 100k Hz wide lock mode
Channel separation: -100 dBFS (@ 1 kHz)
Flatness (±0.05dB) response: 10 to 20k Hz
Phase linearity: 2° (10 to 22k Hz)
Digital input: 16/20/24 bits, 110-ohm AES/EBU
Analog outputs: Balanced (27 dBu max); unbalanced (21 dBu max)
Gain adjust range: 24 dB

M•Sync-1 Clocking Module

Internal crystal: 44.1/48/88.2/96 kHz
Varispeed range: 37 to 52 kHz and 74 to 100 kHz
External sync: Wordclock or AES

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Five Towns College graduates know all phases of audio production, and receive advanced training in MIDI, mixing, and post-production. Most graduates have interned at a major New York City studio as part of their professional preparation.

Five Towns College offers associate, bachelor and master degrees in music, theatre, business and liberal arts. Graduates from the Music Department are also professional musicians with skills in arranging, composition, and conducting; while Business Department graduates have strong training in management, marketing, finance and accounting, as well as audio and/or film/video.

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FIELD TEST

nal got at least 5 dB louder without overdriving, but the character of the sound—I'd call it density—increased. The audio was less silky, thicker, with a slight edge on top. Got clients who always want it loud? Go right for this setting.

The Aphex 1100 A/D was warmer, with slightly less top end as the straight dB. The Aphex with MicLim engaged sounded more like the straight dB, but was louder because I could kick the input sensitivity up another 3 dB and let the Aphex MicLim circuit prevent the digital overs. The Digi 001 preamp and A/D converter were my least favorite. The sound was noticeably edgier and less natural.

I then ported the tracks via S/PDIF to a new iZ RADAR 24 operating at 24-bit, 48kHz, and listened again in a different monitoring environment. With the RADAR D/A converters, the Digi 001 preamp A/D converter track transformed nicely from edgy to bright, but for the most part, the tracks began to sound more similar and better.

To check out the dB Technologies D/A converters, I patched the straight dB track out of both the RADAR analog and AES/EBU digital outputs. I connected the AES/EBU output to the dB Technologies D/A converter and compared both versions of the same track. Both sounded great, and, although there was a very minor difference, I could not describe it.

IN CONCLUSION

Without question, the dB Technologies A/D converters and D/A converters resulted in improved audio. The analog and digital saturation and other dither options give one the power to make louder sounds and to emulate analog tape compression. The D/A module's ability to reduce jitter is also appreciated, as is the Wide clock for varispeed operation. The other modules are important parts of any studio's digital toolbox until we're all on the same 24/96 (or higher) single-wire digital "bullet train." Having all of the modules in a coherent system is also a welcome idea. I think analog and digital saturation circuits are important enough to consider putting them in a separate D/A or D/D module so they can be used to process audio that is already in the digital domain.

dB Technologies Inc., dist. by Audio Interview Design, 1155 N. La Brea Avenue, West Hollywood, CA 90038; 323/843-1155; Fax 323/845-1170; www.aidinc.com. ■

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KS ADM 2

TWO-WAY POWERED REFERENCE MONITORS

Speaker manufacturers have endeavored for decades to create a reference monitor that could reproduce complex, broadband audio without imposing a sonic signature of its own. But the immutable laws of physics demand that speakers must exert some physical and electrical influences on whatever signals they transduce, thereby skewing the sound. Which prompts the question: If you can't prevent something, then why not simply undo it? That's what German speaker manufacturer KS Beschallungstechnik GmbH has done with its new ADM line of active, digital studio monitors.

KS had the brilliant idea to use high-powered DSP to program a unique *inverse transfer function* equalization curve for each of the ADM Series monitors, thereby neutralizing any inherent coloration effects. (For an in-depth look at the technology behind the KS ADM 2, see the sidebar "Thinking Inside the Box.") In theory, the compensated monitors would then offer virtually perfect impulse and frequency response.

KS's ADM 2 Studio Monitor lies in the midrange, both in terms of price and size, of the ADM product line. An integrated system, the ADM 2 consists of a two-way monitor with internal amplifiers and A/D/DA converters, onboard DSP (including 250-band equalization) and an optional remote level controller. As one would expect, all this costs a pretty penny: \$4,950 list per monitor, or \$9,900 for a pair. (The remote costs \$295 extra.) But, you also get what you pay for. What I heard blew me away like a hurricane. The ADM 2 represents a paradigm shift for studio reference monitors.

FEATURES AND SETUP

The ADM 2 can accept analog or digital input via connections on the cabinet rear. A female XLR jack routes analog input to 24-bit sigma delta, 64x oversampled A/D converters. An



AES/EBU connector accepts digital input at 32 to 56 kHz (continuously variable) sampling rates. Wordclock inputs are noticeably absent. Sixty-MHz, 32-bit floating point DSP provides the FIRTEC digital processing (see sidebar for more info) and crossover and protective limiting functions for the monitor's two drivers. Latency is specified at 6 ms for digital input, 7 ms for analog.

An internal 24-bit DAC feeds two MOSFET power amps for each monitor; a 100-watt amp powers the high-frequency driver, while a 200W amp drives the woofer. The slew rate for the power amps is a respectable 80 V/ms or better. A pair of ADM 2s produces a maximum peak SPL of 122 dB and continuous SPL of 116 dB at one meter. The ADM 2's frequency response is specified as 50 to 22k Hz, ± 0.5 dB, and 38 to 22k Hz, ± 3 dB.

You'll want some heavy-duty monitor stands for the ADM 2s. Each monitor cabinet weighs approximately 43 pounds, and measures roughly 16½ inches high by 12 inches wide by 12½ inches deep. KS needs to provide more substantial packing for shipping these beauties—the cardboard inserts on the in-

side of the box were totally inadequate and did not prevent two units from arriving damaged. (KS has indicated that it will rectify this shortcoming, possibly substituting returnable flight cases for cardboard shipping boxes.)

KS's literature specifies that the ADM 2 incorporates an 8-inch radiator driver and a 1-inch compression driver. But the high-frequency driver is actually closer to five inches in diameter. It's mounted directly behind an extruded, exponential waveguide that provides a 1-inch-diameter opening for the driver (hence, the 1-inch specification). The woofer cone is made from lacquered paper and is coupled to a rubber surround. A front-firing, elliptical bass reflex port, tuned to roughly 42 Hz, graces the gray-black, textured, 22mm MDF cabinet. Mounting hardware is provided on both side panels, for horizontal orientation.

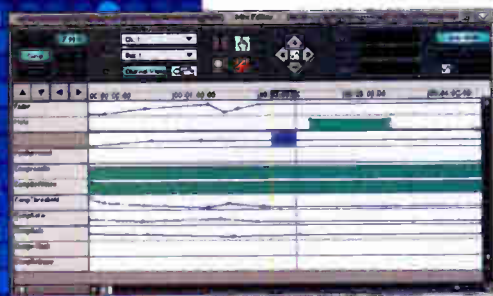
A small toggle on the ADM 2's rear panel switches between analog and digital audio input modes. In addition to the female XLR for analog input, there is a male XLR output. This provides audio pass-through to KS's optional ADM W subwoofer (\$3,250). There are also both male and female XLRs for digital audio connections. The female jack accepts

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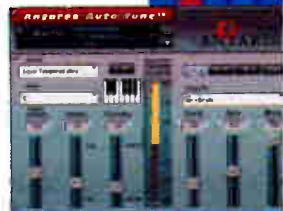
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AES/EBU input, and the male serves as a digital signal pass-through to a second speaker. It doesn't matter which speaker gets the input first; simply patch an AES/EBU cable from, say, your digital mixer to either ADM 2 in a stereo pair, and then patch another AES/EBU cable from the first speaker's digital pass-through (male XLR) connector onto the second speaker's digital audio input.

A front panel LED serves as both a power status indicator and as a guide for L/R speaker setup. The LED for the left speaker is situated in the bottom-left corner below the woofer (when the speaker orientation is vertical); the right speaker's

LED is in the bottom-right corner.

A rear panel stepped control knob attenuates the ADM 2's level up to 32 dB in 4dB increments. This works for both analog and digital audio input modes and, because the attenuator follows the on-board DAC, no reduction in wordlength occurs. An additional knob setting, marked Off, provides infinity attenuation (muted output).

The ADM 2 can also be attenuated via the optional Model 01091 handheld, wired remote box (\$295). This is connected to one speaker cabinet's rear panel via a captive 7-meter cable, fitted with a D-type connector. You then patch a companion cable of equal length from the first speaker to the next, using a pass-

Thinking Inside the Box

To understand how KS's technology transcends the ordinary limitations of speaker performance, let's first take a look at a speaker's inherent shortcomings. Every driver has an infinite impulse response; that is, inertial forces cause it to move both before and after a signal is reproduced. This unrelated movement distorts the original waveform's frequency, amplitude and phase components, causing skewed spectral balance, smeared transients and phase anomalies such as comb filtering. Multiple drivers, along with active circuitry and the cabinet's acoustical response, compound the distortion.

The composite result of these aberrations can be quantified in the monitor's transfer function curve. The transfer function is essentially the sonic signature—both electronic and acoustic—that the monitor imposes on the source signal. Put another way: If you were to subtract the input signal's frequency response curve from the signal at the monitor's output, then the curve of the remaining signal—the speaker's transfer function curve—would show the speaker's unwanted contribution to the sound.

After a 25-hour burn-in period, KS measures the transfer function of each new ADM 2 monitor, using 22ms bursts of full-bandwidth audio to excite the monitors. An inverse equalization curve is then computed and mapped into the memory of the ADM 2's onboard 250-band digital equalizer, making sure that the curve is properly aligned along the timeline with the monitor's transfer function curve. KS refers to this inverse equalization curve as a Finite Impulse Response (FIR) curve, and to the pro-

prietary KS technology as FIRTEC (pronounced "Fire-Tech") processing. In theory, FIRTEC processing should completely neutralize, or cancel out, the ADM 2's sonic signature, producing an accurate reproduction of the source material.

A unique, custom FIR equalization curve is applied to each and every speaker before it leaves the factory. That is, an average response curve is not computed from a sample set of units. Each monitor gets the exact curve needed to compensate for any manufacturing tolerances (or deviance in the physical properties of materials used) that may have affected that individual monitor. Once computed, this custom EQ curve is programmed into non-volatile memory inside the monitor and made available to the user via a preset selection knob on the monitor's rear panel. The FIR curve is also logged against the assigned serial number for future reference.

Upon request (and currently at no extra charge), KS will also program a second preset equalization curve that tweaks a particular ADM 2's response to compensate for control room's acoustics (in addition to compensating for the speaker's transfer function). In order to compute the needed curve, KS will need a recording of swept tones, taken at the mix position. KS will then return some PC software that contains the computed inverse EQ curve for the room in question. The software may be downloaded via the ADM 2's remote-control connector. The downloaded preset is stored in non-volatile memory inside the monitor, and can be recalled via the preset selection knob on the unit's rear panel.

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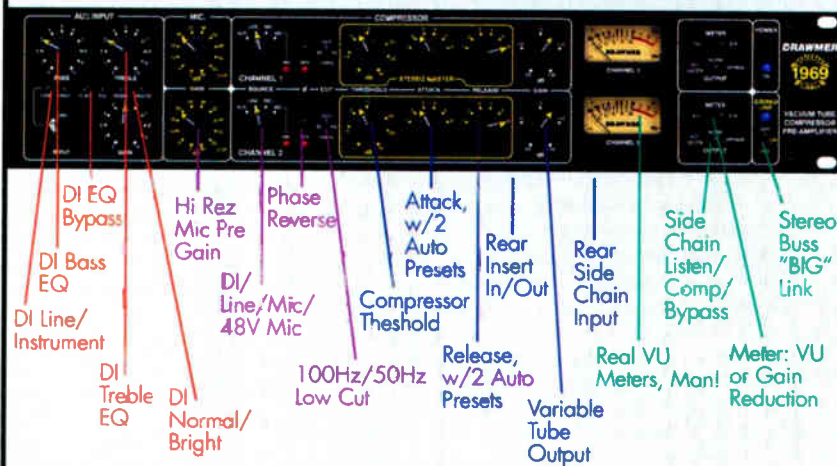


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through D connector on the first monitor's rear panel. The remote allows the user to adjust levels simultaneously for all ADM 2s in a system (including multichannel surround setups); level adjustment is post-DACs in order to maintain bit depth. While a mixing console control room monitor pot will also provide control over analog levels, the remote's control over digital levels makes it especially useful. The remote also provides a convenient toggle for switching between analog and digital audio input modes. Furthermore, the remote box's level attenuator knob provides much smaller increments of level change than the speaker's rear panel control. Nevertheless, I was pleased to find that the rear panel attenuators remain active with the remote hooked up.

Also found on each monitor's rear panel is a low-frequency room equalization knob. This steps through the two FIR equalization presets (see sidebar), plus eight other filter settings that modify the presets. The eight modified filter settings provide varying degrees of boost or cut at 20 Hz, with four settings modifying the inverse-transfer function preset curve, and another four modifying the preset that also counters room modes.

A power switch, detachable AC cord and heat sink (for the onboard amplifiers) round out the ADM 2's rear panel features.

I'M ALL EARS

For my critical listening tests, I listened to some of my favorite CD releases that I consistently use as a reference, spanning rock, pop, country, techno, folk and Celtic music styles, plus several of my recent stereo mixes. My review units only had the inverse-transfer function FIR curve and its four modified filter settings stored in memory, as I did not request additional DSP to correct for room modes. Although the modified filter presets could be very useful in some control rooms, the ADM 2s sounded best in my room using the unmodified FIR preset (i.e., no additional boost or cut at 20 Hz), so that's what I used to review the speakers' performance.

I could immediately tell that the ADM 2s' FIR curves were calculated from test signals passed through the monitors' A/D converters, because analog input mode sounded so much better than digital input mode. (It's a real testament to KS's FIRTEC technology that, even with one additional conversion, the analog inputs eclipsed digital in sound quality.) Compared to digital, analog input exhibited noticeably better transient response, more extended

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and crystalline highs, slightly smoother high mids, more open low mids and tighter bass. The pitch of bass guitar notes was also better defined with analog input. In comparison, digital input sounded a tad flabby in the bass, less open and detailed, and exhibited a slight glare in the upper mids. It's not that digital input mode sounded bad, however; it actually sounded quite good. But analog mode sounded so spectacular that digital suffered by comparison.

In fact, I'd never before heard two-way monitors achieve such accurate spectral balance and extended response. Particularly impressive was the reproduction of low bass frequencies. You won't need a subwoofer with these babies. When the subterranean bass on Paula Cole's "Tiger" (from her *This Fire* album) kicked in during my listening tests, I literally whipped around to turn off my subwoofer—it was already off! The ADM 2s reproduced low bass so effectively that the bottom of my seat vibrated, with only 85dB SPL at the mix position. The rest of the spectrum, all the way up to airy highs, was so proportionally balanced and coherently reproduced that I just sat there slackjawed, lis-



The rear panel features XLR I/Os and a toggle that switches between analog and digital audio in.

tening in awe. I couldn't hear any smearing of transients, as is common with other speakers.

Unfortunately, the ADM 2's imaging was less than great. The monitors' stereo sound stage localization was a little ghostly. The depth of the image also could have been better. While the monitors are adequate in this regard, they do not offer the pinpoint imaging of D.A.S.

Monitor-8 or Hafler M5 monitors, for example, both of which cost a fraction of the ADM 2's list price. But those monitors can't touch the ADM 2's extended bass frequency response.

I suspect that the addition of word-clock inputs or a digital link between the monitors might tighten up the imaging and improve depth. Another design improvement would be to use a common DSP card to clock both speakers; as it stands now, each monitor has its own card. I'd also like to see a FIR equalization preset for digital input so that it can sound as accurate as the analog path.

Nevertheless, the ADM 2s—at least in analog mode—are the ultimate reference for checking spectral balance and transient content in your mix. They are articulate yet sweet, clear yet warm, detailed yet non-fatiguing. Bottom line: The ADM 2s sound absolutely amazing.

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



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World Radio History

SOUNDELUX ELUX 251

MULTIPATTERN TUBE MICROPHONE

Most people would rank the multipatterned Telefunken ELA M251E/250E as one of the three most sought-after tube condenser microphones, alongside the Neumann U47 and the AKG C-12. Priced at \$5,000, the Soundelux ELUX 251 is the closest thing to an exact copy you'd ever want of the vintage Telefunken.

Not to denigrate the original 251, but, after all, it is a 50-plus-year-old mic using 60-year-old materials and manufacturing technologies. For this reason, I did not base this review A/B'ing the new ELUX 251 and any particular Tele M251. With antique mics, what I call the "vintage factor" becomes a significant issue. Vintage factor—the physical condition, upkeep, modification history, how and where they were used and how gracefully they have aged—makes finding two M251Es that perfectly match impossible. Without an established "baseline" performance for the average Tele 251, an A/B seems pointless and of little value.

NEW VS. OLD

The original Telefunken ELA M251E (always called the ELAM 251 because the letters all run together on the mic body) was designed and manufactured by AKG for Telefunken and used a CK 12 capsule and 6072A vacuum tube just like AKG's C-12. AKG also made a non-import version using a Telefunken AC701 subminiature tube called the M251 (no "E" suffix). Sister mics are the M250, an omni/cardioid model, and the M252, the exceedingly rare twin capsule stereo version. The Tele used the much smaller T14/1 audio-matching transformer rather than the larger Type V1248 used in the first few hundred C-12s. With a larger transformer, a mic should have a more linear response at higher SPLs, especially in the low frequencies. The ELUX 251 uses a special wide-bandwidth transformer with the same primary/sec-

ondary turns ratio as the Tele and provides a more uniform impedance vs. frequency than the original.

The same plated/loaded amplifier circuit as the original is used but with "tweaked" part values to obtain a quieter noise floor. Like the original, only half of the 6072A tube is used, running at a low 120-plate voltage and only six volts on the filament. Lower voltages mean longer tube life. The other half of the tube is not even lit up, so some enterprising person could invent a socket adapter to "rotate" the tube around and use the newer other half—if and when the other side wears out in about 10 years. Sovtek and new-old-stock GE tubes are carefully tested and selected by Soundelux for lowest noise, maximum SPL and minimum distortion.

Modern manufacturing techniques address many of the serious problems that arise in 50-year-old mics, such as oxidation that can occur even in reconditioned vintage mics. AKG used polystyrene plastic for the terminal board in the M251E to avoid excessive moisture absorption—a problem that many old microphones suffer from, compromising sonic performance and noise floor. The ELUX 251 uses a Teflon terminal board with a very high dielectric constant (the ability to insulate high voltages) to take care of moisture. Mechanical components such as the tube socket and wire-wound resistors are all resonance-damped to disallow any mechanical noise. The point-to-point, internal handwiring on the ELUX is silver-plated copper with Teflon insulation for maximum conductivity and, over time, minimal oxidation and negligible temperature influence within the heated microphone body.

Although some early Soundelux U95 mics were Chinese-made, all of the company's mics—including the ELUX 251—are now manufactured in the USA. Designer David Bock select-

BY BARRY RUDOLPH



ed a German-made capsule with a 6mm Dupont Mylar diaphragm and the same close tolerances and asymmetrical design as the famed CK 12 capsule used. Like every part of the ELUX 251, the capsule is hand-built, tuned and strictly tested. The head grille's internal chamber resonance closely matches the Tele M251E in equivalent volume and "mesh count," which affects HF response.

IMPRESSIVE PACKAGE

The ELUX 251 comes in a large aluminum briefcase with the 110/220VAC P251 power supply, the mic itself, all cables, instructions and shockmount. The black-colored shockmount is a stout affair with upper and lower knurled thumb screws that tighten two constricting metal bands around the mic's body. The bands are covered in felt to avoid scratching the "Institution Green" painted microphone body—an exact color match to the M251E. You have to take care that the upper band does not compress over the pattern switch...bad news! Unlike a Neumann U47, there are no concerns about placing the ELUX 251 capsule



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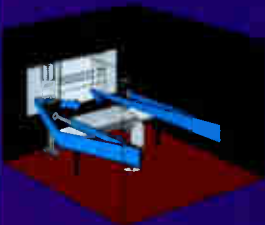
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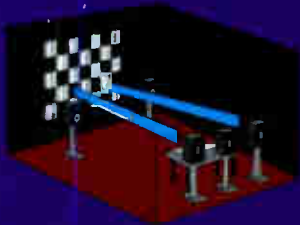
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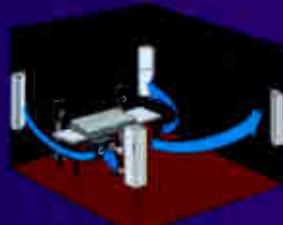
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*Suggested US retail price.

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up or down, because the mic generates very little radiating heat.

The P251 power supply is a significant improvement over the old M251E's unregulated power supply. The original supply emitted an acoustical noise and, as it was unregulated, "shocked" the capsule with an excessive momentary spike of polarizing voltage when the microphone was first turned on. The ELUX 251 uses a power transformer twice the size needed and a shunt regulator (zener diode) for the high voltage. This linear shunt design is preferred sonically over series regulators

and/or switching power supplies common in computerized gear. A constant-current source circuit provides regulated DC filament voltage. Soundelux could do a good business selling power supplies for old M251Es—instantly improving the sound of those mics.

The ELUX 251 connects to the P251 power supply with a double-shielded cable using 6-pin Tuchel connectors. The Tuchel threaded and locking connector was chosen over a multi-pin XLR connector for two reasons: less likelihood of disconnect and zero mechanical noise. An XLR can wiggle around in its socket and cause crackles or microphonic noise. Me-

chanical inertness of all components within a sensitive microphone is important so that loud sounds vibrating them don't contribute to the mic's sound.

IN THE STUDIO

My first trial for the mic was in a session with a loud, male rock vocalist. In the past with loud singers, the ELA M251E would not have been my first choice, because the Teles tended toward a brighter and edgier sound near or at clip a lot of the time. I also find more need to de-ess every time I use a typical-sounding Tele 251E. Comparing the frequency response curves of the ELUX and the original, the ELUX is smoother with a less boost in the upper midrange and high frequencies.

For my rocker, the ELUX was really good—better than any Tele I have ever tried for loud guys. I got a bigger sound with good low end, even though it was placed 10 inches back from his mouth. At that distance, older condensers do not typically have an overload problem, and there was certainly none here. I did use an industrial-strength pop filter and slightly tilted the mic out of the direct wind path. With a modicum of EQ (a bit of cut at 2.5 kHz) and compression (4:1 ratio, RMS compression of about 3 to 6 dB), my singer loved "working" the mic, as its cardioid response is even all around the front.

One problem I often have with old Teles is noise. After setting a good, hot mic gain level, using a little EQ and compression, there was usually a constant background noise. These days, with 24-bit digital, everything else is so quiet that mic noise is unacceptable. The ELUX 251 is quiet for a vintage design at about 27 dB "A" unweighted.

Female rock vocals fared equally well, but I had a chance to use the mic more dynamically on the song as the verses were quieter. My singer liked the fat sound of this mic, and I tried recording in omni pattern, with smooth results. In a friendly sounding room, the omni pattern adds a more transparent "openness." Soundelux points out that the main focus of the mic is the cardioid pattern, but besides the omni pattern, users will appreciate, I am sure, the mic's figure-8 versatility for distant coincident M/S orchestra miking or just about any other application. Two of them would "rule" for drum overheads!

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Indigo Girls

Amy Ray

Marah

Freedy Johnston

Marvin Pontiac

Those Bastard Souls

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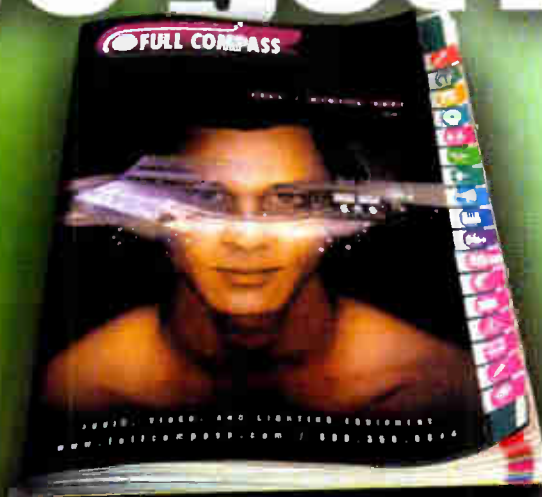
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HEY NINETEEN

NEW YORK STORIES FROM REAL LIFE

The AES show is about gear, baby, new and exciting products, blah, blah, blah...But exit polls after several recent tradeshows all yielded ho-hum comments. Perhaps we have become jaded, or addicted to rapid growth, or we haven't stopped long enough to realize that progress is still being made *fresh daily*.

There's nothing like a little reflection to help put things into perspective. So, for this month's column, I've reached back into my memory to identify a sonic mile-marker and/or professional growth spurt for each of my 19 years in Manhattan. The idea is that a lot has happened technically in the past almost-20 years, and a lot's still happening. Perhaps one of my tales will trigger a memory or two for you. So, sit back, enjoy the latté and have Sherman set the Way Back Machine to 1-9-8-0.

PRINCE VALIANT

I arrived in New York City 21 years ago with cassettes of my best work, a duffel bag of clothes, a small tool case and a 1963 Plymouth Valiant (Fig. 1). No matter how big my dreams were, New York City had a way of narrowing my focus to the essentials—like eating and paying the rent. Regardless of the number of audio career choices that may have been available then—certainly there are many more options now—my perspective was refined by the desire to engineer and produce the ever-elusive “hit record.”

1980: TAKE GOOD CARE OF YOUR FEET, PETE!

On “Easter Monday” of 1980, New York City was in the middle of a transit strike. To cover a mere 50 blocks took several hours by car, drastically reducing the potential number of job interviews per day—as well as a great many brain cells killed off by automobile fumes.

Lesson One: New York City was made for walking. Be flexible. Learn how to make the most of challenging situations. Ditch the car. Bring com-

fortable shoes and extra socks. Most of the time, it is not the resumé that gets the job, but being in the right place at the right time. Same with finding a cool restaurant away from the tourist traps. Eat well for less.

1981: DEPTH OF FIELD

Nothing puts pressure on a freelance engineer like a studio full of musicians and a ticking clock. However, when I found myself in an unfamiliar control room and focused more on balance than EQ, my rough mixes sounded better on more systems than they did when I had more time to tweak.

Before MIDI and samples, engineers were always made to feel responsible—if not guilty—especially for drum sounds. On one memorable date, session drummer Andy Newmark sat down in front of the same “house” kit I had tuned and used on countless sessions. Within 15 minutes, the tape was rolling. The drums were as consistent while I was tracking as they had been when I was getting sounds. My jaw was on the floor in amazement, and I stepped up to the glass to observe his technique—it looked as if the skins were barely being touched.

Lesson Two: Less is more. Better-sounding sources require less tweaking. I humbly acknowledge all the great musicians who make our jobs easier. Aim high!

1982 LATO-A: AUDIO ARMAGEDDON

On the flip side of that coin, recording a few power-metal pop bands led me down a dark and mysterious path. Each subsequent referral became heavier and heavier until I was asked to finish a Plasmatronics record and “do sound” for them on Tom Snyder's *Tomorrow* show.

Observations:

- An electric chainsaw with a contact



Figure 1: The stock 1963 Plymouth Valiant was equipped with a 220-cubic-inch slant-six engine, push-button automatic transmission and an AM radio with Class-A output amplifier. Fuel consumption was at least 20 mpg highway.

pickup sounds just like a vacuum cleaner that is similarly outfitted.

- A real “floating wall” moves when explosives on the other side blow off the hood of a car. This was not your average union TV gig.
- Contrary to her wild and ferocious stage persona, the late Wendy O. Williams was as gentle as a kitten in the studio. I once bumped into her at a health food store.

1982 LATO-B: DIGITAL FANTASY

My first digital experience was at Fantasy Studios in Berkeley, Calif. With only 10 days to complete an overdue project (with Snakefinger stepping in to produce The Mutants, a Bay Area band), the option to go digital via Mitsubishi X-80 became attractive, even compared to the opportunity to use an Ampex ATR-102—my favorite analog machine. Using minimal EQ to save time and avoid sonic sand traps, I found the X-80 to be brighter and punchier—typical for digital at that time—yet complementary in this instance; the X-80 won out over the ATR.

Had time allowed the tracks or the mix bus to be EQ'd as “competitively bright” as other music of that time period, I might have joined the “digi-phobe” bandwagon early. Digital audio

BY EDDIE CILETTI

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technology has made incredible progress since then, but so have we all, learning to treat it differently from the way we use analog tape. When once we struggled to keep a mix bright, now the focus is at the opposite end of the spectrum. Bright is easy; "warm" is the goal.

1983: ACROSS THE UNIVERSE

My official transition back to geekdom began with a project for Atlantic Studios. CDs had just entered the mainstream, and the studio had just received a Sony PCM-1610 editing system. While interviewing veteran mastering engineer Sam Feldman about his specific requirements for a transfer console, I noticed initials on some documentation. The "sf" script seemed so familiar—almost musical—I soon realized it was Sam's initials that appeared between the lead-out grooves and the label of some of my favorite records (as shown in Fig. 2); right next to it is the "Bell Sound" stamp. (I was quite the record fanatic before joining the profession.) Imagine being recognized for your initials! I sure made a friend that day.

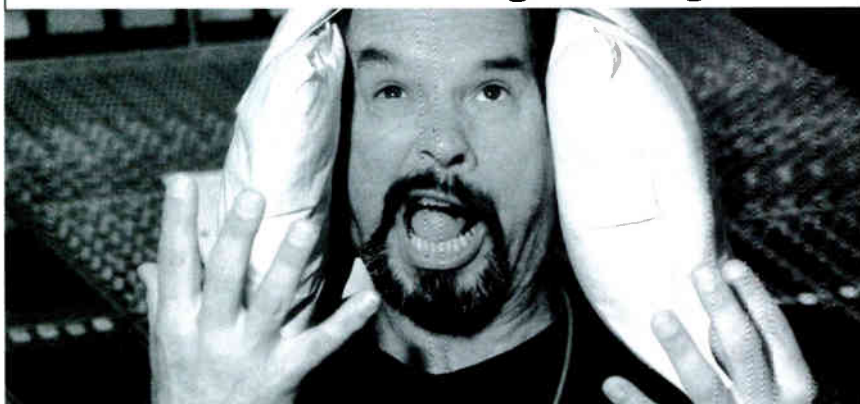
Bell Sound was a hot independent studio in the '60s, along with Fine and A&R studios. Just as we struggled with digital in the '90s, Sam Feldman and his peers had their own beasts to tame: For example, the transition from mono to stereo, and the quest to push levels on 45 rpm records to make them competitively louder on jukeboxes and at home. (Sound familiar?)

Atlantic was my night job. During the day, I did wiring at Photomag, a sound-for-film facility on the East Side. I had never seen magnetic film recorders, let alone racks of them—all interlocked with Selsyn motors, and each representing one or three tracks. One floor below, the sound of the electromechanical synchronizing equipment was frightening. We've come a long way, baby! The beginning of the MDM revolution was still seven or eight years away.

1984: WATERING THE PLANT

I joined Record Plant with more experience than discipline. Because mentoring is an important aspect of this business, I'll mention one of mine. Paul Prestopino was the spiritual leader of the maintenance department, and he taught me the value of patience, organization and humility (though it still took a decade or so to acquire these skills). Paul's multiple talents include woodworking, metal

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work, engraving and tailoring. How can you argue with someone who is a master of all trades *and* a musician (currently on tour with Peter, Paul and Mary)? Be sure to thank your mentors, and be one when the opportunity presents itself.

Occasionally, when the studio was short-handed, I was called out of the shop to assist. Some of the engineers were surprised that a technician could actually do this job. Having scaled the walls rather than climbed the ladder, I knew what was expected. On a Miles Davis date, I "accidentally" stopped the multi-track after seeing his hands in the air, thinking it was a signal to stop. (Actually, that's all I ever saw of Miles during the entire overdub session.) The engineer turned and said, "Don't stop the tape even if he falls on the ground." Miles, always a bit more succinct, asked, "What the #@%\$ did you stop the tape for?" (See Fig. 3.)

1985: PHREE AT LAST

Before leaving Record Plant in Spring of '85, I told owner/engineer Roy Cicala about my plans to start a freelance maintenance biz and cater to the growing "demo" studio scene. (That's what project studios were called before digital sperm fertilized the analog egg.) I could see Roy was not comfortable with this topic, but I couldn't see how a 1-inch, 16-track "closet" studio might threaten the existence of a multiple-room facility with two remote trucks, a collection of vintage gear to die for and a formidable track record. Perhaps Roy saw the writing on the wall, or maybe it was just bad coffee...

Once I left, the freelance gigs doing tech support for Record Plant's remote trucks were cherry—Eric Clapton was particularly impressive at Live Aid. At Farm Aid, an overweight policeman *a la* Boss Hogg misinterpreted my response

3	4	5	6	7	8	9	10	11	12	1
CBS	Pos#	105	643					24	dolby	
Miles	Davis							2	12002	
Miles	Davis							2	DBX	1800
Ron	Eddie									
24/15	456	dolby	Rec	5	5/5					

Figure 3: A Record Plant schedule sheet with setup details for a Miles Davis session. The "S/S" refers to SelSync, as in "overdub."

for attitude and told me "This ain't no Miami Vice!" A mindless wiring job at a video facility was paying better than my gig at Record Plant. I saw the writing on the wall, *and* the coffee was better...

In Manhattan and other urban areas, the biggest challenge for most semi-pro gear was RF and TV interference. (Digital products are generally more noise-immune because they have to be!) My apartment was line-of-sight with the Empire State Building and the World Trade Center, a situation that made cassette deck alignment impossible. However, the location served as a good test site for problematic equipment, even after I set up a dedicated shop space.

Cassette decks were difficult enough to maintain—speed and azimuth being their Achilles' heels—and fighting interference only added sand to the Vaseline. Sure glad we don't have to deal with cassettes anymore. Hate digital all you want; I'll take a CD over a cassette any day!

1986: SEARCH AND DESTROY

Two great remote gigs followed: one at the Kennedy Center in D.C. (a Martin Luther King birthday celebration featuring Stevie Wonder), and the other at the Statue of Liberty Celebration in New York Harbor. Applying wireless technology to in-ear monitors reduces stage levels, protects hearing and ultimately improves the FOH sound. I used the Japanese version of the FM Walkman because it differed from the American FM spectrum, allowing more available "clear" channels. Stevie also gets cues so he can move around onstage.

Wireless can also be absolutely frightening technology, especially when the Secret Service used it to "sweep" Governor's Island for potential bombs. Every level meter on every tape machine and console was momentarily pegged. Had there been a bomb, the audio and video geeks must have been considered expendable, as opposed to saving a guy who thought ketchup was a vegetable.

I was especially taken aback when a gentleman showed up in



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Figure 2: Vinyl maniac Here's the signature of the mastering engineer, something not found on CDs.

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our sound truck with a custom high-speed, multiple-cassette playback rig used to "augment" the audience response during President Reagan's speech. This was before someone thought to use a sampler for subversive mind control. A Sony 1630 editing system cost about \$80k.

1987-1991: INSTALL THIS!

Until the '90s, the typical project studio had eight to 24 analog tracks on either narrow format or second-hand 2-inch machines. Synchronizers were not uncommon, but not much fun either. Think about this: Three Otari ½-inch, 8-track decks and two synchronizers cost approximately \$20k, about \$5k more than three ADATs at their original list price. The MDM seeds were being planted...

Before the minds at Mackie ever thought about marketing a 32-input analog 8-bus mixer, a 32-input 4-bus Soundcraft Series 200 desk was \$8,000. (Now, digital consoles with Total Recall and signal processing are falling into that price category.) Installation with three patchbays was a similar amount. A Sonic Solutions editing system cost about \$100k in 1991, the NoNOISE option was about \$20k, and the CD burner was \$10k. Blanks were \$25, about the cost of DVD blanks now.

1992-1993: SKATING AWAY

Just after I paid off a small business loan, Alesis introduced the ADAT and everything changed, nearly overnight. The narrow-format analog machines that formerly were the primary source of income for both users and service facilities quickly disappeared.

The writing was on the wall, but it was graffiti this time. Cassette decks were fussy enough, but early DAT recorders required the patience of a Swiss watchmaker *after* all the layers were removed to reveal the transport. Few people come to New York City with this skill hoping to make it big. Affordable mixers put pressure on installers to streamline the wiring process. Who wants to pay three-times the console price for wiring and patchbays? Most budget project studios were being user-assembled with premade wiring harnesses.

1994-1996: THE SYSTEMS ANALYST

Large-scale integration assisted the digital transformation, changing the service business in the process. Equipment was becoming more powerful and more reliable—yet less serviceable. I freed my-

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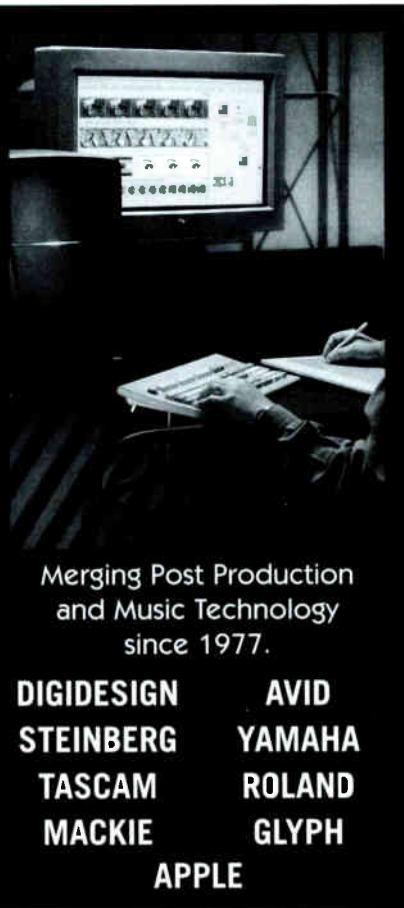
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self from the role of employer to pursue more "interesting and challenging jobs," such as providing vacation relief in a video facility. The audio project studio was in full swing then; affordable technology soon allowed video to make the equivalent transition. Interestingly, although it's more technically challenging than audio, video quickly embraced digital technologies, some of which did not operate in real time—even then.

Service of high-tech equipment at the hardware level primarily consists of board swapping, otherwise known as mail-order maintenance. Understanding signal flow via block diagrams is more important than parsing circuitry in "the black box." Microprocessors in each black box require the former hardware specialist to zoom out and take the "Systems" approach to maintenance.

To overcome the hazards of software and hardware collisions, it is necessary to interrogate the user, remain calm and show no emotion when pressing the Reset button or flipping the Power switch. Live remotes were good training for achieving this state of "nerve-ana."

THE TECO-INTERROGATION PROCESS (SOME SAMPLE QUESTIONS)

What were you doing when it failed? When was the last time you saved? Assuming a power cycle resolves the problem, do you understand that anything not saved will be lost? Okay. Let's power everything down and start again. Back online.

Sound familiar?

NETWORKING THE FUTURE

The same forces that made audio gear more affordable and more powerful have shaken the whole foundation of video. Then, the capital investment for video gear was staggering. Now, it's still more expensive than audio gear, but less so than the early Sonic Solutions workstation.

In order to create the many frames for any animation project (think *A Bug's Life* or *Toy Story*), several Silicon Graphics workstations were networked together. These cost tens of thousands of dollars plus extra \$\$\$ for a yearly support contract. Each "box" renders a single frame that is exported to an external hard disk recorder via network. Only then can it be transferred to tape in real time. The workstations could not display full resolution moving images in real time. Now, well-endowed, off-the-shelf dual-processor PCs can do the same job.

Until the video facility gig, I had never really considered networking but quickly applied the knowledge to my shop PCs.

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THE TECH'S FILES

Networking is easier now and more affordable than ever. Earlier this year, I added a four-port gateway (\$90) between the cable modem and the rest of the network. Now, all of our computers—Macs and PCs—can access the Net for software updates and registration.

1996-1998: THE STRAIGHT AND NARROW

Not real comfortable around advertising and marketing types, I bailed on the video gig and returned full-time to digital tape machine repair. Working alone is soothing. An ISDN connection was all I needed *then*, except for this Aeron chair and that frothy cappuccino...

The consumer DVD arrives. I'm mixing 5.1 surround on a workstation, and burning a reference DVD will be \$15k with programming. Blanks are \$50.

1999-2001: THE GREAT ESCAPE

I loved New York but got tired of paying rent. I'm completely virtual now and living in the Twin Cities.

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I never imagined owning a studio, but I always fantasized about having enough gear to overdub and mix. Before digital, the paradigm was miniaturized analog. After I reviewed two workstations, the future was clear.

At this year's AES show, my mission is to seek out workstations that support dual-processors and compatible file-exchange formats as well as affordable DVD authoring for non-feature film applications.

Enjoy the show and appreciate the progress we've made. As with any construction project, it takes 20% of the time to accomplish 80% of the work. The converse is true for the job of "finishing the details," aka, refining digital technology. ■

Eddie Ciletti became a father for the second time in the middle of writing this article. Visit tangible-technology.com for Web cam views of early snow.

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The Wireless Reality

Field Miking and Mixing for TV's Hottest Genre

Broadcasting's current soup du jour, otherwise known as reality television, offers a plethora of nightmares to torment audio crews. Take a recent challenge posed by NBC's *Fear Factor*. For some reason, contestants agreed to crawl through a rat-infested drainage tunnel while water flowed over them, in keeping with the show's format requiring players to participate in bizarre stunts. Those logistics, in turn, required the audio crew to transmit wireless signals from contestants' stunt mics inside the tunnel up to field mixing stations.

by Michael Goldman



Fear Factor



The audio control room at the Big Brother house on the CBS Radford lot in Studio City, where the show is recorded in a controlled environment, rather than out in the field like most genre shows.

In the spirit of the game, the crew cheated slightly on its standard wireless approach, according to Stacy Hill, *Fear Factor's* senior audio supervisor. Instead of relying on wireless mics, they planted a hard-wired mic in the tunnel that served as the equivalent of a boom.

"In the tunnel, even with high-powered wireless, our signal was extremely weak," says Hill. "Fortunately, the video team had rigged an infrared camera on a track to follow contestants through the tunnel. We planted a Sennheiser MKH40 mic under the infrared camera as it traveled on the track, and we hard-lined that mic out of the tunnel to a wireless transmitter. That transmitter then sent a signal to the field mixer just 20 to 30 feet away so he could dial in the signal and add it to the mix. The cable was over a 100-foot run, but in the end, it became a wireless signal. In the tunnel, the mic picked up the contestants like a normal booming situation, because it was right on top of them. Of course, we also had to waterproof the mic since they poured water through the tunnel."

Such challenges are now commonplace in the reality, or unscripted, universe. While the creative and social values of such reality-based shows can be debated endlessly, production innovations resulting from such programming are too numerous to mention. On the audio side specifically, reality-based shows have moved the art and science of wireless recording technology to a new level.

At least that's the view of Jeff Santoro, a longtime TV and film sound mixer and owner of Pacific Technical Group, Burbank, Calif., a company that now focuses exclusively on providing equipment, crews and consultations for reality shows, including *Real World*, *Road Rules*, *Fear Factor*, *The Mole*, *Murder in Small Town X* and others.

"Most of these shows require a wireless approach, usually in complicated environments," says Santoro. "When crews are following people in those environments, there are times when wireless cannot be duplicated, because, unlike other types of programming, these shows are too chaotic. Some manufacturers are now producing products specifically for this market, but crews are still innovating like crazy out in the field. That's because, until recently, no one had



Some of the Wendt X2 mixers recently used during production of CBS's upcoming *Amazing Race* reality show.

approached these shows with specialized equipment or techniques, since few people really believed the trend would last. But now, there clearly is a market for this kind of specialty, so manufacturers are starting to develop new tools, or modify existing ones, for these jobs."

MIXERS AND MICS

Production on the first season of *Fear Factor* earlier this year debuted one of those innovations: the Wendt X5 mobile field mixer, a tool that has since spread to

"Before, there was no 5-input mixer you could take on location like this one, let alone a mixer you could bus together with a second one to create 10 inputs and still be mobile, so we talked to Bob and he built one," says Santoro. "It only weighs about four pounds, with batteries, so it's light enough to easily move as contestants move. Plus, it has features like pre-fade listen, which is crucial when you are working with wireless, as people come and go during the shoot."

Mobile mixing boards, however, are only one part of the equation. Complicated mic choices, power issues, frequency problems, elemental hurdles and the unique requirements of individual shows also pose routine problems.

In the past year, Michael Alexander served as a principal field mixer on two new reality shows—*Combat Missions* and *Man Hunt*. He says elemental factors have "a huge impact" on audio capture for such shows in remote locations.

In *Combat Missions*, for instance, teams of former military and police personnel do battle using non-lethal ammunition

on a mile-square chunk of the Mojave desert in Southern California. Alexander says that miking contestants for clear signals was "complicated," mainly because of "howling wind in the desert, made worse by helicopters and other military equipment."

"We chose to lavalier contestants with



Pacific Technical recently put together an equipment package for the first season of Fox's *Murder in Small Town X*, including Sennheiser mics and wireless equipment, Lectrosonics wireless equipment and Wendt mixers, among other things.

several reality productions. Hill's crew used it on *Fear Factor*, and programs like *The Mole*, *Real World* and *Murder in Small Town X* are now following suit. According to Santoro, the X5 was designed by engineer Bob Wendt in consultation with Santoro about the specific needs of reality TV audio crews.

The Wireless Reality

Countryman EMW mics and Sennheiser quarter-watt transmitters, but we also had to find a way to deal with the wind," says Alexander. "We put Windjammer windcreens on them, but we needed more than that, so I asked the wardrobe guys to build burlap flap casings. They put Velcro on them, and that allowed us to enclose the microphone against the contestant. It was amazing in terms of wind reduction, and a cheap solution."

Alexander and his colleague, Pat Siesleski, received redundant signals from contestants on Lectrosonics 210 and Sennheiser EK-4015 receivers in two separate "audio chalets"—pup tents a half-mile apart. There, they created the mix—Alexander on a Mackie 1604 board and Siesleski on a Spirit 8 Folio mixer. (Because the location was a square mile, it was split into grids, with Alexander mixing half the coverage area until contestants passed into Siesleski's area, where she then took over.)

"Of course, being in a remote part of the Mojave desert, we first had to figure out

a noise-free way to provide DC power to the mixing boards," Alexander recalls. "Eventually, [Burbank equipment rental house] Plus 8 found us a couple of [Stat-power 1000 sine wave] power inverter units, and those units ran silent unless they overheated, allowing us to produce converted DC power out of deep cell, AC marine batteries, powering the boards."

A few months later, Alexander found himself in a similar setup on the island of Kauai in Hawaii while working UPN's *Man Hunt*, in which contestants navigate rugged terrain while trying to avoid "hunters" determined to take them out of the game. On that

program, contestants are given walkie-talkies to coordinate strategy with one another. That posed a problem in terms of seamlessly adding those conversations to the mix.



Above: the fear of dogs. Below: Michael Alexander, one of the principal field mixers on the cable show *Combat Missions* with his DA-78 recorder inside his "audio chalet" on location in the California desert.



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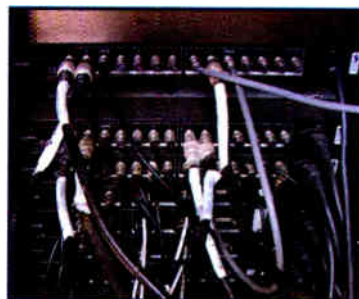
The Wireless Reality

"I had a receiving walkie-talkie in my tent," says Alexander. "I initially thought of just trying to record the signal by plugging into my headphones, but there was too much hum there. Instead, I gaffer-taped a Tram [TR-50] lavalier mic with a Windjammer on it to the speaker of my walkie-talkie, and ran that line directly into a Fostex PD-4 time-code DAT recorder. That gave us truer audio, the way a walkie-talkie really sounds."

THE FREQUENCY FACTOR

Shows like *Combat Missions*, *Fear Factor* and *Man Hunt* all depend heavily on being able to capture clean radio signals from contestants' transmitters. Finding the correct frequency is therefore a complicated issue. Most crews rely mainly on extensive research and tests during pre-production, but even then, complications can, and do, arise.

That's one reason why most reality shows still rely on the venerable sit-down interview with contestants—to provide supplemental coverage in case a particular event is missed by cameras, mics or both. In addition, some wireless pro-



Pictured are the front of the Sony WDA-20 antenna distribution system control unit used on the UK's *Scrapheap Challenge* (top), and the back of the system.

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grams, like *Fear Factor*, do record some backup audio onto videotape during stunts where contestants physically carry clamshell recorders on their bodies, with tiny cameras and mics hard-wired to the recorder. Hill says those backup audio tracks were rarely needed during production of *Fear Factor*, however, mainly because of intense testing done with the show's stunt team to eliminate wireless problems for each setup.

Santoro explains that, in preparation for such shows, his company spends much of its time concentrating on solving signal problems before they arise.

"Frequency coordination is the most complex part of these jobs," Santoro says. "All the on-set frequencies alone, combined with local analog and digital TV and radio frequencies, make it difficult. Our company has developed proprietary software designed to monitor and coordinate the signals to work together as a group once we have chosen frequencies. Before that, of course, we need to use a variety of resources, such as the *World Radio Handbook*, and a couple Websites—particularly the FCC's—to determine what frequencies are currently licensed and transmitting in any particular city. We generate those lists and continually compare and update them."

Of course, not all reality shows are shot in the United States. In the original version of Discovery Channel's *Junkyard Wars*, contestants are given tools, materials and 10 hours to build different types of machines from scratch that are later judged in

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The Wireless Reality

competition against each other. The show is now produced in the United States, but *Junkyard Wars* began life as *Scrapheap Challenge* for three seasons in the UK, where its audio template was established, only to later require revision in the U.S.

Richard Meredith, co-director of England's Total Audio Solutions, served as sound supervisor on the UK version, and as a consultant on the American version. Meredith points out that the show, like *Combat Missions*, has a large coverage area in both a four-acre junkyard and in different venues where the competing machines are tested. By UK law, transmitters are limited to lower power levels than in the United States. This caused Meredith to select an active antenna signal booster system from Sony to handle wireless signals in the show's wide coverage area.

"We used the Sony WDA-820 antenna distribution system, which lets you place four antennas on a single input, and also lets you cascade the units together, creating an actual antenna network, which is

more efficient for a large coverage area," says Meredith. "Contestants wear Sony 860 transmitters, and we also put [Beyerdynamic TGX-30] headsets on them rather than lavaliers, because the contestants use tools to build their machines, and mics could be damaged or drowned out, whereas we can keep headset mics near their mouths at all times, no matter the head movement."

The antenna network enabled Meredith's team to send the various signals to a specially configured mobile audio truck on-site, where the signals were captured by Sony WRR-850 AC power receivers, and then added to the mix on a Sony DMX-R100 48-input studio console, and recorded out to Tascam DA-88 recorders. In order to match picture and audio, however, Meredith's team had to create a system to transmit the signal back to the six video cameras taping the show as it was mixed.

"All the picture cutting is done in post, and the cameras are remote, so we needed to do three mixes—'A' and 'B' mixes of the contestants, and a 'C' mix of the judges—and re-transmit them to the relevant cameras in the field," he explains.



The fear factor of being in a submerged automobile.

"We configured the cameras with Sony WRR-855 receivers, and that captured the mixed signal and put it onto the tape with the picture, locking the two together with

"Every time I sit in front of this Console I just say to myself, God bless Paul Wolff and API."

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small Ambient Lockit signal sync units attached to each camera. The main sound in the final mix came off the DA-88 version we recorded in the truck, but this method let us match picture and sound."

When the show moved to the U.S., however, the crew faced the opposite signal problem—American transmitters can operate at higher power levels, but with fewer frequencies per band. That created bandwidth problems in coordinating the movement of the RF signal from the contestants, to the truck and back to the cameras without interference, according to Meredith.

"I felt the original American setup had not allocated the frequencies very well," he says. "The aim is to set up an intermodulation-free plan, whereby none of the transmit frequencies interfere with any others. The problem in the U.S. was, the bigger the 'side bands' become, the more they cause co-channel interference with other frequencies. In consultation with the American sound crew, we decided to swap things around so that the highest powered frequency was used for transmission back to the cameras, so most potential interference frequencies would be above everything else we were using."

WIRELESS-LESS

Not all reality shows, of course, take place outside. Meredith also serves as sound supervisor for the Fox Family Channel recurring special *The Scariest Places on Earth*. That show takes place inside ancient castles around the world, where selected families are required to spend a night in total darkness while performing odd tasks.

Because the program usually is shot in old buildings with thick walls, the RF approach was not an option. Instead, audio is acquired alongside video on mini-DV recorders worn by contestants in special vests. The issue Meredith's team faced with that approach, however, was the lack of any ability to field-mix the signal. And contestants often scream, per the format's design, which presented a problem maintaining proper levels.

"Contestants wear Sony ECM-77 lavalier mics attached to the same little arm that holds a mini-camera, both hard-wired into the DV recorder," says Meredith. "When the player screams, that obviously creates a high sound pressure level. We needed to keep the signal from being distorted in those situations, so we devised a little custom box specifically for this show that essentially amplifies the mic signal up, or limits it down, to the recorder's line input level. We gave the system an amplifier, but also inserted a limiter into

the box to protect against overload if voices get too loud."

Such solutions are commonplace in the unscripted world, and future programs will feature more innovations, including the use of multitrack hard disk recorders, among other things, according to Santoro.

"In the future, many people believe that the method of acquisition for these shows in the field will be with digital Betacam and HD cameras," says Santoro. "So many people are working right now to improve wireless technology so that the signal will interface better with Sony digital recorders, and work better around HD cameras. Right now, HD cameras bring

higher-frequency noise levels with them out in the field, so problems like that need to be attacked."

But as Santoro points out, there will never be "a correct way" to record such shows, particularly as they become more outrageous, if such a thing is possible.

"It's a break-the-rules, make-it-up-as-you-go-along industry," says Santoro. "That's the biggest evolution we're seeing—nothing ever stays the same. Every show is different and you just have to figure it out." ■

Michael Goldman is the senior editor of Mix's sister publication, Millimeter.

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SURROUND ON LOCATION

Multi-Mic Technique Meets Phase-Based Matrix

by Larry the O

Surround recording is an area many are exploring nowadays, and each of those that do so have their own applications and reasons for doing it, but it is likely that Riccardo Mazza is alone in taking on this topic to justify elephant rides in Sri Lanka and river trips in Thailand. The wife of this high-spirited, 37-year-old, Turin, Italy-based musician and engineer likes to travel, and she's not so keen on anything as nearby as Venice or Florence.

As Mazza watched his travel bills mount, he realized he had to find a way to make this wanderlust earn money instead of hemorrhaging it. The answer lay in recording the sounds of the far-flung destinations. Mazza had already spent nearly a year devising software to let him experiment with surround motion techniques in the music he was writing. Now, recording in surround seemed the answer that would justify his perambulations and their costs, but there was a catch: Portable multitrack digital recorders were not as easy to come by in 1997 when he started the effort as was his trusty Sony portable DAT deck.

The challenge was plain: Find a way to record immersive surround recordings on two channels that could then be decoded in post-production to recapture the surround image.

The solution Mazza came up with was a family of multi-mic recording techniques and a phase-based matrix that encoded the microphone outputs into a 2-channel signal capable of being decoded by a standard Dolby Pro Logic unit. The development ignited in him a burst of technological and musical activity that produced a unique set of tools and techniques, as well as the world's first Dolby Surround-encoded sound effects library.



Peter Giola (standing) and Riccardo Mazza

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DEEP BACKGROUND

Mazza began his musical career as a drummer, but that didn't last past his teens, because, as Mazza explains, "I was crazy, rolling all the time and giving fire to the cymbals. Nobody wanted to play with me at all!"

In his 20s, Mazza began studying technology. Although he continued composing and playing music, including an abortive madcap attempt at rock 'n' roll stardom in Los Angeles, he also began an intensive study in sound and audio technology. While immersing himself academically, Mazza kept close to "the street," engineering and sound designing for major Italian recording artists, and providing technical support for companies like KS Waves, Opcode Systems and Creamware. In 1995, Sony Italy released a solo album of Mazza's "progressive pop."

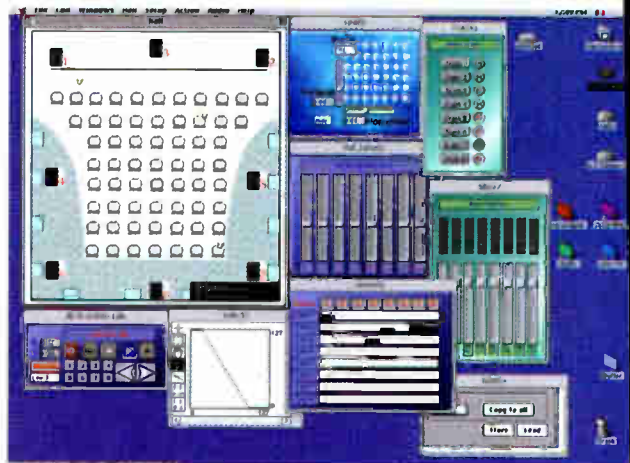
By 1996, Mazza began teaching at the Scuola di Alto Perfezionamento di Saluzzo, one of Italy's most highly regarded schools of music, an activity he continues today.

(He's also involved with conservatories in Bologna and Milan.) Then the surround bug bit, and within a year, Mazza had created his first surround software tool, 3D Total Surround (3DTS), for use in a performance at Milan's Magazzini Generali of a suite he composed and conducted. "It was a major step for me," says Mazza, "experimenting with dynamic motion and the reactions to various curves of different source and speaker positions."

3DTS is a stand-alone application that controls a DAW or digital mixer with MIDI control change commands to manipulate up to eight signals playing over up to eight virtual speakers placed within a defined space. The behavior of each speaker is specified and can be varied in real time. A built-in sequencer can record and play mouse gestures, and OMS compatibility allows MIDI controllers to be used and recorded.

In 3DTS, the user first defines the dimensions of the room in which the

sound will be played (a PICT of an actual space can be pasted into the display for convenience and realism) and then the placement of speakers within the space. Next, the user creates dynamic response characteristics for each speaker by specifying a maximum output level (which roughly correlates to its throw, or distance coverage) and a table containing a curve



Screenshot of the 3D Total Surround (3DTS) software. The venue and speaker placements are illustrated in the window called "hall," with the room's dimensions defined in the "space" window. The main determinants of how sound moves through the space are set by the virtual speaker levels in the "Out Levels" window and the curve (or "table") in the "tab:51" window.

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SURROUND ON LOCATION

onto which signal volume for the speaker will be mapped.

Both of these parameters are very flexible: The maximum volume can be varied in real time to effectively change the amount of leakage or separation between speakers, while the curves in the tables can be drawn in any shape. With the environment and its response created, the user then makes and records movement

gestures for the sound.

3DTS typifies a very important aspect of Mazza's work in surround: His viewpoint is musical, and so his primary concern in the tools he makes and their usage is creative rather than scientific. While his mic techniques often do not produce the most accurate representation of an acoustic event, 3DTS is not designed to be a true emulation of speaker response in a room, and many of the sounds on the CD library are not mono-compatible. Instead, his aim is to achieve the greatest dramatic impact that surround sound promises. (More information on 3DTS and the rest of Mazza's innovations can be found at www.renais

sancesfx.com. A 4-in/4-out version of 3DTS can be downloaded from www.riccardo-mazza.com.)

MIKING TECHNIQUES AND X-MAT

With 3DTS up and running, Mazza started developing his mic techniques, which he called "X-Technologies," as a research project that further exploited some of the curves and ideas he explored with 3DTS, and combined them with the surround effects produced by out-of-phase material. His experiments started with the distance formula:

$$d = \sqrt{(X2-X1)^2 + (Y2-Y1)^2}$$

Where d = distance; X1, Y1 = listener's position coordinates; and X2, Y2 = coordinates of a sound source moving through space.

The result of this was mapped onto a mathematical matrix that assumed 360° pickup (by any number of miking techniques) and combined a time-variant re-

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XMAT setup for the I configuration with a cardioid, a shotgun and a bidirectional mic. Bus 3 is phase-reversed.

sponse curve with a linear mapping of the space definition to yield a value representing angular distance from a directional microphone.

Using this system, a source moving past a mic array will produce an out-of-phase signal over a certain range of coverage angles and distance. When the mic outputs are properly summed, this produces a 2-channel, Dolby Surround-compatible signal without any of the lowpass filtering and other limitations of Dolby Surround encoding.

Mazza leveraged Dolby Surround steering by carefully combining microphone pickup patterns and placement, level and phase control. His research resulted in four X-techniques intended to allow acoustic events to be recorded with maximum impact.

"X-Techniques are a derivation of Mid-Side technology," Mazza points out. "You can use many different mic techniques; the key is the principle of sum and difference combination with a figure-8 or a cardioid microphone."

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SURROUND ON LOCATION

"In order to use this technology, I need a double-encoding of phase. I have phase control on the first section of the channel and another phase switch on the destination, so summing and differencing both phases I get what I call 'double-sided' coding."

Putting these ideas into action required building a means of performing the careful, phase-correlated level and phase manipulations necessary to get the desired effect. Mazza programmed the necessary encoding matrix, which he calls "X-Mat," as a plug-in for Creamware's powerful Scope environment. (Scope consists of a PCI plug-in card containing 15 Analog Devices SHARC DSP chips and a software library of audio processing modules from which you can build virtually any custom circuit.)

X-Mat has five channels for microphone inputs, each with a level control and assignment to one or more of four buses, which are then summed down to a 2-channel signal. Phase reversal is possible at numerous points in the process: independently on each channel, on pairs of channels (1/2 and 3/4) and for each of the buses.

Mazza's "I" format is a good example of how his X-Techniques work. The I format puts an omnidirectional microphone, a shotgun and bidirectional (figure-8) mic in a near-coincident M/S-like array, where the figure-8 is at a 90° angle to the shotgun. In the X-Mat matrix, the omni and the figure-8 are assigned to buses 1 and 2, and the shotgun to buses 3 and 4. The buses are combined into Lt-Rt, but the phase of bus 3 is flipped before combining. The result is:

$$L_t = O+L-R+S=L+R+C+S+L-R-S=2L+C-S$$

$$R_t = O-L+R+S=L+R+C+S-L+R+S=2R+C+S$$

Which, once Dolby Surround-decoded, yields:

$$L=2L, R=2R, C=2C, S=2S$$

This configuration excels at capturing front-to-back motion, but yields a weak stereo image and suffers from proximity effect. Consequently, this format is optimal for recording large events, like ex-

plosions or gunshots, at a distance.

The X-O format, on the other hand, is intended to produce an accurate 360° image. It requires five microphones: four cardioids and an omni. The cardioids are placed with one facing each direction: One pair is placed at right angles to each other and captures the front L/R, while the other pair faces the rear and captures SL/SR. The two pairs are placed coincident to each other, while the omni is placed in the middle of the whole affair. In the X-Mat matrix, the cardioids, appearing on channels 1 through 4, are as-

signing were necessary. The biggest was that it was obviously not possible to take a Scope system with him, eliminating the use of his X-Mat software. In its place, Mazza constructed a very simple, passive electronic circuit that accepted four inputs, summing the transformer-coupled left and right channels with an out-of-phase surround and the center channel (which was attenuated by 3 dB through empirical determination). Thus, the left-channel output was:

$$L+S+(C-3\text{ dB}), \text{ while the right was } R-S+(C-3\text{ dB})$$



The Matrix. The Filter Mode buttons under the "Ch 1" and "Ch 2" legends in the main center section allow the HPF and LPF filters to be applied in flexible and unusual ways, while the parameters can be modulated by the LFO Matrix to their right.

signed to buses 1 and 2 (which then feed Lt/Rt outputs) in odd/even pairs (FL/FR and SL/SR to 1/2), but the phase on SL is flipped. The omni is assigned to both buses 1 and 2. Defining the pickup of the omni as (L+C+R+S), we get:

$$L_t = L-Ls+Omni = L-Ls+(L+R+C+S) = 2L+R+2C+(S-Ls)$$

$$R_t = R+Rs+Omni = R+Rs+(L+R+C+S) = 2R+L+2C+(S+Rs)$$

To make this work, the Ls signal must be normalized to compensate for the summing of Rs with the S component of the omni.

The Y-8 format uses two cardioid mics and a figure-8 to capture a 270° soundfield, best for capturing environments rather than motion. The Y-Hyper format substitutes a hypercardioid for the figure-8 and yields a 360° soundfield.

OUT IN THE FIELD

By 1998, Mazza felt it was time to take some of his ideas out in the field and put them to the test. To be practical for field recording in exotic locales, a number of

compromises were necessary. The biggest was that it was obviously not possible to take a Scope system with him, eliminating the use of his X-Mat software. In its place, Mazza constructed a very simple, passive electronic circuit that accepted four inputs, summing the transformer-coupled left and right channels with an out-of-phase surround and the center channel (which was attenuated by 3 dB through empirical determination). Thus, the left-channel output was:

Although today Mazza's circuit is nicely mounted in a project box, the original passive matrix was nothing more than loose circuitry: Just the thing to concern airport security in far corners of the globe. The hardware box's stripped-down nature limited the X-Techniques he could use with it, resulting on his relying most often on his Y-Hyper format. For microphones, Mazza used various combinations of the AKG 300 Blue Line Series (for their robustness), a Shure VP88 MS mic, Earthworks SR77s, Schoeps boundary-layer (on less distant and dangerous outings), and Oktava MC 012s (mostly on gunshots because of their hardware level pad). ATI Nanoamp mic preamps fed a Sony SBM (SuperBitMapping) converter, and the output was recorded on a Sony DAT deck. Using a homemade carrying case and a mic mount, Mazza struck a deal with his wife (a photographer) that for every picture she shot, he would record a sound.

POST-PRODUCTION TOOLS

Between trips, Mazza, who considers himself to be primarily a composer, continued building tools for creative surround production. Eventually, these were brought to bear on the field recordings, as well as musical works and commercial jobs.

Mazza programmed two more applications, the Matrix and the LFE synthesizer, as plug-ins for the Scope environment. These surround tools were integrated into his production studio by connecting the Scope system to a Pro Tools Mix Plus system through an ADAT bridge.

"The Matrix creates a 5.1 environment from a stereo source, or even a mono source," describes Mazza. "The Matrix was originally designed for me as a key-

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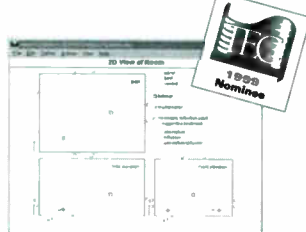
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SURROUND ON LOCATION

board player. I normally use two keyboards to make one sound, so I created the Matrix because I needed it to do surround keyboards. Then I tried using the Matrix with stereo sounds, and I found that it worked very well, so I started using it for surround in normal production."

The Matrix is a multichannel morphing filter intended to produce interesting motion effects. It accepts four inputs configured as two stereo pairs (originally often a stereo synthesizer and a sampler) and produces 5.1 output.

There are six sections to the Matrix. The first is the Input section, which provides gain and phase control, metering and bypass (for in/out comparisons) for the two input pairs.

Next, the signals are fed to the Filter section. Each stereo signal is provided a lowpass filter, a highpass filter and a comb filter, all of which can be configured in a variety of ways. For instance, the LPF could be applied to the left channel, HPF to the right channel and the comb section (which is stereo) fed in parallel, with the outputs of the whole mess being combined at the end.

The LFO section contains four sine LFOs, which cause the motion in the signals. Each LFO is assignable to one or more parameters of the Filter section. The Vector section has two virtual "mod wheels" to which MIDI controllers are mapped in order to crossfade level and pan of the two stereo channels. The level wheel simply crossfades the two stereo channels, while the pan wheel exchanges pan positions between stereo channels (stereo channel 1 L/R moves to the pan positions previously occupied by channel 2 L/R, and vice versa) or within channels (channel 1 L moves to the location of channel 1 R, and vice versa, the same thing happening with channel 2 L and R). Because the wheels are controlled by MIDI controllers, the moves can be recorded and edited by a sequencer.

Another LFO is provided as an alternative to using MIDI to control the level wheel. This LFO is more sophisticated than those in the LFO section, with definable waveform, fade in and a Sync mode.

More MIDI control is available in the MIDI Modulation section, which lets key position, velocity or aftertouch be mapped to filter parameters. Response curves for the controllers can be drawn and edited.

Last, but far from least, is the Assign-

ment and Master section. In 5.1 mode, each of the four inputs you've by this point completely warped can be assigned to one or more of the five main outputs. The ability to assign an input to more than one output yields the ability to create complex interactions that will cause dramatic movement in the surround space. This mode also produces excellent Dolby Surround-compatible output. The Master section also has a Stereo mode.

The Master section contains two LFE processors, which use Tartini's third sound principle to produce very low-frequency signals. (Tartini was an Italian violinist who documented different tones in his mid-18th century harmony manual, one of the first discussions of what we now call the "missing fundamental effect.")

There are three versions of the Matrix: Matrix F (Full), M (Medium) and S (Small). The difference is simply the addition of a final delay section. Because delay can take up a lot of memory, the S version has no delay, while the F version provides the ability for each of L, R, SL and SR to be delayed and sent to any of the other three channels.

Taken as a whole, Mazza's Matrix provides a nearly overwhelming wealth of options for manipulation of two stereo signals to create a rich, moving surround soundfield.

BUILDING THE LIBRARY

Three years ago, Mazza met Turin businessman Pietro Giola, a former commercial composer now running a musical rights licensing concern, and the two decided to create and market a surround sound effects library with Mazza's tools and field recordings. A multi-CD set was planned, and Renaissance Sound Technologies was formed to produce it.

Mazza had always felt that the LFE channel played a crucial role in providing impact for surround sound, so it was decided that the CD library should contain an entire disc of LFE elements. To facilitate production of this disc, Mazza created the LFE Synthesizer (LFE-S), again using the Creamware Scope system as his development environment.

The LFE-S is a toolkit that exploits several psychoacoustic effects and synthesis techniques to generate very low-frequency materials. Five oscillators (one of which can be switched to accept an external input signal for processing) and two noise sources can be combined and assigned as modulators in an FM synthesis circuit with a sine wave carrier. The modulating oscillators can be defined by a number of parameters and further altered with wave-shaping sync circuits.

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SURROUND ON LOCATION

From this point, the output of the FM synth and the modulating oscillators themselves are split into two signal paths. One path feeds a filtering section with 24dB/octave highpass and lowpass filters and the output of this section feeding a VCA. The other path goes to an LFE section, which is an adaptation of the LFE algorithm used in the Matrix, but tuned to lower frequencies.

A sophisticated modulation section with two full-featured LFOs, two envelopes and comprehensive MIDI mapping capabilities (the LFE-S is fully MIDI-controllable) provides more resources for complexity in the circuit.

Finally, the whole shebang: All of the various synth outputs (summed oscillators, waveshaping, FM, subtractive filtering) are combined with the outputs from the LFE section in the final output section.

With production of the CD library underway, RST began producing surround sound scores for conventions of Italian industrial giants ranging from Martini Bac-

ardi and Fila to Alfa Romeo. Surround sound in a live, commercial event was a revelation to many clients, as Giola recalls: "Renaissance Sound Technologies started to enter the market for original music production in surround for B2B [business-to-business] purposes, [which was] something very new for the market of

special events, conventions, multimedia events, exhibitions, etc.

"Marketing directors, creative managers—they know about surround production just on the cinema side; they usually don't think to use surround sound in special events or other similar applications. When we introduce them to what



An uncharacteristically serious portrait of the usually irrepressible Mazza in his studio. The window above the left corner of the Digidesign Pro Control unit looks into the recording room where he develops his X-Techniques.



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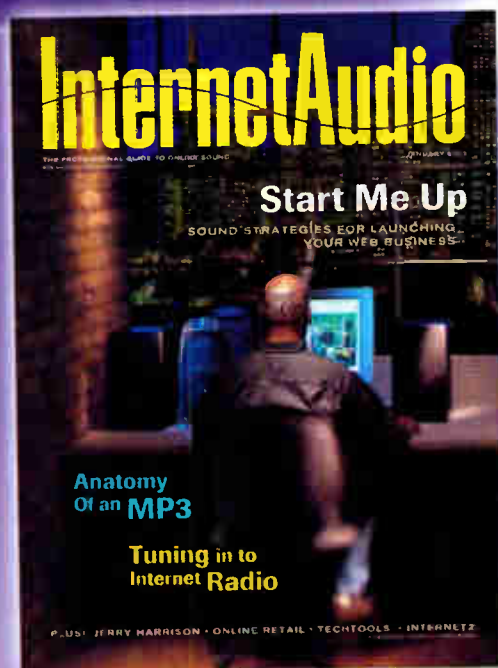
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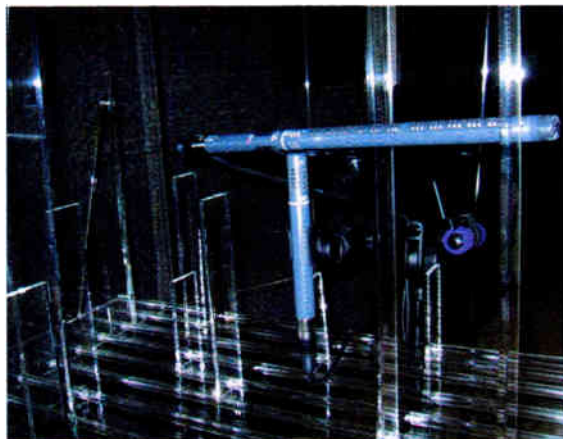
SURROUND ON LOCATION

surround sound is, they don't believe it is possible that audio can have so much impact on an audience [as we tell them it can have]. As soon as they sit in Riccardo's studio and listen to his surround-spatialized effects, all of them immediately change their point of view on audio and music and understand the real added value of surround sound production. For us, it is fundamental that they understand that surround audio is not just a better way of listening, but a new way of listening. It's a way to be 'in the sound,' and can be the key for developing new creative communication ideas and products. In this way, you can give your audience new 'sensations.' Every time we produce original surround sound, production clients feel there is something they didn't feel before.

"To illustrate the point, in the fall of 2000, we produced original surround sound installations for an in-

ternational art exhibition on the Etruscan people at the Palazzo Grassi in Venice. In the 'war room,' where old Etruscan arms were exhibited, we re-created a battle environment in surround sound to convey to visitors the sensation of being in the middle of an Etruscan battle.

"On opening day, the exhibition's official press release started with: 'Impactful battle sounds come from the war room of the Etruscan exhibition at Palazzo Grassi in Venice opening this Sunday. [You'll



Mazza's Reflection Chamber Emulator. Plexiglas "boards" of carefully calculated heights are placed to generate resonances at harmonically desirable frequencies.

hear] really involving and fascinating sound effects of roars, screams of wounded soldiers, clanging of swords, horses running and neighing; In this room, it's impossible to forget that Etruscan people were a warrior people as well."

RENAISSANCE SFX CD LIBRARY

By the end of 1999, the Renaissance SFX library was released and quickly garnered worldwide interest and distribution (with North American distribution through Sound Ideas). The Dolby Surround-encoded library, when originally released, contained seven discs (it now has 11), with a combination of natural field-recorded ambiences and effects and highly manipulated or synthetically generated ambiences and effects. The set is notable for its variety and out-of-the-ordinariness, with ambiences ranging from a monastery in the mountains of Thailand to a mall in Sao Paulo, a train in Prague and, of course, a pizza restaurant on the Italian Riviera. Alpine streams and horse pass-bys recorded in the Pampas of Uruguay illustrate the effectiveness of Mazza's miking

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SURROUND ON LOCATION

techniques, while science fiction sounds, ghost and goblin voices, and crazy and evil laughs demonstrate the usefulness of the post-production tools in studio work. An entire disc is also dedicated to surround musical elements: loops, pads and hits.

To differentiate effects intended to have a natural sound from those that are deliberately shaped, the sounds are identified in the library's catalog as belonging to one of three classes, which Mazza details: "We have 'natural' sounds, which are from the X-Techniques, that we used on city tracks and so forth. Then we have what we call 'motion' sounds, which are sounds that do not have an exact spot motion but they have a character or personality, like a ghost flying around you. Then we have sounds with exact motions, named 'panned,' which have a defined path, like 'gunshot LCRS,' which means from left through center to right and into the surrounds."

Mazza labored extensively in the authoring of the discs to ensure that the

sounds not only worked individually but also in combination. "Every sound has been treated independently so that any sound can be layered with any other sound without losing phase-based images," explains Mazza. "You can do many layers of the sounds in the library and still get the correct motion. If I have two versions of a sound, I treat one such that it will have a little phase difference from the other, so that you can always layer the sounds and build your own surround environment." Extensive testing layering combinations of sounds in the library was conducted to ensure that phase cancellation would be unlikely.

But the phase-based nature of Dolby Surround did force some difficult decisions. "We choose not to be completely mono-compatible," notes Mazza. "Natural sounds are mono-compatible, but the panned sounds are not mono-compatible. We do that so that you can get the maximum motion."

The choice of the Dolby Surround format, as opposed to 5.1, was largely a practical one. For starters, releasing 5.1 audio discs could only be done on DVD, as op-



Riccarda Mazza and his peregrine wife, Carola, shooting photos and recording sounds on Thailand's Mani River.

posed to standard CD-DA, which, in 1999 especially, was the more established format. Additionally, the library as released can be used in stereo without downmixing.

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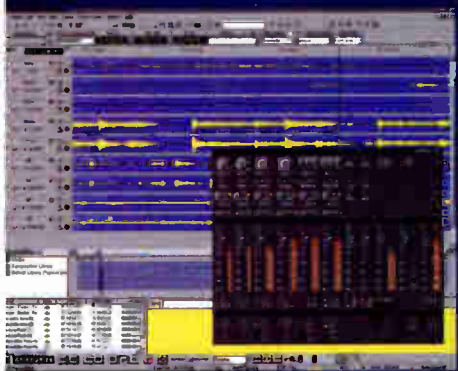
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The release of the CD library was only the first volley, and production of more discs was ongoing. Since the original release, four more discs were added to the set, one being the LFE disc mentioned earlier. Mazza also wanted to release more musical elements on disc and continued developing tools toward that effort. The other new discs contain some of the results of this work.

His most recent invention is the Reflec-

tion Chamber Emulator, or RCE. Once again, Mazza took an unorthodox approach: Where recording engineers usually struggle to eliminate standing waves in recording spaces, the RCE was created to generate them. The RCE consists of a slotted Plexiglas sheet as a "floor" in the X plane and two sheets mounted at 90° to it as "walls," the two walls being at a 30° angle to each other. On the floor, Plexiglas "boards" of carefully chosen heights are arranged so that their placement results in standing waves of desired frequencies and amplitudes. The boards can be changed to accommodate the needs of the application. Generally, Mazza arranges the RCE to pro-

duce harmonically related standing waves calculated to complement the tonality of the musical piece he is recording, and he has written a program for his Psion PDA to calculate the height and placement of the boards for a given set of desired resonances.

The RCE is positioned in front of the musicians and then miked with either an inverse M/S arrangement or one of Mazza's X-Techniques, and recorded onto two tracks. In post-production, an M/S matrix or X-Mat is used to decode the material back into surround. Mazza's idea is to create a rich, harmonic surround environment for musical elements, and three new CDs have been created with the help of the RCE.

All of Mazza's tools and techniques have been built to serve his music, and even with the development time, travel and library production, he has kept up a continuous stream of performance and installation projects. In 1998, he created a system of sensors linked to works of art in Turin's Chiesa S. Filippo gallery. In 2000, RST created an interactive surround spatialization environment for the ARTISIMA Art Exhibition in Turin, a multisensor-controlled surround installation at an art exhibition in Milan, and the Palazzo Grassi installations described earlier, while 2001 brought yet more multisensor surround works with a performance at the Contemporary Art Museum in Turin and two installations at the Experimenta scientific exhibition, plus a surround soundtrack for the Giocathlon interactive exhibition on sports. Whew!

Mazza's work with sensors spurred the development of yet another tool: an interactive music language he calls CSXL (Coding Source Extended Language). "It's basically a squencer of ideas," explains Mazza, "where you can have placement of sound components algorithmically controlled by external factors like sensors."

Even with all of his tools, techniques and credits, Mazza still focuses on doing what it takes to get the job done, even when it calls for extraordinary measures to keep harmony in his household, as exemplified by a recent example of a recording done for the CD library: "In order to record breaking dishes [used in the library], I had to wait for my wife to go and see her mother, since I wanted to use all the marble surfaces in my house. The difficult part was cleaning everything up before she returned!" Oh, were we not supposed to print that part? ■

Larry the O is a musician and sound designer who has contributed to Mix since 1984.

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World Radio History

New York Post

Building Back Business After the Strike

by Gary Eskow

Setting up an audio post facility with the right people, technology and amenities is critical in the highly competitive New York market. Targeting your client base is also key. All bets are off the board, however, when an unforeseeable firestorm like last year's long and bitter Screen Actor's Guild strike hits town. Suddenly, work dries up, and even the most senior players in the field are left scrambling for billable hours.

Did the strike (now a fading memory) change the face of audio post in New York? Did major studios realize that they were vulnerable in ways they'd not considered before and look for additional



Bob Pomann of Pomann Sound

revenue streams? Did clients turn to non-union labor or talent outside the greater Metropolitan area? If so, did some of the audio post economy travel with them?

Understandably, not all of the post houses *Mix* contacted wanted to speak on the record about the long-term impact of the strike. However, we were able to gather a group of highly experienced—and visible—post personnel, including Howard Schwartz

of HSR/NY, Gail Nord of SoundHound, Ralph Kelsey of Broadway Sound and Bob Pomann of Pomann Sound. Their comments about the strike, and the current state of the industry, should be illuminating to anyone interested in the health of audio post.

So, let's begin with how the strike changed business, if at all, for your companies.

Howard Schwartz: It was a very interesting time, that's for sure! My clients all hired non-union talent, and, as a result, it took twice as long to record stuff. From a billable hours point of view, business was mostly okay.

The bad news is that while the actors and actresses were on strike, a lot of people found out that there were other places to work than New York, and even the United States. They also found out that some of these other areas were less expensive to work in than New York. That newfound awareness has definitely changed the landscape of the production and post-production businesses in this area on a long-term basis.

Gail Nord: SoundHound was lucky to have a strong on-air promo client base that remained extremely busy during the strike. We used it as an opportunity to solidify and add to that client base, as well as add in long-format program mixing for some of our cable clients.

Bob Pomann: There was less of a cash flow! We found ourselves putting more effort into getting promo work clients, which was an area we hadn't pursued vigorously prior to the strike. We were fortunate to have a steady cartoon series, *Sheep In the Big City*, on the Cartoon Network at the time. We hustled to get more series work, and that effort has paid off well.

Ralph Kelsey: The bulk of our business is cable promotion, so we didn't really get a direct hit from the strike. However, since there was less business out there, we felt an indirect hit as a result of ad facilities trying to fill their studios.



Howard Schwartz of HSR/NY

Did you find yourself recording more music dates or delving into new media?

Pomann: We've got a composer on staff, but we didn't go out looking to book our studio for music dates.

Kelsey: No, we didn't get an increase in music dates. We didn't actively pursue different business, although we did seem to get more long-form programming from our cable clients.

Nord: No increase in that area. We were fortunate in that the History Channel and A&E got more active in searching for this kind of business at the time of the strike. Having a strong client base was critical.

Schwartz: I didn't change my business plan at all. We don't do either of those two things—music sessions or new media work. Because of both the actors' strike against television shows and the writers' strike with Hollywood, both areas geared up and were pumping out a lot of work for a while, in anticipation of these stoppages. The consolidations of the post-production industry caused by Liberty Livewire created some new friends for us.

Things always are changing, and you have to be able to adjust. We have a great deal of capacity here, so when the advertising portion of our business went down, ADR went up. Last year's Super Bowl was

—CONTINUED ON PAGE 230

Composer Spotlight Carter Burwell

by Paul Verna

Ecology is a word you don't hear too often in the context of recording studios, but it suits film composer Carter Burwell's home-based facility in New York.

"One of the first things I said to my architect, John Storyk, is that I wanted the studio to be an ecology of technology," says Burwell. "I wanted all these different species of machine to live together in some symbiotic way. I've always loved the fact that my life is filled with machines and that they're all going to talk to each other, and new ones will be born and old ones will die. An ecology is a messy, complex thing, and we have to accept that that's what it's going to be."

Those who have followed Burwell's work will not be surprised to hear him liken his studio to a living, breathing being. After all, Burwell's scores are universally acknowledged as some of the most organic and original in the

film industry, enriching already brilliant films like Joel and Ethan Coen's *Blood Simple* and *Fargo*, David Mamet's *The Spanish Prisoner* and Spike Jonze's *Being John Malkovich*.

For most of his career, Burwell worked out of a self-built studio on West 37th Street. While that space served him well as a composition

—CONTINUED ON PAGE 234



Carter Burwell (left) and John Storyk

Facility Spotlight Sonicopia and Pulse 3-D

By Tom Kenny

Just when sound editors and mixers were getting a handle on drop-frame, nondrop and the idiosyncrasies of international video/film formats, along come

HTML coding, bandwidth optimization, JavaScript and cross-browser compatibility. Sound a bit intimidating? Sure. But it doesn't have to be.

Despite the gloom-and-doom press of the past year, the Internet is very much alive and well, and for anyone working in sound-for-picture, it seems a sure bet that Internet audio is going to be the Next Big Thing. While most applications thus far have focused on streaming and MP3, the notion of music and sound effects loading with the Web page, providing a backdrop similar to television spots, is ready today.

Many companies have developed custom sounds for particular sites, but Sonicopia, a San Francisco-based Web audio developer, has taken the idea one step further, providing a tool for any Web designer to add music, voice and effects in real time. No need to learn coding; the drag-and-drop interface in the newly released (available in

—CONTINUED ON PAGE 238



Sonicopia founder Stuart Dubey, left, with Pulse CEO Fred Angelopoulos

A Sound Designer by Any Other Name...



By Larry Blake

Last summer I was interviewed by a nice young man who is writing a doctoral dissertation on the evolution of modern film sound. Although he was in many ways guilty of classic, predictable mistakes of academia, his heart was clearly in the right place. I was frank with him regarding my contempt of assumptions of Grand Artistic Intent and Design propped up primarily by recycled errors present in papers written by other academics. In other words, opinions that pass the muster of post-graduate academia although they lack any resemblance to everyday working reality.

At one point in our conversation he asked me about the nature of the “sound design” credit. Try as he did to get me to create a clear distinction between “sound designer” and “supervising sound editor,” I couldn’t help him. Many people who had one credit could rightfully claim the other. Some people who have one are deserving of neither. I’ve never thought of this before, but unions and academics have this in common: They both have a deep, ingrained need to carefully pigeon-hole job descriptions.

This month’s column also won’t come up with any solutions to this “whodunnit” mystery. Instead, I hope readers will be satisfied with some background not only on the history of sound design, but also some of my feelings on the use—and misuse—of the credit.

To the best of my knowledge, “sound designer” first appeared on films in summer 1979 with Walter Murch’s credit on *Apocalypse Now* and Ben Burt’s on *More American Graffiti*. (The wording had been in use in live theater, where equal billing alongside the lighting, set, and costume designers is commonplace, though theater sound folks still aren’t considered for Tonys. What a crime.)

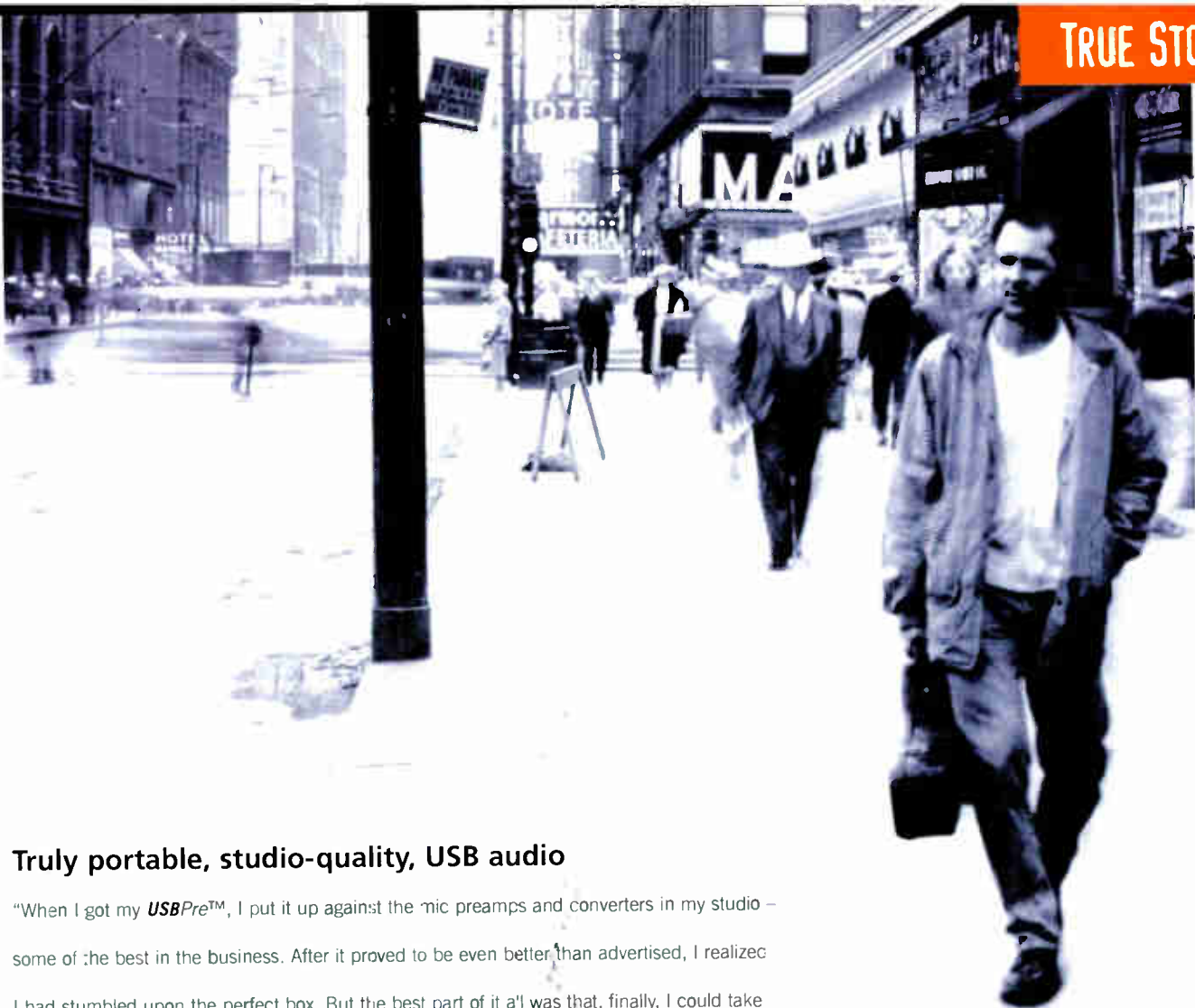
It makes sense that this newfangled credit would first be taken by Messrs. Murch and Burt, for they comprise two-thirds of my three-man All-Time Film Sound First Team, the third position being held by Murray Spivack. (See glossary for their credits.) The extent of their influence on the art of film sound is inestimable, and their work set standards for film sound’s use as an expressive medium.

The best tracks of the past few years—*Contact*, *Saving Private Ryan* and *Fight Club* come to mind first—clearly stand on their shoulders.

All of this begs the question: What is and is not sound design, or better yet, who is or is not a sound designer? While “sound design” is most easily recognized as special sound effects, the title “sound designer” can also apply to the person who is in charge of bringing sounds to the mix, regardless of the nature of those sounds. As long as they are the person the director calls, or who the director reams when things aren’t right, that person qualifies for the title. Sorta...

I consider that sound design, real sound design, is the pinnacle of the film sound art. It’s one thing to make an ADR line or a noisy production track fit into a film without getting in the way of the drama. It takes great skill to make music, either in the form of standard underscore or an onscreen performance, sound great in a big room. Although the creation of new “design” effects might not be needed in a car chase or a cops-and-robbers shootout, the differ-

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ence between a good job and a pedestrian one is readily apparent.

But the act of creating a mood or a moment where there was none, is magical. At its best, it can not only interweave invisibly with film music, it can reach the same level of creative expression. More often than not it will involve bending or shaping some previously existing sound, most probably unrelated in species or design to the task at hand.

What about me, you might ask? On most of the films that I work on I receive a dual "supervising sound editor/re-recording mixer" credit, because I genuinely do both jobs and feel that my work is best expressed in that manner. I'm not a supervisor who nurses a few faders and calls himself a mixer or a mixer who slips a few tracks at the mix and calls himself an editor. (I know, I should say what I really think.)

Although my level of involvement on the track of these films is far-reaching, and I am in charge over the, yes, design of the soundtrack, most of the films that I've worked on haven't had many moments in which to exercise (or flaunt) garden-variety sound design skills. Therefore, I relish those moments when they do occur. The one film that I did have many such opportunities, *Housebound*, I decided to take a "Sound Effects by" credit. The primary reason I like this wording is its Jack Webb, "just the facts, ma'am" nature of describing the work. (I'll also admit that a small part of me likes the homage to the credit taken

by Mr. Spivack for his work on what is generally considered the first great sound design job, the 1933 *King Kong*.) Along these lines, should I ever add production recording to my job description, I would then be able to go for the simplest, most inclusive possible credit: Sound. But I don't see this happening any time soon.

Another point about my credit: The

***It's all about the work,
and good work doesn't need
a fancy-sounding credit,
and bad work won't be
helped by one.***

order (sound editing first, re-recording second) is quite intentional, because I believe that the work that I do in prepping, recording, editing and generally supervising the dialog, music and sound effects that find their way to the mix is more important than the work that I do as a re-recording mixer behind the console. And I think if you ask others who also do both—and there are no more than 12 in the world of feature film sound—they would agree with that position.

The bottom line is, of course, that the credit doesn't matter—the work has to stand for itself. So it goes without saying that Murch and Burt and a handful of oth-

ers are deserving of any credit they chose to take. However, over the years the term has become misused, and has been co-opted by many whose job scope was not as inclusive as is usually thought appropriate for the credit.

The late '70s/early '80s was a fertile period in film sound. There were many who were familiar with processing gear and multitracks, often with music backgrounds, who would create special sound effects for films. Some of them are better-known (read: infamous) in film sound circles for their superior skills at self-promotion than they are for their admittedly sometimes solid work. Nonetheless, it gave many old-timers pause that sound design was being equated with electronic processing, when such work had been done for decades with good old 1/2-inch and 35mm manipulation and a great imagination.

The other, usually unspoken problem that many of us have with the "sound design" credit is that it is a bit guilty of the "P" word. You know: pretentious. Not quite like a garbage collector calling himself a "Sanitation Engineer," but something like that. Another one of the undisputed great talents in film sound, the late Alan Splet (*Eraserhead*, *The Elephant Man*, *The Black Stallion*) sometimes was credited for Sound Design, although he was indeed leery of the Pretentious Factor, equating it with "hair design."

It's all about the work, and good work doesn't need (or isn't hurt by) a fancy-sounding credit, and bad work won't be helped by one. In addition, I feel equally strong that regardless of what the Person in Charge of the Creative Aspects of the Sound Job calls himself or herself, they remain the Person in Charge...Pretty simple and fair, huh? Not to many in the Hollywood sound community.

The dissatisfaction with the SD credit perhaps peaked in the early '90s, when there were attempts within the Sound Branch of the Academy of Motion Picture Arts and Sciences to preclude people bearing that title from being nominated for Best Sound Effects Editing. This blew over soon, no doubt in part to the essentially unenforceable, Draconian nature of such a rule, and its (il)logical potential scenarios. What if someone outside of the U.S. (with no way of knowing arcane Academy rules) was completely responsible for the sound of a film that everyone in the Academy Sound Branch agreed was the best sound-edited film of the year. If

GLOSSARY

BEN BURTT Revolutionized film sound in 1977 with the sound effects and creature voices that he created for *Star Wars*, and later went on to do the sound for the other three *Star Wars* episodes and the three *Indiana Jones* films and for *E.T. The Extra-Terrestrial*. He is currently editing the picture and, soon, the sound on *Star Wars Episode Two*, to be released in May 2002.

WALTER MURCH Responsible for the sound of *American Graffiti*, *The Conversation*, *Apocalypse Now*, and the first two *Godfather* films. Won Oscars for both Best Sound and Best Film Editing for *The English Patient* and is generally credited with being the first to simultaneously mix and supervise the sound of feature films.

MURRAY SPIVACK In his 43-year career he went from founding the RKO Pictures sound editing department to recording the music and supervising the re-recording of 12 films that won the Best Sound Oscar, including *West Side Story*, *The Sound of Music*, *My Fair Lady* and *Oklahoma!* Oh, yes, he was also a top percussion teacher from 1927 until 1994.

JACK WEBB Star and producer of the television show *Dragnet*, in which he and his partner would approach each case and its suspects with decidedly unfunny deadpan sarcasm. Webb's famous tag line, when a witness was wandering off the subject, was "Just the facts, ma'am." In film sound-ese, this is translated to: See a dog, hear a dog.

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their credit read "Sound Designer," would "No One" be the name of the person whom the Oscar would go to?

Give me your opinion about sound design—the art, the credit, the job—at PO Box 24609, New Orleans LA 70184, or via the Internet: swelltone@aol.com. ■

Larry Blake is a sound editor/re-recording mixer who lives in New Orleans for reasons too numerous to mention, although one of them would have to be that people there are as confused by "supervising sound editor" or "re-recording mixer" as they are by "sound designer." Therefore he simply says that he works "in film," which makes it easier for them to imagine that he's constantly hounded by starlets.

—FROM PAGE 224, NEW YORK POST

probably 75 percent filled with dotcom spots. This year, there was one. The industry created capacity to fill that need. Now it's gone.

Did you have any construction plans that were put on hold as a result of the strike?

Nord: We were able to complete all our

construction plans as scheduled, which included a complete remodeling of the common areas of the facility—including the lobby, client lounge, conference room, hallways and bathrooms.

Pomann: Yes. I was about to build a lounge when the strike hit, but I canceled

plans. I'm now building a new studio, which should be completed by October of this year. We have five editors now, and we're very impressed with an Australian company called DSP. They make a workstation, the DSP Poststation, that's comparable to a Fairlight. It's made specifically



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Ralph Kelsey of Broadway Sound

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Has the strike had a long-term impact on the way your business is conducted?

Schwartz: No.

Kelsey: Our commitment still remains to our core clients, but because of our increased capacity, we're now able to avail ourselves to other markets.

Pomann: Not really. We just thought positive throughout the whole process. We did believe that the strike would end more quickly than it did. I feel sorry for the people who struck, because they got

very little out of it.

Nord: The strike really helped confirm our business philosophy of developing a diverse client base.

Has the commercial work come back to the level it was at in the pre-strike days?

Nord: Our commercial work has not returned to its pre-strike levels, although it seems to be picking up again in the last month or so.

Schwartz: No, and I don't think that it ever will. With the consolidation of the advertising business, every agency laid off 24 percent of their staff. How many people lost money in the LBO craze? Or the dot-com madness? That money went into thin air, and some of it was used to support the advertising industry that drives a large piece of the production business.

As far as New York goes, two of the big shows done here ended their runs. *Cosby* went off the air, and *Spin City* went to California. We're doing some new reality show work, plus lots of sports programming. We're also doing more cable work than we used to do, and that's okay. Our promo business is up for all of the networks. In general, things are okay, and okay is better than it could be.

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Pomann: Yes, pretty much. We're experiencing the usual summer slowdown, but that's normal. The slowing of the economy also has an impact, but that's also cyclical. We do a lot of high-end radio work, and the economy slowing down hasn't affected that part of the industry as much as it has television. We do casting, music and basically everything you can do for a radio spot. Clients come here from as far away as Boston to put a package together. Smaller agencies working without a producer will often have us act as producer as well.

Kelsey: Advertising is such a small percentage of our business that it's hard to say. It is actually one of the markets in which we plan to expand into.

Have you had to lay off any staff due to the impact of the strike?

Nord: Fortunately, we have not had to contemplate any staff layoffs, as our volume of work has remained consistently high.

Schwartz: Yes, we've done some house cleaning. Things were fat; now, it's "may the best man win." There have been a number of closures already, both audio and editorial companies.

Pomann: No, we kept the entire staff going. ■

—FROM PAGE 225. CARTER BURWELL

room, it did not stand up as a professional mixing environment. So, when Burwell moved to a 3,000-square-foot loft in TriBeCa in 1999, he seized the opportunity to build a world-class studio that would encompass all of his musical activities, from writing and programming to recording and 5.1 channel mixing.

"When I decided to build a studio here, I felt I wanted a good listening envi-

ronment and also a room where I could do my 5.1 film mixes," explains Burwell. "I really thought this was an opportunity to build a room I could mix in myself and have so much more control over that part of the process."

Before the room went up, Burwell had spec'd a Euphonix CS3000 digitally controlled analog console. However, when he saw the Euphonix System 5—a 24-bit, 96kHz-capable digital console—at the



The Euphonix System 5 Studio at Carter Burwell's TriBeCa home studio.

PHOTO: HOWARD SHERMAN

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Audio Engineering Society convention in New York in October 1999, he quickly switched gears.

"Clearly, in the future the signal path is going to be all digital, and I felt that while we're building the studio, we might as well acknowledge that fact," says Burwell. "If I put in some other type of board, I'd be replacing it in a few years; if I put in a digital board that's 24 bits and capable of 96k, then that's probably a piece of equipment I'd be able to live with for a decade."

The 24-fader System 5 is complemented by a Doremi VI video disc recorder; Macintosh G3 and G4 computers running Pro Tools and Digital Performer systems; two Tascam MX-2424 high-resolution hard disk recorders; and racks upon racks of synthesizers and samplers, including various Roland models (notably the XV-5080, VP-9000, S-760 and JV-1080), a Korg Wavestation and two NemeSys GigaSamplers.

Processing equipment includes the TC Electronic System 6000 and Finalizer; Lexicon PCM 70, 80 and 90 Series reverbs; Empirical Labs Distressors; and an Eventide H3000 Harmonizer.

Burwell's front left, center and right



PHOTO: HOWARD SHERMAN

Burwell insisted that natural light be incorporated into the design of his TriBeCa loft.

monitors are Genelec 1038s, with a Genelec subwoofer. Fully aware that the rear speakers should match the front in a professional surround room, Burwell intended to use the same monitors for the back, but had to make alternate plans because the 1038s physically wouldn't fit along the back wall of the control room.

The solution? Storyk enlisted audio specialist Ted Rothstein to custom-design rear speakers, using Dynaudio drivers, to match the front L/C/R array.

Although Burwell had never met Storyk, he hired him based on the architect's reputation as the builder of more than 1,000 state-of-the-art facilities all over

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the world, starting with Jimi Hendrix's Electric Lady in New York. "I knew I needed a professional to achieve my goal, so I went to John Storyk because he's so well-known," says Burwell.

As is often the case with building a studio in an existing space that must also function as a residence, there were limitations to what Storyk could do. Burwell says, "One of the biggest challenges was the question of windows and light. I was insistent on keeping all the windows I have here, which doesn't help the acoustics, especially when you're doing 5.1. But John managed, by covering everything else with soft surfaces, to make the acoustical space still work."

Storyk worked in tandem with architect Kathy Chia, who designed the residential space and consulted on the studio, and Burwell's wife, lighting designer Christine Sciulli.

The attention to detail and the investment have paid off for Burwell, who says he takes pride in knowing that all of his film scores are mixed in his own apartment.

"My mixing engineer, Mike Farrow, who lives in L.A., flies out here to mix all my projects," says Burwell. "Mike says this is his number one room to mix in. It's his preference, as opposed to any other room in the world. On any of these projects, we have a choice of rooms, and if Mike wanted to mix somewhere else, we

would."

Besides its state-of-the-art mixing capabilities, Burwell's studio offers amenities and flexibility that rival those of multi-room, multimillion-dollar facilities.

"One of the essential parts of the design is that the whole place, including the residential end, is fully wired so that everything talks to everything else," explains Burwell. "So we have eight tieline panels throughout the residence, each with a couple of video lines, coaxial lines, Ethernet, telephone, and analog audio and digital audio."

The studio's flexibility was tested to its fullest capacity recently, when Burwell, Farrow and Burwell's assistant, Dean Parker, were mixing the score to the upcoming film *Simone*, written and directed by Andrew Niccol (of *Gattaca* and *The Truman Show* fame) and starring Al Pacino. The problem was that Burwell—who admits that he is at the mercy of producers and directors when it comes to scheduling—had to start composing music for another film, *The Bourne Identity*, directed by Doug Liman, based on a Robert Ludlum novel and starring Matt Damon.

"We took the GigaSampler and the Roland XV-5080 out to the living room, along with a keyboard and the VI, and I basically had a little composing situation out there," says Burwell. "But both the GigaSampler and the XV-5080 had sounds that were required for the *Simone* mix, so they had to be playing back the mix that was happening in the control room, even as I was using them to write out there. Well, it turns out GigaSampler has four MIDI ins and eight outs, and the Roland has two MIDI ins and eight outs, so we sent the MIDI from the Digital Performer file running the *Simone* mix into our network.

Then, from the panel in the living room, I was able to plug those MIDI connections into the two synths, took a couple of digital audio outputs from those machines and put them into the panels, and they came up back in the control room. So all day long, I was out there listening to certain outputs and using certain MIDI inputs and hearing the score I was working on, while in the control room, those guys were using the same machines but hearing totally different sounds and working on a totally different film.

"It was wonderful," Burwell adds. "It represented the best use of the flexibility that those machines have, and the flexibility of this place, meaning the residence

DVD Picks

SANTANA: SUPERNATURAL LIVE

(Arista)

The consummate entertainer, Carlos Santana has been pumping out steaming live shows for nearly 35 years. Any Santana show is magic, but for this occasion, he ups the ante, getting a little help from his hot band and guest performers Cee-Lo, Everlast, Lauryn Hill, Dave Matthews, Sarah McLachlan, The Product G&B, Wayne Shorter and Rob Thomas—all of whom turn the thermostat even higher. Shot at the Pasadena Civic Auditorium, this 87-minute (plus another 55 minutes of interviews, bonus clips, music videos, etc.) concert DVD features tight direction by Joel Gallen and a spectacular DTS 5.1 soundtrack that captures the fury and fire happening onstage. Smokin'!

Recorded by the Design FX remote truck. Recording engineer: Paul Sandweiss. Music mixers: Jim Gaines and John Harris. Mixed at Effanel. Audio post: POP Sound. Post-production mixer: Ted Hall.



THE RUTLES: ALL YOU NEED IS CASH

(Rhino Home Video)

The granddaddy of all "mockumentaries," the 1978 *All You Need Is Cash* began as a short Beatles parody clip that aired on Saturday Night Live and ended up as a feature-length TV special created by Monty Python's Eric Idle and SNL producer Lorne Michaels. The superstar cast—including Idle (in many roles), Bill Murray, Dan Aykroyd, George Harrison, Ron Wood, John Belushi, Gilda Radner, and notables Mick Jagger and Paul Simon (both of whom play themselves, "interviewed" about how The Rutles influenced their lives)—are nothing short of brilliant. The script is both hard-hitting and hilarious; the intercutting of new and stock footage to re-create the past is amazing; but perhaps best of all is the band's music (written by ex-Gonzo Dog Band member Neil Innes), which makes one wish that Rutlemania was real. As a low-budget TV production, the film's audio production is less than stellar, and the 5.1 "remastering" didn't help much (somebody should have done a Yellow Submarine on this one!), yet through it all, this is a classic to be watched over and over.

Directed by Gary Weis and Eric Idle. Executive producer: Lorne Michaels. Music and lyrics: Neil Innes. Original production sound: Tony Jackson and Bruce White. Re-release 5.1 mixer and/or mastering engineer: uncredited.

—George Petersen
—CONTINUED ON PAGE 242

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World Radio History



as well as the studio."

As if those two projects haven't kept Burwell busy enough, he has also recently completed music for a low-budget, independent film called *Searching for Paradise*, and is scheduled to start working on the next feature by Jonze, the video director who made his film debut with the acclaimed *Being John Malkovich*. The Jonze picture, *Adaptations*, stars Nicholas Cage and Meryl Streep.

Juggling multiple—and completely different—projects is nothing new for Burwell, a lifelong musician whose career got off to an auspicious start in 1984, when an obscure pair of brothers named Joel and Ethan Coen asked him to score their debut film, *Blood Simple*. That movie's critical and commercial success laid the foundation for a career-long association between the Coens and Burwell that has yielded such other highlights as *Raising Arizona*, *Barton Fink*, *Fargo*, *The Big Lebowski*, and *O Brother: Where Art Thou?*

Burwell's relationship with the Coens continues. He has scored their latest film, *The Man Who Wasn't There*—which is scheduled for release later this year—and is about to begin a new Coen feature

titled *The White Sea*, based on a James Dickie novel and starring Brad Pitt as a World War II U.S. pilot who is shot down over Japan.

If Burwell shares the Coens' eyes and ears for the ironic, then his offbeat sensibilities have also attracted the attention of such other film auteurs as Mamet, Michael Caton Jones and Richard Donner, who hired him to score, respectively, *The Spanish Prisoner*, *Rob Roy* and *Conspiracy Theory*.

Whether working on a big-budget Hollywood extravaganza or an indie film, Burwell stays true to his artistry by approaching each as a method actor would tackle a role.

"I feel that working on big Hollywood films is really useful for me," says Burwell, "not only in that it financially subsidizes this studio, but it allows me to work with players and in places and with schedules that wouldn't be possible on independent films. The fertilization goes the other way as well. Working on independent films, you're constantly challenged by budgets and working with ensembles that are maybe 10 or 12 players instead of a symphony orchestra. It's a much more interesting challenge as

composer and orchestrator to be faced with 10 players and try to figure out how to get a variety of colors and sounds from them, and it's a bigger challenge for the players as well."

With a studio that can handle any project and a musical sensibility that attracts all types, Burwell is poised to continue enlivening his films with some of the most memorable scores in modern times.

"It really helps me to go back and forth between different kinds of projects," concludes Burwell. "If I were just doing low-budget films or just doing big-budget films, it would be a significantly less interesting and a less enlightening life for me." ■

Paul Verna is Mix's N.Y. editor.

—FROM PAGE 225, SONICOPIA

(November) Pulse Sonifier writes it into the page.

Stuart Dubey, an Emmy- and Clio-winning composer/producer and the owner of audio post house Dubeytunes Studios, launched Sonicopia as an interactive audio division about two years ago. He hired application programmers and a business development team, then began

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batch processing more than 20,000 bandwidth-optimized effects and music cues, many of them original to Dubeytunes, while others came from available libraries they had deals with.

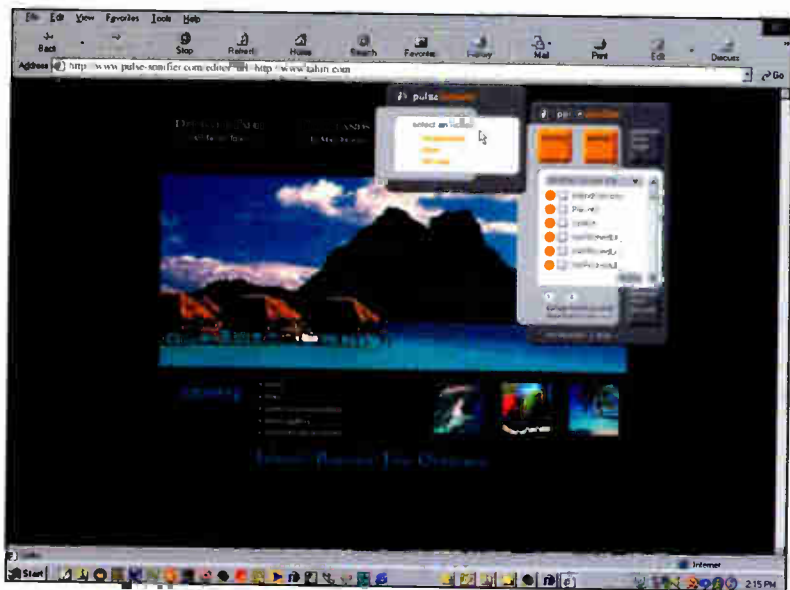
"People have no idea yet how much impact good sound design and audio

implementation can deliver on the Web, because most people haven't really experienced interactive sound," Dubey says. "Studies have shown that compelling audio creates a more engaging experience and increases the time that people stay on a particular site. Audio brands that were pro-

duced for traditional media can be carried over onto Web-based media, creating consistency among broadcast advertising and Web-based advertising. Audio can provide the bridge between the two.

"The trick is, how do you make interactive audio as transparent and seamless as possible so that it doesn't affect the page performance?" he asks. "Up until now, because of the technology and bandwidth constraints, visuals have been given priority and creative use of sound was absent from the Web. But the way we code the audio, it allows graphics the priority so that if you're on a high-speed connection, it plays together. But it senses if you're on a low-speed connection and allows the page to load first along with short bursts of audio data for user interface sounds before the music comes in."

In May of this year, Sonicopia was acquired by Pulse Inc., a leading technology innovator for interactive 3-D animation on the Web. In Webworld, it's the equivalent of Avid buying Digidesign, but with greater synergies. "The goal of the combined companies is to provide the next generation of rich media on the Web—the combination of visuals and audio," Dubey says. "The other big thrust



The Tahiti travel site, with search engine and Sound Bin "floating" over the site. Audition buttons and Highlight buttons are to the left of each sound.

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- Mark Goldblatt, Academy Award nominee for *T2: Judgment Day*, *Pearl Harbor*, *Armageddon*.
- Tony Mark, *Scary Movie II*, *Once Upon a Time in Mexico*, *Desperado*
- David Krall, President/CEO, Avid Technology
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is personalization, or creating the technology that serves as the layer between the information and its delivery. That means everything from having custom sites with audio updated daily, to having a virtual person read e-mails to you." (Don't laugh, it's coming: At SIGGRAPH, Pulse showed a tool for creating a 3-D image out of any 2-D photo, with full lip sync and next-generation text-to-speech capabilities.)

"We are doing the same thing with audio that Pulse is doing with animation," Dubey says. "We're basically building a multilayer, 'multitrack' soundtrack that can be triggered by the user's actions or navigation decisions. It's similar to games,

in that the composition and sound design follow different pathways that all transition and segue into each other. No matter where someone is on a page or what they trigger, it should create a harmonic, very linear experience."

Personalization is the key to the Pulse Sonifier, and the extent to which a Web designer, or any savvy audio engineer, can customize a site is nearly limitless. And it's simple. During *Mix's* visit to the Sonicopia facilities, Dubey put together a simple audio presentation for a Tahiti travel site in about five minutes.

Because all the work takes place within the browser, the user simply types in the

URL of a site, and the Sonifier instantly makes a copy for sonifying. After that, it is a simple three-step, click-and-drag process:

Find Sounds. An audio library search window pops up over the site, with more than 10,000 effects and 10,000 music cues available by keyword, type or theme (Science and Technology, Places and Travel, etc.). Theme sets include music and "pitched effects" in the same key, so that mouse roll-overs and user-interface sounds, for example, play harmonically with the background music. Effects and music are auditioned and then, with one mouse click, loaded into a Sound Bin for placement on particular objects. The catalog management system was developed in conjunction with mSoft, though Sonicopia makes use of a proprietary database.

Sonify. Here's where you drag and drop the sounds you've collected from the Sound Bin onto any objects or images on the page. In our example, Dubey clicked on "parrot" and dragged it to the parrot image so that every time the mouse rolls over, you get a squawk. Background music and effects can be easily added to play on page load. After you've placed all your sounds, you simply click Preview and the site plays. If you like it, then you...

Publish. A final designed site can be FTP'd to your server, e-mailed or downloaded to a hard drive for client preview. It's really that simple.

The initial release of the Pulse Sonifier is technology-agnostic, Dubey says, supporting a range of file formats, including .SWF and Pulse's .PWC and .PWS formats. "The audio engine in the Pulse Player is extremely robust," Dubey says, "and the most recent release is starting to incorporate enhanced audio capabilities. At the same time, we recognize that Flash is everywhere, which is why we are converting our MP3s to .SWF files."

All audio resides on the back end of the Sonicopia server, so files are secure and simply cached in the user's browser as he or she visits a sonified site. That's one attraction for record companies, and it's no surprise that Sonicopia is currently in discussion with the major labels.

But the possibilities are infinite, whether in retail, e-learning, advertising, corporate Intranets or plain ol' individual promotional sites. The Pulse Sonifier will be available on an affordable subscription basis of \$10 to \$20 a month.

For more, visit www.pulse3d.com or www.sonicopia.com. ■

Tom Kenny is the editor of Mix.

—FROM PAGE 236, DVD PICKS

THE CONVERSATION

(Paramount Home Video)

In the "Mix Interview" a few years back, Walter Murch, when asked why he thought people took such notice of the sound on *The Conversation*, said that first, it's the singular point of view of the main character being a soundman; and second, dialog essentially disappears about halfway through the film, so the brain fills in the holes by looking for sound effects. "It's like having the full moon at night," he said. "You know the stars are there, but you don't really think about them... On moonless nights, these smaller lights begin to acquire a fascination and an interest."

Director Francis Ford Coppola sandwiched *The Conversation* between *Godfather I* and *II*, and it's the first film that Murch edited both picture and sound. Listen for the realistic, urban environmental sounds, designed to match the documentary style of the picture. The sound montages surrounding the conversation itself, built on distortion, are brilliant. And what a lonely solo piano score by David Shiner. Commentary by Murch and Coppola.

Supervising editor, sound montage and re-recording: Walter Murch. DVD produced by Kim Aubry. Designed and mastered by the American Zoetrope DVD Lab. 5.1 surround mix team: Walter Murch, Kim Aubry, Pete Horner, Michael Kirchberger. Dolby Digital.

—Tom Kenny



THEREMIN: AN ELECTRONIC ODYSSEY

(MGM Home Entertainment)

Much of the world of pop music wouldn't exist as we know it if it weren't for developments by pioneers such as inventor Leon Theremin. His most notable creation was the Theremin, an electronic instrument that was played without being touched. Volume and pitch could be controlled by the proximity of the player's hands to the instrument. The movie *Theremin* is an engaging overview of his life, his creations, and those who played it and were greatly influenced by it. Bob Moog and a barely comprehensible Brian Wilson talk about the impact of Theremin on their lives. There are many wonderful, haunting performances by masters like Clara Rockmore and Samuel Hoffman that illustrate the Theremin's capacity for emotional nuance; certainly more so than the standard '50s sci-fi motifs that often showcased the instrument.

Written, directed and produced by: Steven M. Martin. Music by: Hal Willner. Sound mix: Andy Green. Additional Sound: Hui Cox, Dave Zieff. Stereo Sound mixed by Kim Aubry at Zeotrope Studios, San Francisco.

—Rick Clark



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World Radio History

Producer Michael Wagener And His Twin R100 Consoles

Producer/engineer Michael Wagener of Double Trouble Productions, Inc. recently installed two Sony R100 digital consoles

mixing the debut album from rock band Olive Carpet. The CD is scheduled for a fall 2001 release.

"I wanted a full-fledged 5.1 studio," comments Wagener. "So, I needed a digital board. In-depth research led me to the Sony R100s. In addition to its 5.1 capability, the console has really clean converters, great mic pres, extremely flexible input/output routing, and incredible sonic clarity. I was also impressed by its total recall capability. Sometimes, after finishing the mixes for an album project, I go back and do some remixes. The ability to recall a complete setup within seconds is critical to the studio's workflow."

Wagener began working on Olive Carpet's album immediately after installing the R100s. "I have engineered on digital boards before so there was only a short learning curve," he says. "The console is really intuitive. We recorded the album with surround sound in mind. In fact, we just wrapped up the stereo mix, and in a couple of months, we plan to mix the whole project in surround."

With a number of projects on the horizon, including the latest release by Brazilian artist Badi Assad, Wagener is totally pumped by the performance of the new Sony boards: "I received a lot of support from Sony. The first project went smoothly – the sound just blows me away."



Producer/engineer Michael Wagener with his twin DMX-R100 digital consoles.

in his Nashville based WireWorld Studios to ready the facility for multichannel surround sound projects. Renowned for his work with such artists as Ozzy Osbourne, Metallica, and Janet Jackson, Wagener just completed his first project on the R100s—recording and

Sony Supports All Star Guitar Night

Sony Professional Audio once again lent its support to guitarist Muriel Anderson's All Star Guitar Night (ASGN), held Friday, July 20, 2001 at 8PM at the Wildhorse Saloon during Summer NAMM. The ASGN benefits the Music for Life Alliance, a charity founded by Anderson to provide musical instruments and music education to underprivileged children via grassroots organizations.

The show's lineup was highlighted by the appearance of legendary guitarist Steve Cropper, co-writer of soul standards "(Sittin' On) The Dock Of The Bay" and "In The Midnight Hour." Also performing were five-string banjo trailblazer Eric Weissberg, composer of "Dueling Banjos" and a member of Art Garfunkel's band; prolific, Grammy-nominated guitarist, Phil Keaggy; Thom Bresh, the charismatic son of Merle Travis; Australian guitar phenomenon Tommy Emmanuel; blues guitarist and leading pickup manufacturer, Seymour Duncan; Nokie Edwards of the seminal surf band, The Ventures; Jim Hurst, known for his session guitar work with Sara Evans and Claire Lynch; and Nashville multi-instrumentalist Wanda Vick and Sentimental Journey; as well as the inimitable Anderson and special guests.



All Star Guitar Night
Founder, Muriel Anderson

Producer Michael Omartian Gets Instrumental With Sony R100

Producer/musician Michael Omartian recently installed a Sony R100 digital mixing console in his Nashville-based private studio Sound House. Using the board for both commercial and personal projects, Omartian's first completed effort on the R100 is his own instrumental album titled *Animator*, which features both original material and variations of hit songs that he produced in the 80s such as "Glory of Love," sung by Peter Cetera and "Sailing," sung by Christopher Cross. The album is scheduled for release on RCA/Victor this summer.

"My long-time engineer Terry Christian was asked to write a review of the R100 for a trade publication so we experimented with it here, and it immediately became our central tool," reports Omartian. "The delivery of the R100 coincided perfectly with the final stage of *Animator*. We decided to do the mix on the console, and were really impressed. I've worked on the Oxford, and after using the R100 it was evident that the same high-quality technology and engineering were put into this desk as well. Sonically, the board is wonderful. It's compact, easy to navigate, and offers tremendous power and capability."

"The R100's full automation saves me critical studio time because I rarely work on one production at a time, and I need to go

back and forth between projects seamlessly," adds Omartian. The studio is also equipped with Pro Tools and a Sony digital 3324 recorder. "The R100 was the final piece in the puzzle," he says. "In



Producer/musician Michael Omartian with his DMX-R100 digital console at Sound House.

the past with digital, you had to go through some type of conversion process somewhere in the chain, and, sonically, the recording would sound thin. Now, we are able to stay in the digital domain, and the sound is genuine and rich."

Omartian is scheduled to use the R100 on upcoming projects for R&B group Sons of Soul and traditional country singer Barry Smith.

A-Pawling Turns To Sony DMX-R100

Peter Moshay of A-Pawling Studios in Pawling, NY, is one of a growing legion of audio professionals switching to the powerful Sony DMX-R100 digital mixing console. Having used virtually every



Peter Moshay at A-Pawling Studios with the Sony DMX-R100 digital console.

console on the market, and after researching all the latest available models, he selected a Sony DMX-R100.

"It's the sound of this board that impressed me," says Moshay. "This is the only console at this level that sounded like I could make a serious record with it, and be 100 percent satisfied with the results." With the level of projects that Moshay undertakes, one can understand why the sonic qualities of a console are so important.

Nestled in the rolling hills of New York State, A-Pawling Studios' rooms are filled with racks of the latest analog and digital gear. Moshay has recently moved his large-format analog console out of the control room, to make way for the new R100. This "changing of the guard" is a major step for any audio professional, but Moshay is particularly excited about the transition. "I feel no remorse at all in switching from the analog console to the R100," he states. "In addition to its terrific sound, I love the instant recall capabilities, the input re-routing functions, and the dynamic automation. Unless you consider six figure boards, no other console has these features."

Moshay is equally impressed with the board's flexibility, and notes that having every function at his 'fingertips' with the touch sensitive screen puts the R100 in a class by itself. "The first projects I did on the R100 sounded phenomenal," he comments. "For example we did a very organic acoustic record with just a Hammond B-3, a drum kit with brushes, acoustic guitars, and vocals. I had done a previous mix a few days before on my old board. I quickly put up a mix on my R100, took the same 24 tracks and finished in about an hour, just learning the console as I went along."

"The R100 has become my main console," Moshay concludes. "People who work with me realize how hyper-critical I am about every piece of gear in my studio. I do my research, and everything must be the best. Sonically the R100 is as good as it gets."

University Selects R100 As Digital In-Class Teaching Tool

Webster University Professor Gives Console High Grades

By Barry Hufker
Associate Professor, Audio Production Degree Program
Webster University School of Communication

When it came time to purchase new gear for the Audio Production program here at Webster University, I went through a lot of trouble to have the school administration ready, and to have a dealer lined up so that we would be among the first to own a DMX-R100. I saw it as "breakthrough product." In the Audio Production program, we try to offer our students professional experiences and professional equipment. We also try to get good value for the money we spend. I was confident the DMX-R100 would be a great choice.

The DMX-R100's possibilities for audio education are obvious. If the day's topic is "signal flow," then the students can use the DMX-R100 to "build a console." We'll assign inputs to channels and channels to busses and busses to monitors and outputs. If the class needs to study signal processing, there is a very flexible EQ, with gating, compression, limiting, expansion on every channel. Automation and synchronization are also well demonstrated by the console.

The console is a great tool for class work, but an even better tool for production. The DMX-R100 enables each student to arrange the console to suit his style. If a student prefers a certain arrangement of inputs or monitoring, it can all be had. Further, the students don't have to worry they are "missing a switch" that hasn't been "normalized" by the previous student. The new student can insert the floppy disk with his or her setup on it, recall the desired parameters, and begin work. And, because production time can be limited, each student doesn't have to feel frustrated at having gotten everything "just setup" as the allotted studio time has come to an end for the day. A quick "save" to the floppy and all is ready for the next time.

While all of that is important, what I like best about the console is its sound. I enjoy the sound of the EQ as well as its flexibility. Because the faders have such high precision, it is easy to get and recall an accurate mix. The students are also able to experiment. They can save what they like. They can undo what they don't like. They aren't limited because they've run out of

compressor or gates. And maybe best of all, they can actually learn something of aesthetics. The students can hear their progress when they compare their new mixes and setups to old ones. They can grow in sophistication as "critical listeners." And, because the students aren't limited by the console's sound or features, they are free to turn out their best work.

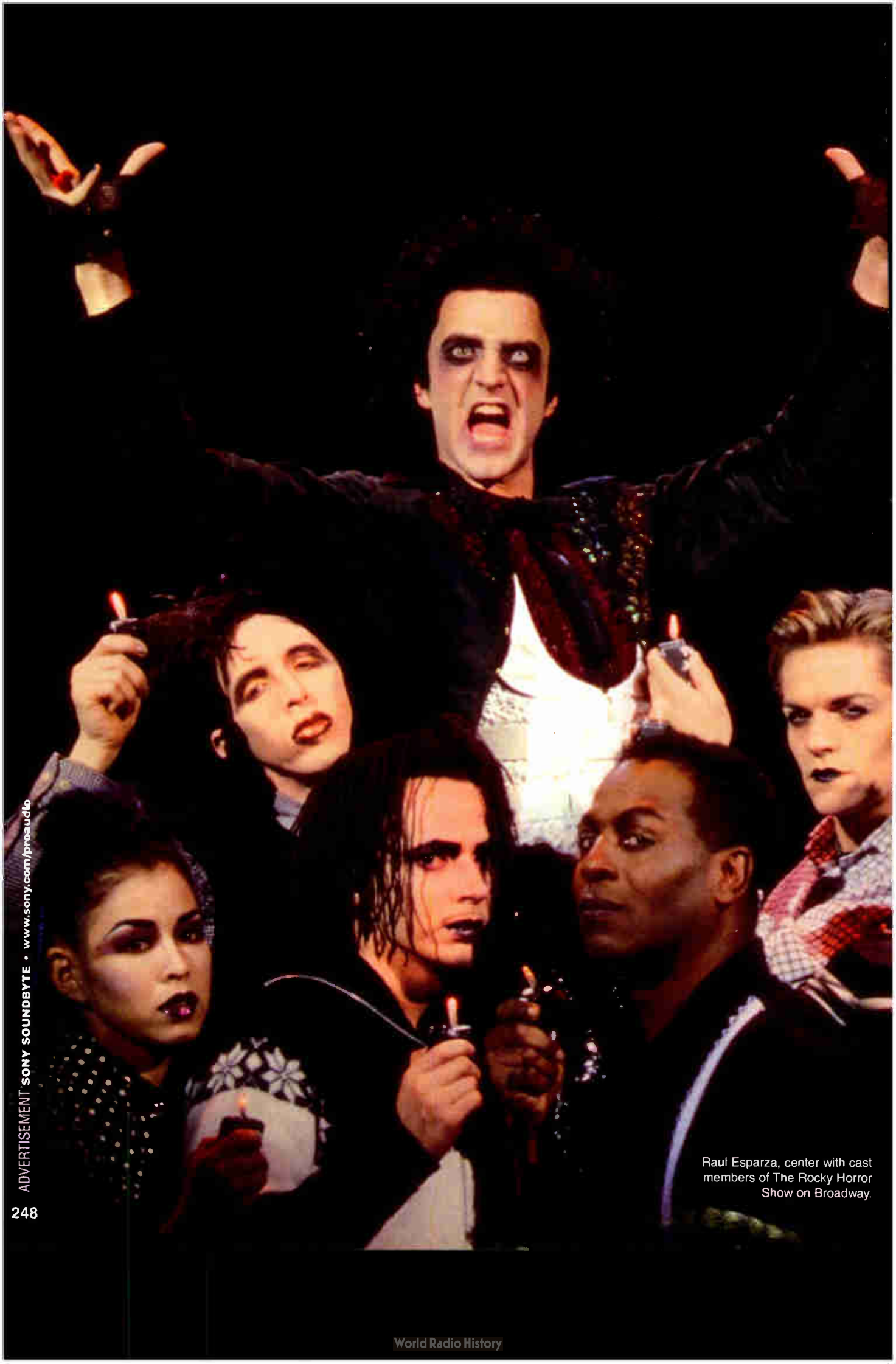
All of the Audio Production faculty are audio professionals as well as teachers. In the time we've had the console, I've mixed two compact discs on it and an opera, Scott Joplin's "Treemonisha," recorded live in performance. One of the discs was a collection of



Left to right, Associate Professor Barry Hufker, with students Joni Gibson, Vince Sievers and Peter Schmalfeldt.

acapella music sung by a local dectet. The music ranged from madrigals, to folk, to pop, to rock. The console was clean enough and versatile enough to give me those styles quite easily.

When it came to "Treemonisha," I was able to employ some lesser known features in the DMX-R100. The first is the console's "M/S" facility. The main microphone pair for recording the orchestra consisted of an M/S arrangement. The console and its polarity inversion feature on each channel made that a quick setup. The "time delay" on each channel also proved to be very important. There were a number of spot mics in the orchestra pit. Using time delay, I was able to delay the audio from the spot mics so that it coincided with the sound directly reaching the main pair. This greatly reduced phase problems and cleaned up the stereo imaging immensely.



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Raul Esparza, center with cast members of The Rocky Horror Show on Broadway.

Wireless Broadway

By Dan Daley

Sony 800 Series Wireless Stays Steady And Reliable While "The Rocky Horror Show" Gets Wild

The Rocky Horror Show is one of those rare anomalies of pop culture: it has managed to maintain its charming weirdness even in the face of mass-market success. Over a quarter of a century old now, the seminal gender-bending rock musical — which has served as a visual and philosophical inspiration for everything from Goth metal music to the off-off-Broadway hit *Hedwig and the Angry Inch* — is now a full-fledged Broadway hit. Yet

it remains as interactively chaotic as ever, with the audience anticipating the dialog and adding their own, often scatological, observations. But, they never overpower the show, thanks in large part to the performance of Sony's 800 Series wireless microphone system, which has managed to keep up with perhaps the wildest show ever to hit Broadway.

Before it opened — around last Halloween, appropriately enough — at the intimate Circle In The Square Theater near Times Square, the staging of the show presented a true challenge to sound system designers Domonic Sack and Richard Fitzgerald, of New York's Sound Associates, which specializes in live-theater sound.

"The biggest issue was the fact that this is a small theater in which the

action takes place almost in the round," explains Sack, noting that the stage has a huge thrust, on which 90 percent of the show's action takes place, allowing it to be surrounded on three sides by the audience. "This is not a traditional proscenium-type stage," he says. "In fact, the part of the stage you'd consider traditional is where the band is set up, not in an orchestra pit. Making the sound work on this was interesting, to say the least."

Sack and Fitzgerald responded with a dual-sound system

design approach. A stereo system, using Meyer CQ-1 and 650-P speakers, was the main music system, projecting the band, which was playing from the rear of the stage area. The second system was designed specifically for vocals and dialog, utilizing three rings of Meyer and EAW speakers in a concentric distribution system flown from above and which amply covers each of the theater's 700 seats.

"The key to making these two systems work together was time alignment," explains Sack. "Each speaker, or pair of stereo



Alice Ripley as Janet in *The Rocky Horror Show*

speakers, has a separate channel with adjustable time delay and EQ. But, the amazing thing about it is that, even though it's two systems, and even though the performers are all over the place — even in the audience at times — the perception of the viewer is that all of the sound is still coming from the stage. And, we can give each seat upwards of 107 to 110 dB of great sound, all perfectly time aligned between the music and the vocals."

At the heart of the vocal sound system is the Sony 800 series wireless system. It was, says Sack, the wireless system of choice to keep up with the frenetic pace of the show, in which cast members climb ladders, enter the audience, and generally break every

Wireless Broadway



rule of theatrical production, just as the original film broke the rules of the relationship between music and the movies. "We needed a compact and stable wireless system that would be frequency-agile and work reliably under any of these conditions," he says. "Sony's 800 series [the WRT-860A transmitter, the MB-806A multi-channel receiver, and WRU-806A module] gave us exactly what we were looking for."

A dozen Sony WRT-860A transmitters are coupled with DPA 4065 microphones and deftly hidden in the performers' often-scanty costumes. These send a full-bandwidth audio signal to the Sony WRU-806A modules in the Sony 806A multi-channel receiver. And, this wireless system, says Sack, has performed flawlessly since the first night of the show.

"The 800 series is frequency-agile, so we can adapt it to the environment it has to work in," says Sack. "We have to be able to work around the enormous amount of RF that is generated in a location like Manhattan, such as emergency broadcasting frequencies, local television stations and other Broadway shows. In a two-block radius, you may have as many as five Broadway shows running simultaneously, all using between 24 and 40 channels of wireless on stage, plus walkie-talkies and wireless intercoms. The Sony 800 series gives us the flexibility to maintain signal intensity and integrity night after night in the most dense RF environment you can imagine."

Sack also cites the 800 series' range performance, critical for a show like *Rocky Horror* since the performers use almost every inch of the theater, let alone the stage. "You need good performance out of the RF side of the system," he notes. "You can't have any dropped signals."

Wally Flores, production sound engineer and FOH mixer for *The Rocky Horror Show*, concurs, noting that the

Rocky Horror Show cast member Aiko Nakasone applies the Sony 800 Series WRT 860 transmitter back stage before the evening performance.

advent of digital television broadcasting in New York has added a new dimension to potential problems for live theater sound – and one the Sony 800 Series is particularly well-suited to dealing with. "The 800 Series makes it easy to dial around frequency problems like that," he says. "DTV is beginning to crush the margins [between frequencies] we have in New York. I've actually had the situation change literally between sound check and show time due to that. You don't get any warning when they're going to turn the DTV transmitter on. And when that happens, you simply lose audio on that frequency. The 800 lets me get around that problem faster than any other wireless system I've ever used."

Equally important was the Sony WRT-860A transmitter's slim profile, which made it much easier to integrate into the performers' costumes. "We were able to fit them into wigs, lingerie, even a dog collar," says Sack. "And they have held up performance after performance – the Sony systems have taken a lot of abuse since the show's opening, but they continue to perform extraordinarily well."

Sony 800 Series Takes Broadway On The Road

Sound Associates is one of the foremost sound companies working in the theatrical business today. It was also one of the first companies to embrace the Sony 800 series wireless system, and the first to bring it to Broadway.

Says sound system designer Domonic Sack, "We used the Sony 800 series system on the initial version of *Beauty And The Beast*, the very first use of the system on Broadway, and on *42nd Street*," he recalls. "In addition, we have it out on a number of touring shows, including *The Civil War*, *Cinderella*, *Snow Boat* and *Funny Girl*."

Sack says that one of the main advantages that the Sony 800 Series components confers is adaptability. "You go into so many theaters and every theater is different, as is every production," he explains. "You face a lot of challenges as productions become more and more complex and elaborate. So, the Sony also gives you a sense of confidence, that you have a secure RF system that's not going to let you down no matter how complex the RF environment is."

Two other advantages Sack cites of the Sony 800 Series wireless system are less immediately noticeable but every bit as critical. "With more and more productions going on, you'll see a lot of ongoing personnel changes on the technical side of the production," he explains. "The 800 Series is extremely simple to use, so engineers can master it almost immediately, and has engineer-friendly features on the transmitter such as long battery life, signal strength and audio level. Secondly, there's a cost-effectiveness that the 800 Series brings to the production's bottom line. I can say that I have personally seen the 800 Series reduce the wireless audio costs of a show by as much as twenty-five percent. So, all I can say is, if you haven't tried this system out yet, you really need to." – DAN DALEY

Palmer-Grassi On The Oxford

Jazz At Lincoln Center's Educational Curriculum Taps Sony Digital Technology

Over the past several months, independent recording engineer Sandy Palmer-Grassi has mixed hundreds of music elements by legendary trumpet player Wynton Marsalis and the Lincoln Center Jazz Orchestra. Working on a state-of-the-art Sony Oxford digital recording console in NY's Sony Music Studios, Palmer-Grassi is incorporating the material into a comprehensive interactive music curriculum (30 lessons-available on CD) funded by the Louis Armstrong Educational Foundation. Produced by Jazz at Lincoln Center in collaboration with Sandy Feldstein of PlayinTime Productions, the Louis Armstrong Jazz Curriculum, which is based on the Jazz for Young People concert series, is designed to educate elementary and middle school students about jazz. Multi Grammy 'Classical Producer of the Year' Award-winner Steve Epstein is producing.

According to Palmer-Grassi, each lesson focuses on a different topic ranging from What is Bebop? to What is New Orleans Jazz? The package includes a teacher guide, student books, and a series of CDs featuring over 10 hours of music with informative narration by Wynton Marsalis, the Artistic Director of Jazz at Lincoln Center. "It's a huge project with many music elements, many with different versions," Palmer-Grassi explains. "We just finished Program #19, What is Big Band-Part I, which incorporates both complete songs and segments from Happy Go Lucky Local, Limbo Jazz, and Twinkle Twinkle Little Star. The series teaches kids everything about the music-from the instruments to what it means to swing.

Jazz at Lincoln Center is the world's largest not-for-profit arts organization dedicated to jazz. With the world-renowned Lincoln Center Jazz Orchestra and a comprehensive array of guest artists, Jazz at Lincoln Center advances a unique vision for the continued development of the art of jazz by producing a year-round schedule of education, performance, and broadcast events for audi-

ences of all ages. These productions include concerts, national and international tours, residencies, a weekly national radio program, television broadcasts, recordings, publications, an annual high school jazz band competition and festival, a band director academy, a jazz appreciation curriculum for children, advanced training through the Juilliard Institute for Jazz Studies, music publishing, children's concerts, lectures, film programs, and student and educator workshops. Under the leadership of Artistic Director Wynton Marsalis, Jazz at Lincoln Center will produce

more than 400 events during its 2001-02 season. Currently, Jazz at Lincoln Center is building its new home - Frederick P. Rose Hall - the first-ever education, performance, and broadcast facility devoted to jazz, slated to open during the 2003-04 season.

"The flexibility and reliability of the Oxford has been vital to the success of this project," continues Palmer-Grassi. "The Instant Recall is particularly helpful. We have more than 200 titles so far, and with all the different takes and topics, we frequently do adjustments and reprints. I don't have a script in front of me during the mix. Without always knowing what Wynton is saying or the intent of the element, sometimes my mix doesn't demonstrate the example as well as it could. When I'm finished mixing a

section, Wynton reviews it, and then I incorporate his revisions. With the Oxford, I have had no problems recalling anything."

This is the first project Palmer-Grassi has completed on the Oxford, and she is looking forward to future assignments. "I was given a brief tutorial and within a couple of hours, I was mixing on the board," she says. "The learning curve is small. The console sounds great too, and it interfaces well with every piece of equipment in the studio."

Murray Street Enterprises handled audio production for the Louis Armstrong Jazz Curriculum with Steve Rathe as senior producer. The series is slated for release in the fall.



Steve Epstein, left, and Sandy Palmer-Grassi at the Sony Oxford console.

Going Mobile in NY for Gathering of the Vibes Festival

Chris Andersen, engineer-in-charge and owner of Neveva Production Woodstock, reports that two Sony DMX-R100 digital consoles were used to record over a dozen bands at the recent Terrapin Presents'



L-R, with the DMX-R100, producer Warner Swain, engineer Dominick Campana and Neveva Production Woodstock owner Chris Andersen.

Gathering of the Vibes festival in Red Hook, NY. The three-day event featured such artists as Bruce Hornsby, the Dickey Betts Band, Buddy Miles, and Medeski Martin & Wood. The R100s were installed in Andersen's Unit 2 mobile recording truck. Neveva provided complete

audio and video services for Vibes.

"Terrapin's Festivals are famous for having two adjacent stages where bands play back-to-back," states Andersen. "Quick transitions are mandatory. The R100s sound great and are very reliable. I've never experienced a crash or a lock-up." Audio engineer Dominick Campana piloted the two R100s—processing 48 inputs from the stage and feeding 48 DTRS tracks. Neveva's new Unit 3 truck was used in conjunction with the Unit 2 to provide four-camera video coverage and allow for flawless transitions and simultaneous recording of both stages for Terrapin's archives.

Neveva also provided on-site encoding services in multiple bit-rates and formats for streaming Internet distribution and feeds to WDST-FM to simulcast portions of the festival.

"Featuring the best artists of the jamband genre, the sixth annual Gathering of the Vibes pulled out all the stops topped off by a huge three-hour-long jam session that showcased various musicians," states Andersen. "We flexed the technology muscle all weekend. The R100 set-up worked flawlessly."

Sony R100 Jazzin' It Up At NJ Radio Station WBGO

WBGO, the NY/NJ market's only 24-hour classic jazz station (88.3 on the FM dial) and the only station to regularly broadcast live from the area's jazz clubs, has installed a Sony DMX-R100 digital console.

The R100 complements a major \$1.9 million renovation of WBGO's downtown Newark headquarters. To celebrate the facility's grand re-opening, WBGO recently hosted an on-air Jazz Radio Festival featuring the Joshua Redman Quartet, the New Jersey City University Jazz Ensemble, and the William Paterson University Jazz Ensemble.

WBGO manager of operations and production Steve Brown reports that the R100 was installed one day before the festival: "I've worked on digital boards before so the learning curve was short. The console sounds great – it's a real thrill to hear a live performance and have it sound like a record. The board's headroom and dynamic range allow me to get the sound I want without having to rely on compressors and limiters.

"Nowadays, a lot of jazz engineers have come to expect poor digital sound from low-cost digital boards," continues Brown. "Sony changed that stereotype by introducing the R100 – a cost-effective digital console with superior sonic clarity. We're trying



WBGO manager of operations and production Steve Brown at the Sony DMX-R100 digital console.

to push the envelope here at WBGO. My goal is to surpass CD-quality sound and dynamics with our live performances, as opposed to presenting heavily compressed and limited FM sound. Sony has been very active with NPR headquarters and member stations like us to make this technology affordable. We really appreciate their support."

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RADIOHEAD

THE MESSY BUSINESS OF BRINGING MEANINGFUL ART TO THE MASSES

by Robert Hanson

The band who could do no wrong: There is no question that the summer of 2001 simply belonged to Radiohead. For a few perfect moments, the band seemed to erase the shameful stain left by years of faux-angst rap/metal and vapid teen pop, reminding the world that music doesn't have to be written for the lowest common denominator to be successful.

Returning after a two-year break, the band released not one, but two follow-up albums to their now-classic '97 release, *OK Computer*. Recorded during the same studio sessions, *Kid A* (released in the fall of 2000) and *Amnesiac* (released last spring) were greeted with both critical acclaim and a bit of confusion on the part of their fans, who were perplexed and excited about the group's new direction. The two albums artfully eschewed the normal conventions of pop music, presenting the kind of bleak, electronic-based, cathartic study of the human condition that *OK Computer* only hinted at. And, despite the band's ardent resistance to releasing singles, making videos or promoting their new albums (except by touring), both albums have fared well commercially.

Created through a layering of sampled percussion, synths, and found pieces of audio and live instruments, this new batch of songs presented the band and their live sound crew with an interesting set of challenges, including the requirement that everything be played live without any prerecorded playback.

Mix followed the band for two of their California dates, stopping in at the Shoreline Amphitheater in Mountain View and the Santa Barbara Bowl. Though set lists varied a fair amount between shows, more than half of the songs

were from the band's last three albums, with a few favorites from *The Bends* thrown in as well. The new material held up live, especially songs like "Idioteque" and "Pyramid Song," and at Santa Barbara, the audience was treated to an excellent cover of Neil Young's "Cinnamon Girl."

Radiohead consists of Thom Yorke (vocals, guitar, piano), Ed O'Brien (guitar, vocals), Jonny Greenwood (guitar, synths), Colin Greenwood (bass) and Phil Selway (drums). For the U.S. leg of the tour, underground darlings and crowd favorites the Beta Band were tapped to open; the band was promoting their latest Astralwerks release *Hot Shots II*.

PACKT LIKE SARDINES

Monitor engineer David "Tree" Tordoff has been with the band since the last leg of the promotional tour for *The Bends* in the mid-'90s. For the U.S. leg of this tour, he began mixing on a Midas Heritage console, which was chosen for its automation features. Tordoff is responsible for 47 inputs and 22 different onstage mixes. Although there are only five members in the band, bandmembers use two additional fixed keyboard positions at different times. Thus, each bandmember requires a custom mix at different stage positions, at different times.

Singer/guitarist Yorke and drummer Selway are the only two members of band using in-ear monitor setups, dual-driver Firehouse 6500 ear molds and Shure PSM 700 belpacks. The rest of the band listens to standard wedges from Firehouse, which also supplied all subwoofers. "Thom has ears and wedges," Tordoff explains. "The wedges are used purely for the electronic drums and instruments that Jonny Greenwood plays. He doesn't like those sort

ALL PHOTOS BY STEVE JENNINGS

of threatening noises in his ears. And Phil, the drummer, has 'ears' and a stool shaker and takes everything in his mix. The bass player has normal wedges and a sub as well, because he also plays upright bass, and you get a bigger sound out of that. Everyone else is on standard wedges."

For effects, Tordoff uses PCM 70s for vocal reverb on Yorke's in-ear mix. And dbx 1000 compressors are used on all of Greenwood's instruments, including guitar, an elaborate patchable synth array and various other items.

"One big change for this tour is that we have an acoustic piano onstage," Tordoff continues. "And if you put an acoustic piano in the middle of the stage, it changes everything! And we have the upright bass as well. It's more interesting with challenging instruments. And more things move. We're wheeling keyboards around all the time. So everything has to have a long umbilical cord running to it. It is a huge input list, but only half of it is being used at any one time."

For sidefills, two Turbo Floodlight cabinets were placed on towers at either the side of the stage, approximately 12 feet off the ground and angled downward. To make these particular speakers fit in with the rest of the stage, which reflects the bleak, neo-futurist themes of the band's music, the cabinets were stripped of their blue, composite-wood housing, exposing the internal components. To the untrained eye, the unfinished metal drivers more closely resembled a work of contemporary sculpture



FOH engineer Jim Warren's elaborate array of outboard processors were indispensable in helping the band to re-create their sound live.

than a speaker. "At these open air shows, it is sometimes hard to fly things, and this was an easy way to get them in the air," notes Tordoff.

"Radiohead is always interested in hearing," he continues. "The guys that don't use in-ears wear in-ears with filters, because it's all about keeping the stage volume down. When they first got signed and realized that they might have a career in music, they all anticipated that it would be for 30 or 40 years. It was a decision from the beginning to be very careful with their hearing. A lot of my job is keeping things quiet, as opposed to being very loud. Many monitor jobs are about making it very loud and exciting. For them, it's very much about getting the mix exactly right, which you really can't do at top volume. To make the show more exciting, they have to play better and not rely on just volume and noise."

ELECTROENGINEERING

At the FOH position, engineer Jim Warren picked a Soundcraft Series FIVE as the main board and a Spirit 324 for effects returns. The Series FIVE is set up for 48 inputs, with 12 effects sends, and all of the input returns on the Spirit are in stereo pairs. Most of the effects are used on the vocals, and include an Eventide H3000, M-1 and D-2 units from TC Electronic, Lexicon PCM 70, Roland SD-3000 and 330 models, and a Line 6 POD. Warren also patches several Yamaha SPX900s across the drums. [FOH engineer Jim Warren was unfortunately not available to be interviewed for this story due to other commitments.—Eds.]

All of the vocal mics are Shure Beta 87As. The miking scheme for the drums break down as follows: M-88 on kick, SM 57 on snares, Sennheiser 504 on toms, Ramsa S-1 for ambience and KSM 32s as overheads. All of the guitar and bass cabinets are miked with Sennheiser 509, and the instruments are also taken direct. The various keyboard/synth/sampler rigs are also taken as stereo DIs.

CLIMBING UP THE WALLS

Firehouse Productions was tapped to outfit the U.S. leg of the tour. The New York-based production company set the band up with a V-DOSC system that could be scaled to work with a variety of large and medium-sized outdoor venues. Additionally, Firehouse provided both consoles and the custom-outfitted monitor array.



Monitor engineer David Kordoff managed both in-ear and wedge monitors for the band members who were constantly changing stage positions and instrument.



Radiohead's Thom Yorke sings through a Shure Beta 58A.

"We also use dV-DOSC for underhung and lipfill," Firehouse system tech John Drane explains. "We have a total of 32 V-DOSC cabinets and 12 of the dV-DOSC. We also carry 12 LAcoustic Arc speakers out with us, because some of the shows that we've been doing have been larger venues. In some of the smaller stadiums, we've needed some extra coverage on the sides. We're also carrying 24 of the ADK proprietary double-18 subs. Amplification is all QSC and Crown, but mostly QSC. We use the Crown on the dV-DOSC and the Arcs. But the QSC is specifically for the V-DOSC."

The Santa Barbara show presented some unique challenges. The Santa Barbara Bowl is actually located in a dense, upscale, residential neighborhood, and a city ordinance places a strict 100dB limit on overall volume, plus a 10 p.m. curfew. The facility itself is also unusual—to the right of the stage, where the P.A. would nor-

mally be flown, there is a large pine tree that would obviously muffle the sound. To work around this, the V-DOSC arrays were flown directly above the stage, which meant that the cabinets were physically behind the mic positions. To compensate for this, the arrays were imaged so that they would overshoot the stage mics.

"Overall, it's been a great tour to be on," Drane concludes. "The audience is just fantastic. It's one of the few shows that I've been to where the audience is just riveted the whole time. At a lot of these shows, you'll go out in the concourse and everyone is hanging out and drinking beer. At these shows, they're not. Everybody is in their seats for the whole show. And they're just a great group of guys to work with." ■

Robert Hanson, Mix's editorial assistant, couldn't have thought of a better reason to revisit his old hometown of Santa Barbara, Calif.

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"THE PRODUCERS" ON BROADWAY



PRODUCTION PHOTOS BY PAUL KOUNICK

by Mark Frink

Oh, delicious irony. *The Producers*, Broadway's biggest hit in years, is the stage version of a 1968 cult film about a pair of sleazebags who have an unexpected Broadway hit. Played on film by Zero Mostel and Gene Wilder, the two scoundrels scheme to create a show so awful it must certainly fail, at which point the plotters intend to abscond with their investors' money. But, despite the deliberately offensive title and a storyline that brings new meaning to the term "box office poison," *Springtime for Hitler* is a smash.

In a bizarre, if deserved, example of history repeating itself, *The Producers* on Broadway was also an immediate smash: When the box office opened on April 19, first-day sales were over \$3 million. Even with tickets priced at a Broadway record high of \$100, the box office lines were so long that, in an unprecedented move, rival theaters across the street opened *Producers* ticket windows in their *Phantom* and *Fosse* box offices. And, crowning commercial success with critical acclaim, *The Producers* won all 12 Tony awards for which it was nominated, shattering the previous record of 10, set by *Hello Dolly!* in 1964. (There is no Tony for sound, an oversight that continues to baffle and irritate sound designers everywhere.)

Mel Brooks, who wrote and directed the original movie (and was awarded an Oscar for his screenplay), also wrote the book and lyrics for the musical. Two songs from the movie, "Springtime for Hitler" and "Prisoners of Love," were held over, and Brooks wrote 15 new songs, of which "We Can Do It" and

"Keep It Gay" stand out as instant classics. Frantic physical comedy, vaudeville moments, theatrical references, musical parody and literary homage abound, and the cast includes *bona fide* stars Nathan Lane as washed-up producer Max Bialystock and Matthew Broderick as nebbish accountant Leo Bloom.

The night before the Tony awards at Radio City Music Hall, I was fortunate to have a night off between Microsoft's Office XP unveiling and Blu Cantrell's New York premiere. I caught the show, met the audio crew and toured the 1,623-seat St. James Theater, which was beautifully renovated two years ago and formerly home to *Oklahoma*, *The King and I* and *Hello Dolly!*

Sound design for *The Producers* is by Steve Kennedy, whose designs include *Aida*, *Titanic*, *How To Succeed in Business*, *Carousel* and *The Who's Tommy*. He is assisted by associate designer John Shivers, and equipment is provided by ProMix of Mt Vernon, N.Y.

The show is mixed by David Gotwald, whom we last caught mixing *Fosse* two years ago, and whose credits include *Crazy for You* and Stephen Sondheim's *Passion*, as well as runs with *Phantom of the Opera* and *Chicago*. The mix position at the St. James is in what Gotwald calls an "unfortunate" location, in the far corner of the orchestra level. Nevertheless, Gotwald calls *The Producers* "probably the best show I've ever mixed" and describes Mel Brooks as "the nicest guy I've ever met."

Gotwald mixes the show's 70-odd inputs on a Cadac J-Type Live Production Console equipped with moving faders.

The console is split between a 46-slot main console for the actors' radio mics and sound effects, and a 36-slot sidecar for the orchestra. Some economy is achieved by using stereo inputs for reverbs, keyboards and rack toms.

Outboard effects include Lexicon PCM 91 digital reverbs, which Gotwald uses for minimal vocal and orchestra treatments. Kick, snare drum and electric bass channels have Valvotronics Gain Ryder 3 compressors inserted, and Drawmer DS404 gates are used on the trap kit's toms. Gotwald has also inserted XTA GQ-600 graphics and DP-200 parametrics on the principal vocals, chorus and orchestra subgroups. "The ensemble subgroups get a little more low end cut, because, generally, when they're onstage there are more open microphones," Gotwald explains. There's also a subgroup for the Shure SM91s used as foot mics for two dance numbers: Lane's "Little Old Lady Land" and Broderick's "I Wanna Be a Producer."



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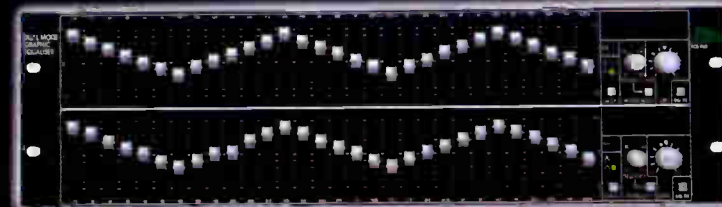
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Live mix

Sampler-based sound effects are triggered via MIDI, either from the console or, for one song, by conductor Patrick Brady via a remote start box. Redundant Akai S6000 samplers play back prerecorded sounds that include a telephone, toilet, gunshots, Mel Brook's voice as a cat's screech (just like in *Young Frankenstein*) and the lines "Don't be stupid/Be a smarty/Come and join the Nazi Party" that Brooks also dubbed for the original film. Conductor Brady, plus the drummer, bass player and keyboardist get a click track in their Sennheiser headphones.

REDUNDANT A/B SPEAKER DESIGN

The A/B redundant theatrical reinforcement approach, pioneered by Martin Levan, reduces the comb filtering that can result when actors are close together and "leaking" into each other's mics. In an A/B design, the principals' mics are each routed to a different speaker system, so their voices interact acoustically in the air, rather than electronically in the console. For *The Producers*, the dozen lead mics are automatically switched to either the A or B system from one scene to the next.

An A/B pair of EAW KF300 speakers are used at each side of the proscenium opening, along with a tandem-drive 10-inch Sunfire subwoofer. (Meyer USW subwoofers were originally used for the pre-Broadway try-out at Chicago's larger Cadillac Palace Theater, but could not be used in the St. James due to space limitations.) EAW JF80 speakers are used in A/B pairs for front-fill speakers. EAW's new SC52 under-balcony cabinets are used to fill in the back of the orchestra and mezzanine levels. The center cluster consists of three more A/B pairs of KF-

300's aimed at the mezzanine, with a fourth pair focused down to cover the center of the orchestra level. JF80 speakers are used in A/B pairs for balcony coverage, and the stage monitors in the wings are JF 200s.

Thirty Crest 7001 amplifiers in a half-dozen racks are situated beneath the stage and behind the orchestra pit. Each speaker zone has an XTA DP-200 processor controlled by AudioCore software over an RS-485 network. The processors can also be accessed over a wireless LAN via a touch-screen laptop, dubbed a "black-ops pad," furnished by ProMix's John Weston. This allows the sound designer to adjust delay time or frequency response from any seat in the house without bothering the mixer.

Next to the amp racks, A2 Paul Delcillo monitors 30 channels of Sennheiser 3532-U receivers via a computer running Mikroport software. Delcillo monitors the 11 principal radio mics via a Leitech 32 XIP switcher, an E-V ELX-1A mixer and an Anchor AN-1000 monitor. Assisting with wireless is Joe Lenihan, who monitors the rest of the ensemble's 18 mics on a redundant computer display. A third wireless signal monitor is at Gotwald's mix position.

The Sennheiser SK-50 body packs are equipped with the new sweat-resistant MKE-2 Gold capsules. "We've discovered that the capillary action of the windscreen wicks moisture, so we're using [the mics] without them," Gotwald comments. "Up in the hairline, they get sweat but don't get any popping." In an early scene, Lane throws a glass of water in Broderick's face and, even if his mic goes out, it eventually comes back. Because Lane and Broderick hardly ever come offstage, both of them are double-



David Gotwald and Paul Delcillo

PHOTO BY MARK FRINK



Yorkville and the Bluebird - It's All About the Music

Meet Amy Kurland, owner of the legendary Bluebird Café.

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The Bluebird is the room where the most successful songwriters in the business gather together and perform the now famous 'In the Round' sessions and try new material for audience and peers, to meet, to collaborate with and to inspire each other. For more info on Amy Kurland and the Bluebird Café, go to www.yorkville.com and follow the 'real people' link, or go to www.bluebirdcafe.com



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Live mix

miked with both signals appearing on two dual-input channel strips; this way, Gotwald can switch between mics on-the-fly without changing EQ or faders.

One thing Gotwald has lots of experience with is hats. "Nathan is constantly putting his hat on and off, so I'm continually making EQ adjustments," he explains. The ensemble is generally EQ'd for hats, because they wear them most of the evening. The running gag in the show is that Broderick can't put on his hat until he's a real Broadway producer. "He doesn't wear a hat until the very end, which is great for me," notes Gotwald.

A novel technique that sound designer Kennedy has used before has the five violinists each wearing a DPA 4065 omnidirectional headset mic. This provides a consistent mic-to-instrument distance and eliminates mic stand clutter in the cramped confines of the St. James orchestra pit. Each violin chair has a mic on/off footswitch that allows the musicians to mute themselves. Custom-manufactured by Weston from a simple guitar amp footswitch, the units include red and green LEDs to indicate status.

The five woodwinds, harp and cello are miked with AKG C-414s, while the trombones, trumpets and French horn are picked up with Sennheiser MD-609s. The trap kit in the middle of the pit is enclosed in Plexiglas, which also helps isolate the brass from the strings and woodwinds on opposite sides of the pit. Kit mikes include an RE-20 on kick, KM-84 overheads, a KM-100 on snare and SM98s on rack and floor toms. The pick-up on the string bass goes through a Valvotronics Tube Amplified DI.

In what is becoming a common Broadway solution to the need for isolation and a cramped orchestra pit, the percussionist and harpist are located up on the seventh floor. The room, dubbed the "sky pit," is divided with Plexiglas and treated with pleated velour. Percussion mics are an E-V RE-20 and four Neuman KM184s. Both musicians share a foldback mix on headphones.

Good orchestra seats for *The Producers* are sold out through spring 2002, but most seats are comfortably close to the stage, and the mezzanine holds nearly as many patrons as the floor with little balcony overhang. If you're looking for tickets, "good luck, good luck, good luck!" ■

Mark Frink is Mix's sound reinforcement editor.

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Wireless

COMES OF AGE

THREE EXPERTS SPEAK OUT

by Chris Michie

In the '80s, sound designers for Broadway musicals were among the first to use large numbers of wireless microphone systems in live performance. Today, the technology has been widely adopted for industrial, concert and TV applications. These days, it's rare to find a touring band who does not carry at least one handheld wireless mic system, while large-scale broadcast events like the Super Bowl may require as many as 1,200 separate wireless systems.

Keeping multiple wireless systems up and running under modern show conditions requires an unusual combination of technical expertise and operational experience. As a result, many musicals (and other complex productions that use dozens of wireless systems) now include a wireless specialist on the crew—the job is too specialized and time-consuming for the regular audio crew to handle unaided. Despite the great leaps that wireless manufacturers have made in terms of usability, pros who can pull quality signals from out of the ether are in high demand.

Mix spoke to three such "RF guys": Kevin Sanford, president of Wireless First (New York City); Gary Stocker, director of R&D for Masque Sound (Moonachie, N.J.); and James Stoffo, president of Professional Wireless Systems (Orlando, Fla.). The interviews cover a range of wireless topics, from the history of wireless on Broadway, to the loss of wireless bandwidth due to the digital TV rollout, to new approaches to diversity antennae.

GARY STOCKER

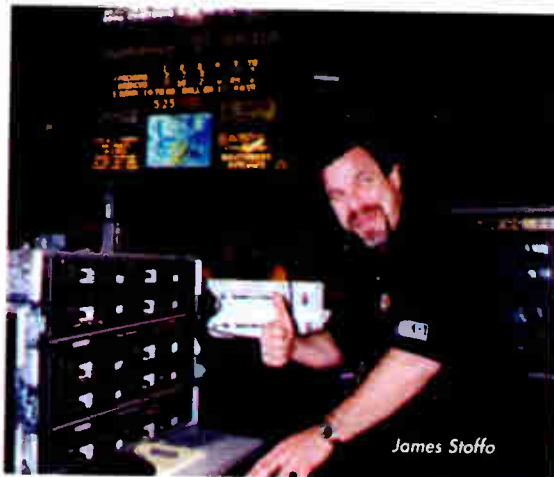
Gary Stocker has "done it all" on and around Broadway. He occasionally mixes *Phantom of the Opera*, has designed shows for both Broadway and

Off-Broadway, and has toured extensively. Asked to pinpoint the dawn of the "wireless era," Stocker recalls the old days when two to four wireless mics on a show was considered plenty.

What was the quality like in those days?

Highly variable. We had what we called the "golden mics," certain transmitter/receiver combos that just sounded way better than others. Typically, if you had a selection of eight or nine mics, two of them would be excellent; the others would be so-so. And that would be direct from the manufacturer.

At that time, and until very recently, everything was on fixed frequencies. Back then, everything was VHF, the bandwidth of the upper TV stations of the old days—7, 8, 9, 10, 11, 12 and 13. The FCC would only allocate every other channel, in any city. So if they had the odd channels allocated, you might see a channel 7 and a 9, an 11 and a 13. That meant that 8,



James Stoffo



10 and 12 were always going to be clear in that city. If you were traveling, you were in big trouble, because as you went from city to city, some of your radios would work and some of them wouldn't.

So how did you cope with that?

You'd try to convince the producers to have a few spare mics, so at least you'd have a couple to pull out if they were really unusable. But back in those days—the late '70s, and early '80s—only the stars got the mics. So a typical show would have two or four stars. Everybody else was on a foot mic or an area mic. By 1985, we started seeing shows asking for 9, 10, 11, 12 wireless mics, and it just slowly increased. They're now putting a microphone, if not two, on every single person in the show. And the number of mics also went up as more frequencies became available. Eventually, the manufacturers moved into the UHF bandwidth.

Was that due to the FCC, or the technology?

Mostly the technology allowed them to. There's a great shift moving from the 170 to 212MHz band, which was the high VHF, then going up into a band that started at 470 and goes to 800. It's a whole new technology to handle those higher frequencies and make it clean and meet FCC regulations. But it also opened up a huge spectrum. So, suddenly, you could put six mics on a channel—six was typically the maximum you could cram into a TV channel—and using multiple channels, you could put 24 or 30 mics in a show.

When you say you put six mics on a channel, they're not all on the same frequency, are they?

No. They're all on individual frequencies within the 6MHz TV channel. Back in the early '80s and in through the '90s, most of the UHF channels that didn't have a TV station or some sort of low-

power transmitter were truly empty. There was nothing there. So you could easily fit six frequencies on a channel that was clear; there'd be no problem. So it wasn't a big deal to have that many. Some of the earlier shows that had a fair number of radios, like *Phantom of the Opera*, *Les Misérables* and *Cats*, had up to 20 radios once you counted spares. So that's when it started mushrooming. In the mid-'90s, you had 48 radio mics on *Showboat*, and the cast was so large you still had changes. There were 60 people onstage, so you still had to move microphones, even though you had 48.

What's your advice for minimizing or eliminating interference problems?

Convince the producers to rent enough mics to give you a decent number of spares. And when touring, check them out in each city to see which ones are the solid ones. Then, without telling the cast, prioritize the parts and shift things around so that the mics go where they are needed most. The less-useful mics might end up on a chorus person, so if you have a little interference, don't bring it up—bring up the foot mic and sneak by.

KEVIN SANFORD

Kevin Sanford, owner and founder of Wireless First, started his rental and sales company five years ago in Boston and opened a second office in New York in June 2001. Wireless First specializes in wireless microphone and communication application for television and live events. His current roster of clients includes MTV, VH1, NBC and Buena Vista Pictures, among others.

You've been independent for seven years. What developments have you seen in that time?

In the past five years, the frequency-agile units have really changed our end of the industry. With frequency-agile systems,

there are 16 to 32 channels in one unit to choose from, allowing you to change channels on-site. Between our Shure and Sennheiser wireless systems, we carry about six different frequency ranges to choose from. We didn't have this flexibility in the days of the single-frequency, crystal-based stuff.

There's a lot more homework involved now, I think. I'm doing a show next week in Lincoln Center, and it's heavy coordination because it's in Lincoln Center, which is typically kind of a rough area anyway for wireless. In New York, you are susceptible to hundreds of outside interferences. Not only are there 20 other venues within a five-block radius, but with taxis and DTV, it's just not that easy anymore. You must do your homework and plan accordingly.

Do you get any help from the people who are in the same bandwidth, or is it up to you to find out who and what is where?

While at a particular show site, you can check with other vendors in the area, but that doesn't necessarily guarantee a problem-free environment. There's an FCC Web page, which allows you to go and actually view licensed frequencies and television stations, radio stations and such in any given area. Which is good basic groundwork, but that's not necessarily going to tell you what's in the theater that's doing a huge musical next door to you. When you get there with the frequency-agile stuff, you've got options.

Why rent all the time, rather than buying their own?

Maintenance and on-site support. You still have the "act of God" clause in wireless—even the best RF engineer is going to have a bad RF day, and that's grief that nobody wants. Plus, they're not without maintenance. It's a lot of electronics in a small device, and they need care. Broadcast-quality wireless microphones can be quite expensive, as well. In entertainment and television, it just makes good business sense to outsource to a company specializing in wireless. A specialist from a niche company will be able to troubleshoot problems and offer maintenance support a lot faster than the average production engineer. The days of the P.A. company that comes in and does everything is somewhat in the past.

You mentioned earlier that you were bringing in in-ear monitor systems as well.



plus they bring on unique complications, and without an analyzer or an experienced technician, the average person will not know what to do.

JAMES STOFFO

James Stoffo, president of Professional Wireless Systems, describes his business as "a group of RF technicians and engineers who focus all their energy on making wireless work in the field."

How did you get into this business?

I was an electronic radio surveillance technician in the submarine service, back during the Cold War. When I got out of the sub service, I went to work for Vega Wireless. I was thrown out in the field to help Broadway shows and Disney World theme parks and to help coordinate large wireless users. In 1992, I moved to Orlando and started this business in my house. We do frequency sweeps, we



coordinate frequencies for digital TV, public safety, any other high-power broadcast RF that's floating around the show site. We design antenna systems, we come in and man the show as A-2s. Once we're done with the RF engineering aspect and frequency coordination, then we assume the role of an A-2, miking the artists and the talent and the

In-ears still have a long way to go. They're very temperamental. They still have issues with range. I think we're still a couple of years away from really perfecting that science. Shure and Sennheiser are probably the strongest players in the in-ear market right now. Their units put away old systems like Garwood and Radio Station, because those were single-channel units, whereas the Shures and Sennheisers are agile units. Still, they are limited in their frequency ranges, so there are some areas where heavy frequency coordination is needed to make things work. And, Shure's currently available two frequency banks are right in the middle of a major Sennheiser bank. That makes it difficult to use some Sennheiser equipment along with the Shure in-ears.

Could you do the job that you're doing if you didn't know as much about the actual technology?

These days, it's getting a lot easier for anybody to pick up a unit and be able to program it and make it work. Again, the agile technology is geared toward people who don't know. It depends on numbers—when using two, three or four units in a club or corporate meeting, it's usually no problem, but when you've got more frequencies involved, or if you're in a susceptible area, you need someone who understands the technology.

I always have a spectrum analyzer with me on my shows, which can tell you what's going on. It's an RF guy's best friend. An experienced technician will be able to locate and fix a problem, whereas an average person is at a disadvantage. The knowledge comes from years of experience dealing with RF problems on-site. In a larger show, your mic signals are being split out to several locations, like the TV truck, music truck and FOH. A hum problem might be easily solved simply by putting a ground lift in-line. But to recognize that two microphones not close in frequency are getting into each other because of harmonics, or that somebody left the lav transmitter on and then turned on the handheld transmitter on the same frequency, that takes experience. There are distinct sounds to those problems,

THE ABCs OF WIRELESS

A majority of RF problems stem from a few factors, and you can avoid most RF headaches if you understand three or four general rules. Here's what I call the ABCs of wireless: Antenna, Battery and Coordination. And if you want to throw a "D" in there, it'd be Diversity. We've talked about antenna problems earlier in detail, so we'll begin with "B," battery and power issues.

We've tested just about every battery you can buy, and found that certain manufacturers are consistent, and others are very inconsistent. With rechargeables, some develop memory, others don't, and certain ones hold the charge longer. So the "B" for battery means making sure that you have the proper batteries and changing them at the appropriate time, so the transmitter doesn't die while the talent is onstage. Fluctuating AC power can have a significant effect on receivers, which become much less sensitive as the line voltage drops. Luckily, on the shows that I do, the audio company provides some type of a voltage regulator. Most *Mix* readers won't have that luxury, but should at least know that receiver sensitivity is proportional to the AC voltage.

"C" is for frequency coordination. All types of devices radiate RF, not only TV broadcasters. Coordination basically revolves around ensuring that your receiver is on a frequency that's absolutely clear and is not interfered with by anything else. Find out what RF exists in your area, from television stations, radio stations, police fire and rescue, DTV, other wireless mics—even your own equipment. Many audio processing devices absolutely spew RF, and simply positioning an RF receiver too close to a mixing console or outboard rack can create interference to the point of making that system unusable. I once drove for four hours across the state to fix an interference problem on an RF system. Arriving there, I moved the receiver one foot to the left. The problems disappeared, and they haven't been back since.

"D" is for diversity—the proper use of diversity. Everybody seems to believe that having a diversity receiver means you won't have dropouts, but that's not true. On a 75-foot-wide stage, where both receiver antennae are located next to the RF rack, the stage will have a dropout point. For proper use of diversity, I generally have one antenna stage left, one antenna stage right. So there's one short cable run, one long run. On the longer one, I generally insert an RF line amplifier, to make up for the cable loss. Most systems use conventional polarized antennae: In this case, make sure that they're on different polarities—one vertical/one horizontal, or both at 45°—or something of that nature.

—James Stoffo



Artist: Katrina Carlson
Genre: Pop

Song: I Know You By Heart

[LO-FI MP3](#) [HI-FI MP3](#) [REAL AUDIO](#)



Artist: Kodac Harrison
Genre: Blues

Song: Love Turned On The Light

[LO-FI MP3](#) [HI-FI MP3](#) [REAL AUDIO](#)



Artist: Faye
Genre: Alternative

Song: What's Right

[LO-FI MP3](#) [HI-FI MP3](#) [REAL AUDIO](#)



Artist: Bill Epps
Genre: R & B

Song: Sign On In

[LO-FI MP3](#) [HI-FI MP3](#) [REAL AUDIO](#)



Artist: Derrick Proce
Genre: Country

Song: Same Plan

[LO-FI MP3](#) [HI-FI MP3](#) [REAL AUDIO](#)

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broadcasters or whoever. And while I'm doing that, the rest of the company in Orlando is busy performing warranty repairs for Clear-Com, Vega Wireless and Sennheiser.

Much of what's needed to make wireless work in the field is not provided by the manufacturer. We feel our custom antennae are the best you can possibly use for wireless mics. Sennheiser builds a great RF system, but people want the Shure Beta 87, so we modify Beta 87 heads to work on Sennheiser wireless. I've gotten more into the technical support business. People bring us in to do frequency coordination, antenna design and to maybe help design a larger wireless system that we may not even sell. We simply provide services for the sale.

In the early days, I would assume that the audio engineer for the tour or production would have been more or less responsible for the wireless systems.

Absolutely true. Responsible, but unwillingly. Everybody had to do it, but no one really wanted to. And what made it worse was if you had a problem. It was very difficult to troubleshoot the problem, because without a spectrum analyzer and a computer and some other little toys, frequency counters and scanners, there was no way to even know what the problem was. Even I, with about 20-plus years in the RF business, wouldn't attempt to go out and troubleshoot a problem without these tools. Plus, don't forget, it just doesn't apply to mics. Now everybody's got in-ear monitors, wireless intercoms and broadcasters use wireless IFBs [Interruptive Fold Backs]. When you see a broadcast talent onscreen, and he's got the little coiled cord that goes into his ear, he's listening to a foldback of the audio programming from whatever show he's on. And it can be interrupted by a director or a producer, and the presenter will hear the director's voice saying, "Okay, you're on in five seconds. Straighten out your tie." Or whatever.

It's actually comparable to an in-ear monitor system.

It's a very low audio quality in-ear monitor. It sounds pretty bad. It's communications-grade, but the exact same principle. So on a typical show now that I do, there are 75-plus wireless frequencies. Back in the old days, when you might have had a half a dozen RF microphones and a couple of guitars or something, that was one challenge, and it was difficult enough. But you certainly didn't need an RF specialist. Now, the average show approaches 100 frequencies. For the Super Bowl, there were over 1,200 frequencies on the field that day. So we had to coordinate with 1,100 other wireless users so the halftime show would be flawless. That's an awful lot of RF. And I get hired on shows where the audio person doesn't want anything to do with the wireless. The mixer just wants to know that it is as reliable as a wired microphone, so when you pull up the fader, the audio's going to be there.

When the UHF band opened up, people really started promoting in-ear monitor systems. The problem with an in-ear monitor is that the person wears a receiver that's right next to a transmitter—the wireless mic. So now you have to be able to coordinate a transmitter that's about a foot away from a very sensitive receiver. And on broadcast events, there might be someone with an IFB, plus they have a handheld mic and a body-pack mic. For

broadcasting, sometimes we'll have backups like that. So now they're wearing three devices for every person. So shows went from maybe 12 wireless mics to 75 wireless mics for a *Latin American Billboard* awards show, for example. And there are maybe 20 channels of stage manager intercom, anywhere from half a dozen to a dozen in-ear monitors, and there are usually a half a dozen or more IFBs, and of course about a dozen or more microphones.

And that doesn't include whatever else is already out there in terms of TV and radio and taxicabs or whatever.

Absolutely, which brings up a major challenge. Over the next three years, the RF band, where wireless mics currently operate, will become more congested than it ever has in any three-year period since the invention of radio some 100 years ago. In other words, if you look at the band that wireless mics currently occupy, and in the UHF band that was 470 to 806 MHz, the FCC has just auctioned off over 100 MHz of that spectrum. So we've lost close to 150 MHz. I'd have to do the math to tell you exactly, but we lost 470 to 512 and 698 to 806 Meg. Those bands, really, in the near future, will become unusable because of high-power carriers that were not there in previous years. So my whole inventory is now squeezed into from 512 to 698 Meg.

LAVALIER MICS: PLACEMENT TIPS

Originally, lavalier mics were buried in the chest area and painted to match the costumes, where possible. Now, lavaliers are mostly mounted on the head, above the hairline underneath the wigs, if the actors are wearing wigs—or on mounts over the ear if they're balding or have thin hair.

The best audio placement for a lavalier is probably the last place the director wants it: Dead-center and as far down the forehead as possible is the preferred spot. The center of the forehead just sounds fabulous—it's really a good place to put a mic. It's very visible, but as you move farther away from the center of the forehead, you have to make more EQ adjustments to make up for it.

Avoiding perspiration is important. A drop of sweat has the same effect as putting your thumb over the microphone. It's just like switching it off.

Hats are another problem, because they create a reflection from the brim. You see a strong reflection in a small set of frequencies, almost like a shelf. If need be, you can mount the mic on the hat and switch back to the head mic when the hat is taken off.

So with 24 mics in a show, you might need 30 or more microphones mounted on various hats and actors' heads and things like that. It's not uncommon now to have at least one, if not two or more, people backstage chasing microphones, checking that they're really in the right place, that they're working before they go onstage. —Gary Stocker

whereas before you had an extra hundred MHz worth of frequency allocation.

What's left is where digital TV has been lighting off. So in a city like L.A., out of that couple of hundred MHz band, you may only have 36 MHz to work with because now there's regular TV and digital TV. And the fact is, I don't have a DTV yet. Do you? I don't know anyone who's got a DTV tuner and is watching. And if 85 percent of the U.S. population does not own a digital television tuner by the year 2006, they are not going to de-energize the NTSC carriers. So you're going to have these parallel programming carriers, digital and analog TV, which leaves very little room for wireless. And what room is left, everybody—all your ENG crews, all your other wireless mics, anybody who has a current wireless system—is going to try using it.

I hate to make it sound like doom and gloom, because I'm actually a pretty positive guy, but the fact of the matter is, it's getting more difficult to make wireless microphones work successfully, and the situation will be worse in three years, when all of the DTV stuff goes up.

Once the FCC's designated a frequency for a DTV channel, does that mean it's illegal for you to use it, whether or not the DTV channel is up and running?

The law is that you cannot transmit within an active television carrier. I'm a Society of Broadcast Engineers frequency coordinator for central Florida. Every major metropolitan area has an SBE frequency coordinator, and it's our job to make sure that when someone comes in, like a news crew, or some other wireless operators, they know what the active stations are, and they don't transmit on any of those. When there's a major event like last week's Daytona Pepsi 400 or a big launch, like John Glenn's shuttle at Cape Canaveral, I get phone calls, and I spend a couple of hours coordinating frequencies to make sure that no one's stepping on or causing interference on anybody else. So I'm the frequency keeper for central Florida. When CBS or ABC or NBC comes down to Orlando or Daytona or Ocala—my territory—they need to call me first. And they do. They're good about it. They run into this all the time, this isn't anything new to these guys in television or radio. They call me, I get my list out, and I say, "Okay, you can use this frequency and that frequency and this frequency and that frequency." The problem

is that with the wireless microphones, no one coordinates.

Beyond frequency coordination, what wireless problems do you encounter?

Other than low-loss cable, possibly a line amp and a splitter, there's very little to a wireless mic system. The antennae themselves are the most important part of the whole system. We use helically polarized antennae, because they just don't drop out. Most antennae you see are log periodic paddles. Those are polarized, so either you can put them on a vertical or a horizontal polarization. If an artist has a handheld mic, and holds it down in front of him, and then leans back and the mic goes up sideways, then a helically polarized antenna picks up the exact amount of RF no matter what polarity the transmitter is. So you simply don't have a dropout with these things. I've been using them for three or four years now. For the Super Bowl halftime show, we were at the 50-yard line on the field, and I could pick up wireless transmitters halfway outside the stadium, through a concrete tunnel on the other side of the field. With a 50-milliwatt transmitter! That's phenomenal.

The helical antennae are our own design. There's only one other guy that I've ever seen use them, and it's in NBC studios in Rockefeller Center in New York. We've installed them, but they don't ship very well, they're not good for road tours. We're trying to think of a better way to make these things. but we really only use them for our own shows right now.

We commonly see incorrect cable used for RF signals—typically unacceptably long runs of very lossy RG-58 or sometimes RG-59, which is really bad because that's video cable. But people use it. When we get racks in for repair, the first thing we do is yank out all that cable and put short runs of low-loss cable between the RF splitter and the receivers, which only needs to be a foot or two long. We replace it with the proper 50-ohm RG-58 cable. On the long runs between the antenna and the splitter, we put in RG-8, which is a very low-loss cable. The cable we use loses only 2 dB per hundred feet, at 700 MHz. Most systems that arrive here have cable that loses 17 dB per hundred feet. So right off the bat, you're up 15 dB simply by swapping the cable. ■

Chris Michie is a Mix technical editor.



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The Hammerstein Ballroom

**FROM ROCK 'N' ROLL TO CORPORATE ONE-OFFS,
NEW YORK'S PREMIER VENUE HAS SEEN—AND HEARD—IT ALL**

On a weekday afternoon in July, rows of chairs line the main floor of the Hammerstein Ballroom, a giant projection screen hovers in the stage house and a multicolored display of Macintosh computers command the stage, all in preparation for a technology convention. It's a far cry from the way the hall looks when it's invaded by thousands of music fans rocking out to Godsmack or grooving to Moby.

"The face of this room can change on a dime," declares Victor Moore, VP of audio sales and production at Manhattan Center Studios. "You can walk in here [for different events] and go, 'Is this the same place?' Pratt Institute [recently] held a big display of their art. If you had come during that time, you wouldn't have recognized it. The room was subdivided into 30 sections."

From sweaty, gritty rock shows to chic corporate events and lavish holiday parties, the Hammerstein Ballroom hosts a wide range of events. And its history is every bit as diverse.

FOLLOWING THE LINEAGE

Opera impresario and theater builder Oscar Hammerstein constructed the Ballroom, originally christened the Manhattan Opera House, in 1906 to compete with the Metropolitan Opera

and create a venue where everyday people could enjoy that musical art form. He was successful during the four years that the concert hall was in business, luring patrons away from the Met and affecting that institution's income for the first time. Then in 1910, the Met offered Hammerstein \$1.2 million to stop putting on operas for a decade. He accepted.

The Opera House then changed hands several times—serving as a vaudeville hall and later a "talkie" movie theater—until the 1920s, when it was purchased by the Scottish Rites of Free Masonry, who made major renovations and built the 1,200-person-capacity Grand Ballroom on the seventh floor, or what was once the roof. During the mid-1930s, Abraham Ellis, the former concessionaire at the Opera House, purchased it. He changed the name to the Manhattan Center, reduced the size of the main stage downstairs and sealed off the third balcony from the public.

"When they turned this into a ballroom, they actually lost this ceiling," points out Robert Carvell, director of production services. "They hung a ceiling below that proscenium, all the way across, and cut off the third balcony and cut off all that empty, open space up there near the ceiling."

The refurbished venue became popular for big band performances, union

meetings and trade shows. During the following decades, management gradually let the facility slip into a state of disrepair. The venue eventually closed in the mid-1970s, but then Manhattan Center Studios Inc., a subsidiary of One-Up Enterprises, took it over.

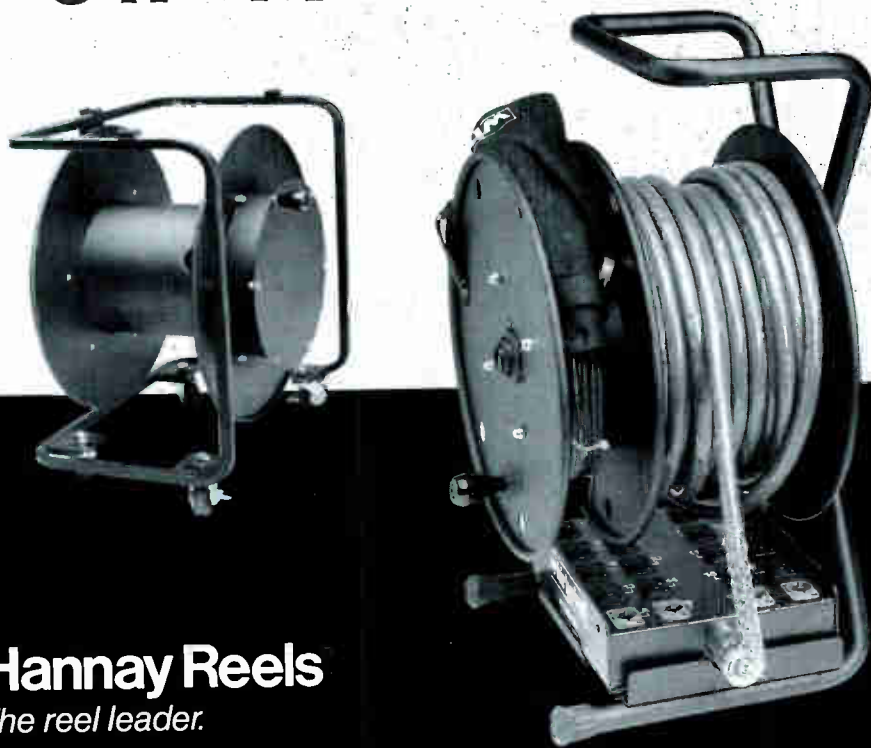
"We've been here for 25 years," reports Randy Davis, president of Manhattan Center Studios, "and since then started building audio rooms, video rooms and post-production suites, with these two big ballrooms as the core of our facilities." His company has transformed the Hammerstein Ballroom into one of the premier live music venues in New York City.

The current capacity of the Hammerstein is 3,700 when the audience is standing. The floor holds 2,500, and each of the two open balconies holds 600 seated patrons. When there are seats on the main floor, 1,200 people can sit there, reducing the overall capacity to 2,500. The third balcony is closed to the public, but the lower ceiling was removed, once again revealing beaux-arts angels flying on ceiling frescos high overhead.

The Hammerstein hosts many seated shows, from award ceremonies (the Tamika Reggae Awards and the Rhythm & Blues Foundation Pioneer Awards) to

by **Bryan Reesman**

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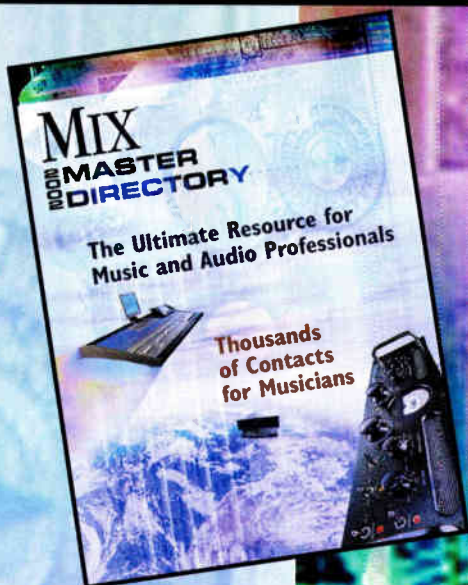
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Live mix

launch parties (Microsoft and Lexus). But music is still what the public comes to hear. "When you see concerts here, you're not far away from the show," observes Moore. "[Even in] the balcony, you're close to the show." Both open balconies are low and at shallow angles, so fans can avoid the unpleasant "nosebleed" feeling common to other concert venues.

Carvell reports that the Hammerstein's plaster ceiling is 75 feet high, and the grid height in the stage house is 85 feet. The building itself is solid brick on the outside, plaster inside, and the structure is steel.

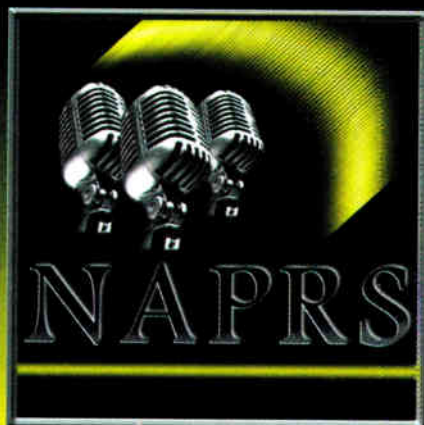
"It's kind of a unique room, because the actual room itself traverses both the front of house and stage house," Carvell explains. "We have a small, hard stage now in the stage house, which is 24 feet deep by 54 feet wide. We have additional staging to build that out up to 40 feet deep, and, if necessary, we can bring in an extra stage to fill the whole stage house. It's an enormous stage if you do that. The proscenium is almost in the middle of the room. It was built for opera—major fly space, big stage."

Soundwise, the Hammerstein is well-stocked with some powerful equipment. Mixers have the option of a 40-channel Crest VX or a Yamaha 01V digital unit. The venue offers a wide range of Turbo-sound cabinets, including 20 TSW-721s (bass), 18 TFL-760 Floodlights (mid/high) and eight THL-2s (full-range), all powered by QSC Powerlight amplifiers. It also has 12 EAW KF300 cabinets, seven Apogee cabinets (four AE-2 subs and three AE-5 full-range) and 14 Meyer cabinets (10 UPA full-range and four subs).

"We have found that the Turbo-sounds are very good for concerts," says Carvell. "It's really full, good-quality sound. For a lot of the more corporate events or talking-head things, we've found that the EAWs work very nicely to distribute the sound. As you see, we've got sound all the way around the sides. We've got a couple of speakers up front as well. You have very good coverage all around."

Carvell points out that because the Hammerstein was originally designed as an opera house, it has very good acoustics. "It's been changed, and a flat floor has been put in, so that did make a little bit of impact," he says. "But the acoustics have been sampled for one of the [E-mu] reverb units."

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BACK IN THE CONTROL ROOM

Those acoustics are put to good use in a live forum, and the Hammerstein is well equipped to record shows in multiple formats, from CD to DVD. "All of our facilities have tielines to this room, so we can record in the various formats," explains Moore, referring to Manhattan Center Studios' three audio recording studios, two video control rooms and two digital online video editing suites (with D2 and DigiBeta formats).

"It's kind of like Noah's Ark," he quips. "Two of everything basically, just in case." Studio 7 has a Neve VR 96 console with 120 inputs, and it is the main room used for live recordings in the Hammerstein. Studio 4 has a Neve VR 72, and Studio 8 has a 72-channel Mackie console that is often used for Pro Tools work and tracking. Studios 1 and 6 are the video control rooms with adjacent stage areas.

Because the Ballroom is literally plugged into Manhattan Center Studios' recording facilities, artists and labels are able to record a show in multiple formats. Such a multiform event transpired recently when reggae legend Beres Hammond performed and recorded a Pay-Per-View special.

A multicamera shoot was done for a forthcoming album, home video and DVD. "We did the stereo mix for the album, we did the 5.1 surround mix in [Studio 7], which is set up for 5.1 recording and mixing since we do so much film stuff," Moore says. "The thing about our rooms is, we've been doing film work for 10 years, so we're ahead of the game with mixing 5.1, because we know and understand how to set up and mix in that format."

The video shoot was coordinated from the sixth-story video control room, which is an analog room with a Grass Valley 250 switcher and Sony Betacam machines. "For the music stuff, we'll almost always take a feed from Studio 7 direct to the Beta machines," Davis explains. "So we'll do two or three different audio record-

ings. We'll do it on DAT, often we'll do a digital recording as well on our 3348 machines, and record it directly to the Beta machines. Having the different formats and capabilities makes it that much easier for our clients, being that we can do *all* of that in one facility."

Video shoots at the Hammerstein can expand to as large as eight to 10 cameras. "We've done everything from the *Oprah Winfrey Show*—when her guests were Janet Jackson and Paul McCartney on two different days—to HBO Boxing in the Hammerstein," remarks Davis. "Even just smaller, single-camera product shoots and music videos and the *Top of the Pops* for Germany. We have fiber lines throughout the building, as well as fiber lines connecting us to satellite transmissions." One of their clients worked with Aaliyah and wanted a live performance transmitted to the German *Top of the Pops*. "They did it live here and sent the signal live to Germany, so they did a downlink there to be able to show that live in prime time."

From audio to video, one of Hammerstein's most distinguishing factors is its diversity. The venue has held everything from "very high-end rock 'n' roll concerts to high-end parties," says Moore. "Our location is unique. We've got access from subway stations to the Jersey tunnel. We're between 8th and 9th Avenues on 34th Street in Manhattan. Penn Station's there. We're in a great setting."

One wonders whether Oscar Hammerstein had any inkling of how his opera house would be transformed into an all-encompassing entertainment venue. The divas performing here today may be different from those at the turn of the century, but, ultimately, the ballroom still fulfills its purpose of bringing music to the masses in a lavish setting with superior acoustics.

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Bryan Reesman is a freelance writer in the New York metro area.

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PHOTOS BY STEVE JENNINGS
TEXT BY CHRIS MICHIE

With two multi-Platinum albums and a Gold-certified single behind them, Sugar Ray have enough of a following to sell out most of the venues on their current U.S. tour of theaters, smaller arenas and sheds. Playing to a predominantly female audience at San Francisco's Warfield Theater, Orange County, Calif., natives Mark McGrath (vocals), Rodney Sheppard (guitar), Murphy Karges (bass), Stan Frazier (drums/guitar) and Craig "DJ Homicide" Bullock delivered an energetic and entertaining set drawn from their recently released fourth album, *Sugar Ray*, plus the hits "Fly," "Someday" and "Every Morning" from the *Floored* and *14:59* albums.

Sugar Ray's infectious mix of alternative rock, punk, reggae and metal guitar ruckus, combined with sampled beats and DJ Homicide's turntable pyrotechnics, rang loud and clear from a JBL VerTec line array P.A., purchased for the tour by L.A.-based sound system contractor Schubert Systems.



Ray's Bar



Bassist Murphy Karges (left) and drummer Stan Frazier (center) both have Shure PSM 600 wireless in-ear monitor rigs and wear Ultimate Ears UE-5 earpieces.

Production manager and FOH engineer Bryan Clements (below) has been with the band for four years. Because drummer Stan Frazier also plays guitar and sings, an Akai DR16 sampler runs prerecorded drum tracks for about half the set. The Akai takes up about 12 inputs, leaving Clements with about 36 remaining for band and effects inputs.

At the top of the FOH outboard rack is a Summit TLA-100 compressor for singer Mark McGrath's vocal. "It's pretty transparent," says Clements. "I use it on almost every show." New in the effects rack for this tour is a TC Electronic D2, which Clements uses for long delays; a Harmonizer H3000 takes care of chorus and vocal effects. Unruly band dynamics are handled with dbx 160A compressors and Aphex gates, while overall system EQs are BSS $\frac{1}{2}$ -octave graphics. Assisting Bryan Clements at FOH is systems tech Neal Shelton; Arthur Porter rounds out the Schubert Systems sound crew.



The Sugar Ray road crew, L to R: DJ tech Peter Butsicaris, drum/bass tech Derek Gordon, stage manager Frank Fuccille and guitar tech Matthew Baratto.



FOH engineer Bryan Clements at the Yamaha PM4000.



Independent monitor engineer Scott Boculac is on his first tour with Sugar Ray—he has been mixing monitors for Creed since 1998 and was most recently out mixing in-ears for Peter Dinklage. For this tour, Boculac specified a Midas Heritage 3000 mixing console, on which he creates both in-ear and wedge mixes. For singer Mark McGrath, Boculac creates stereo wedge mixes supplemented with proprietary Schubert Steridian full-range sidefills (all wedges are Clair Bros. 12AM models).

"The most challenging part of the gig for me is that Mark likes to hear a lot of effects onstage," says Boculac. "He likes to hear Harmonizer as well as reverb, which is why his center monitor wedges are run in stereo. Getting it loud enough for him while still keeping tonal quality—that's the challenge." In addition to a Harmonizer H3000, Boculac is using Yamaha SPX 990s for monitor mix reverbs.

Singer Mark McGrath uses a Shure U4D wireless system for his vocal mic, a Shure Beta 58. FOH mixer Bryan Clements, who is a member of the TV sound mixers' union, also spec'd an all-Shure mic selection onstage (except for a Sennheiser 421 on the bass cabinet).



PHOTO AND TEXT BY STEVE JENNINGS



SADE LIVE

With her *Lover's Rock* CD already RIAA-certified Platinum, Sade set out on her first U.S. tour in almost eight years. *Mix* caught the Shoreline Amphitheater show in Mountain View, Calif., in mid-July.

Mixing FOH for the tour is Howard Page, who, as VP at Showco, was largely responsible for the design of the Showconsole, the digitally controlled analog console that Showco developed jointly with Harrison/GLW.

"I don't do full tours much anymore," notes Page, who started touring in his native Australia in the '70s. "So this is a rare opportunity to use some of the things I've designed and built. I have a different stored preset for every song on the show. Sade and I have structured every song [in terms of the mix], and each song

is very different from the next. With the Showconsole, I just hit one button and the whole mix resets for that song's feeling, grooves and sounds, all in the blink of an eye."

Though the P.A. is a familiar one for Page—a Showco Prism system—the choice of lead vocal mic was less straightforward, because Sade wanted to use a wireless handheld. "We ended up with a Shure SM87 head on a Shure wireless system," notes Page. "A female vocal is tricky at the best of times, and generic vocal mic choices don't always work—you have to tailor the choice to the artist's intonation and the way the artist sings." Perhaps not surprisingly for an artist who has a sophisticated ear, Sade is using Future Sonics in-ear monitors.

NEWSFLASHES

JBL's new VerTec line array system got a workout at "Wango Tango," a multi-act show sponsored by Los Angeles radio station KIIS, which featured appearances by Aerosmith, the Bee Gees, Ricky Martin and others. To cover the capacity audience of 60,000 at L.A.'s Dodger Stadium, ATK/Audiotek provided a VerTec system consisting of six separate columns, each 12 speakers deep...Classic soul-funk band Tower of Power is on tour with 14 McCauley Sound SM950-2 stage monitors powered with a dozen QSC PowerLight 236 amplifiers fitted with DSP-3s. "The DSP-3s allow us to change crossover points, EQ settings and limiter settings simply by plugging a laptop into the DSP-3 and doing a quick reconfigure," said tour and production manager Bryan Cross...To cover the capacity crowd of 12,000 worshippers in the Los Angeles Forum for a recent extravaganza for the L.A. Church of Christ, producer Chris Wall called for a massive EAW sound system. Designed, installed and operated by Burbank-based Nelson Sound, the system included 20 EAW K850 loudspeakers and 12 EAW

SB850 subwoofers. A distributed delay system included 34 EAW 850s and 21 Apogee Sound AE5s...Steve Wood of Trutone Electronics in Bellingham, Wash., provided a Tsunami Technologies-powered sound system for Joan Osborne's appearance at the 1,500-seat Mount Baker Theatre, a 1927 art deco gem that is now a historical landmark. Almost 30,000 watts of power was provided by nine HQ-2002S, six HQ-1302S and six HQ-702S Tsunami Technologies power amplifiers.

PURCHASES AND INSTALLATIONS

Delicate Productions of Camarillo, Calif., has purchased an Innova-Son Compact Digital Console. Freelance audio engineer Lyle Dick has been using the Compact at corporate shows, including the Disney Millennium New Year 2000 in Pasadena...The Indianapolis Symphony Orchestra (ISO) has purchased a 56-channel Soundcraft Series FIVE mixing console. The ISO, which performs 200 concerts a year to a total audience of over 500,000, uses the board for its 30-date outdoor summer series and also at its 1,800-seat home in Indianapolis, the

WERCHTER FESTIVAL

Sting, Roxy Music, Beck, and the Black Crowes were among the artists who performed at the Werchter Festival, the largest European festival of the summer. The three-day event, which attracted 70,000 to Leuven, Belgium, featured Adamson Y-Axis line array systems (provided by EML) for both the main and secondary stages.



NEXO AT OFF-FEST

ThunderAudio provided a Nexo Alpha system for OFF-FEST, a spin-off from Ozzy Osbourne's OZZFEST that featured Slipknot, Papa Roach, Linkin Park, Mudvayne and Disturbed. In addition to 48 stacks of Nexo Alpha components, Thunder Audio also supplied Nexo Alpha E sidefills and a full complement of Midas mixing consoles.

DIDO GETS IN-LINE

Electronic pop chanteuse Dido, on tour to promote her *No Angels* album, is using a Meyer Sound M3D line array system. Jason Sound/Westsun of Ontario is providing 10 self-powered M3Ds per side with additional MSL-4s as mid-fills and outfill speakers. Jason Sound/Westsun is also providing a Meyer Sound M3D system for Canadian pop sensations Bare-naked Ladies.

Hilbert Circle Theater. Other ISO purchases include an EAW KF750 rig with subwoofers, 22 Crown MA-2400 amplifiers, BSS FCS-926 Varicurve EQs with an FPC-900 remote controller, and microphones from AKG, Neumann, Schoeps and Shure...Advanced Audio Visual (West Chester, Pa.) has taken delivery of the first Resolution 2 system in the U.S. Manufactured by Funktion-One in the UK, the Resolution 2 is a compact full-range system and comes with integral flying hardware...QSC has supplied 10 4-channel CX404 Series amplifiers to Portland General Electric Park, home of Portland's AAA baseball team, the Beavers. The system was designed by Dave Stearns of Dallas-based Pelton Marsh Kinsella (PMK) and installed by local contractors Delta AV. ■

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MIKE MANGINI

HE LET THE DOGS OUT

Last year it was inescapable: You couldn't go to a sporting event or a dance party without hearing that unmistakable, a cappella opening booming out of the speakers: "WHO LET THE DOGS OUT? *Woof, woof, woof, woof!*" And then what followed was a delectable dollop of Caribbean sunshine mixed with a little rap, some hot percussion and some more surreal canine lyrics. In the video for "Who Let the Dogs Out," the Baha Men, who really are from The Bahamas, were the sleek, smiling party boys on the prowl for some good times—simply irresistible! It was a perfect anthem for summertime, though professional football teams also adopted it in the fall of 2000. The song went on to win the Grammy Award for Best Dance Record, and the album it came from went triple-Platinum in the U.S and has sold millions more around the globe; quite a world music phenomenon.

There's a lot more to the Baha Men than "Who Let the Dogs Out." In fact, the album, also called *Who Let the Dogs Out* (it's the group's seventh—so much for being overnight sensations), is rich with great uptempo material that deftly mixes tropical flavors with some killer dance grooves. "You All Dat," "Get Ya Party On" and "Getting Hotter" all demonstrate their depth and versatility. And their first follow-up since the success of that album, the song "Best Years of Our Lives" from the top-selling *Shrek* soundtrack, shows that last year's successes were not flukes.

At least part of the Baha Men's success is due to the imaginative work of New York-based producer/songwriter Mike Mangini—he co-produced the album's best tracks and co-wrote two of the songs (though not "Who Let the Dogs Out"—that was a Trinidadian tune). Not surprisingly, this has been the highwater mark for Mangini's career, but he has a number of other interesting productions under his belt, too, includ-



ing work for jazz/rap pioneers Digable Planets, O-Town, Bruce Hornsby, Imani Coopola and David Byrne (his latest, *Look Into the Eyeball*)—all those following a successful stint as an engineer, programmer and session drummer. We caught up with Mangini at the Manhattan offices of S-Curve Records, which released *Who Let the Dogs Out*, and where Mangini is currently building his own studio.

How did you get into doing engineering and programming originally?

I was a musician originally, and I'm still a musician. But in 1989, I came to New York [he grew up in Baltimore] and got a job at Chung King just as the whole hip hop explosion in New York happened. I was an assistant for about *a week*. [Laughs.] The guy I was supposed to be an assistant for on Run-DMC just stopped showing up all of a sudden. The great thing about hip hop is they'll give anybody a shot, so they're asking me, "Hey, can you run this stuff?" "Sure, no problem." Of course, I couldn't really, but somehow I managed, and then we started working,

and I started doing engineering and programming for all kinds of hip hop groups.

You must have had some experience.

I had a little home studio, and there would be local bands who would come in and pay to record there, and also I'd try to find artists who were interesting, spec them, and try to make demos and records with those kind of people. I was even doing some hip hop before I came to New York, but I didn't know the first thing about making it any real sort of way. Then I came to Chung King, and it was like the biggest education in the whole wide world. Within a couple of weeks, I understood how hip hop records were made. But the one thing I always thought was that hip hop records are cool and the vibe is great, but they don't sound very good.

Well, there were certain "accepted" machines and there was an almost consciously low-tech thing going on...

Sure, that's part of it—everyone using an SP1200 or 12-bit samplers. What I realized is that nobody making these records had much of an idea of what the hell they were doing. As long as the bottom end was

BY BLAIR JACKSON

really loud, everybody was happy. So from the beginning for me it was important to try to make better-sounding hip hop records. And, certainly, I wasn't the only one doing that. There were other people around who were also starting to try to make the records sound better.

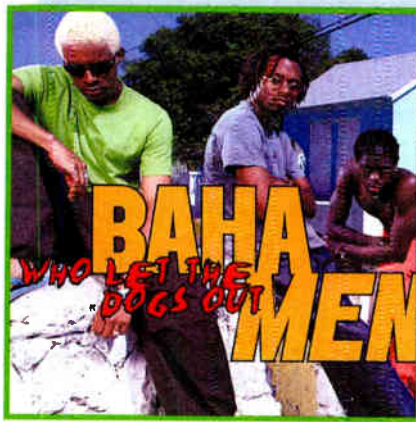
Was there a racial component to working in hip hop?

Absolutely. If you look at what the traditional notion of what a producer does—in other words, they're editing other people's ideas and shaping records—I was already doing that back in those days [early '90s], but there was no way I was ever going to get to "produce" hip hop records back then, basically because I was white.

By about 1993, I'd had a lot of success as a programmer and a mixer of all kinds of records—I worked on Jo De Ci; I did a lot of stuff for Puffy [Sean Combs] when he was an A&R guy at Uptown; I did a little work on Mary J. Blige and for Def Jam. I was having a lot of success in that world, but there was no crossing over into a pop thing, so to make a long story short, I decided that I wasn't going to make those kinds of records anymore. So I sort of sat on the sidelines for a minute to regroup and come up with another plan, when this woman called up and said, "I have this artist and I'd really like you to work with them." "What kind of music are they?" "Well, they're rappers, but..." And I said, "You can stop right there. I'm not interested..." But she really stayed on me and called and called, and eventually I met with them and it was this group called Dignable Planets. So I made that record in my house, and they let me co-produce.

What did you have in your house?

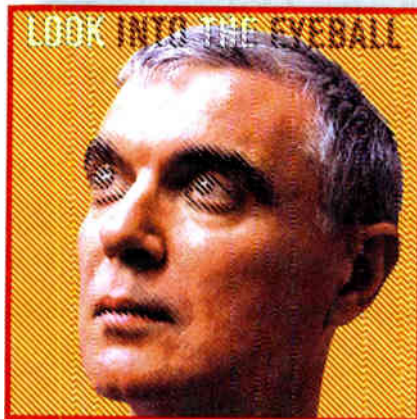
It was the most rudimentary studio you can imagine. I had a place in New Jersey, right near New York City. I recorded that album [*Reachin' (A New Refutation of Time and Space)*] on a Tascam 16-track half-inch and a Tascam console, and an MPC-60 and a S-950. It was pretty raw stuff. But their ideas were really good and the record became very successful—it went Gold, and the single, "Cool Like That," also won a Grammy for Best Rap Record that year, beating out people like Dr. Dre and Naughty By Nature. So that was pretty exciting. And that was really my favorite era in hip hop—when there were groups like Dignable Planets and A Tribe Called Quest and Arrested Development doing those interesting combinations of styles. So I made that record there, and then many years later I ended up doing the Baha Men record in my apartment in New York, doing tracks there, mixing it there and having a huge record. So



there's a certain beauty in working at home, I guess!

So did doing Dignable Planets lead to other work?

Yes, and it also allowed me to move into pop a bit, and I started doing some remixing of pop acts, where I'd put beats on. It would be a conventional record with a lot of live instrumentation, and I'd take away the live drums or loop up live drums. It was that whole movement around '95, '96, '97, where people did a lot of that. I did a couple of things for the Beastie Boys around then.



I've talked to a lot of engineers through the years who aren't happy about what remixers have done to music they've recorded.

I can see that, but I think you have to look at it for what it is, which is a different medium entirely. When somebody does a remix, it doesn't take the place of the original mix; it's just looking at a song from another perspective and, hopefully, redoining it in creative and interesting ways.

I've been on both sides of it, too. I made David Byrne's most recent solo record [*Look Into the Eyeball*]. I produced the entire album. Subsequently, David has gone out and gotten some remixes done because he's a very forward-thinking guy—that's one of the things I love about him—and I think it's great, because some-

one can take it and go a whole 'nother place with it than we did. Now, he brought me the songs and I tried to, in a rhythmic way, stay true to what the song was supposed to be about. But someone can come around and do something completely different that could give the song another life, introducing it to a whole bunch of other people who might not hear the song otherwise. I think it's only positive. Unfortunately, not everyone doing remixes is great at it, so that's a down side. But if you get a great remix, it's amazing. I think it's a really creative genre.

Didn't you spend some time in England?

Yes, in the mid-'90s I went to England for about a year, which was a really good experience. I worked a lot at Metropolis, which is this huge warehouse with a zillion studios in it; there's a lot going on there. And I also worked at Konk Studio, which is The Kinks' place. I was doing producing, which means I do the track and then get the artist to hopefully deliver a compelling vocal. Or I was reworking other people's tracks, or in some cases engineering and mixing.

Then I came back to New York, and in '97 I met this girl named Imani Coppola, who was like 17 years old and didn't have a deal, and we went into the studio and cut a couple of tracks with her, which led to this huge bidding war over her. That was a different kind of thing musically—it was hip hop, but it had a psychedelic thing going on with it. For me, it was influenced by what the Dust Brothers were doing. She ended up doing a record for Columbia [CBS], and she had a Top 30 single with a song called "Legend of a Cowgirl," and that seemed to crank my career up a couple of notches; it got a lot of people calling me. Even though the record only did about 150,000 [sold], it was considered kind of a "hip" record, and a lot of people wrote about it.

After that I did a bunch of different records. I worked with Joan Osborne for a bit on the her second record [*Righteous Love*]...

That must've been on the early, pre-Mitchell Froom version...

There were many early versions. There were at least six producers who worked with her and I was one of those people. I co-wrote one song that ended up on the album ["Hurricane"]. During that period, I also produced half of Bruce Hornsby's record, *The Spirit Trail*. That was a very interesting experience. Bruce was great. We worked at his studio down in Virginia, which is a very cool place, and we also worked here in New York. He's an amaz-

ing person and an incredible musician.

What do you bring to the table for someone like that, who's such a forceful songwriter and a commanding presence?

A lot, I hope. I'm a songwriter as well—in fact, I'd say that's a predominant part of who I am. I think he wanted to make his sound a little bit hipper without losing who he is or selling out. When he was making records when he was his most successful, he was using a LinnDrum. So I think he wanted to get back into some grooves like he had on those records, but hopefully update the sound a bit. I think that record turned out really well.

I also did some work with Dido, but the tracks didn't make it onto the record. *How did you book up with David Byrne?* David came to me and said, "I'd like you to produce my record," which I found very surprising. I mean, growing up, Talking Heads were huge for me; he was almost like a hero of mine. So to have a guy who's a hero to you call you up and say he wants you to produce his record, it's a very cool thing. And I said, "Why?" And he said, "There are two records of yours that I've heard in the past five years that I think are really great—Imani Coppola and Digable Planets. They were quirky yet commercial, and I want to make a quirky, rhythmic, commercial record." So we got together and he played me all his demos.

There are some complicated arrangements on that album; all those strings. What were the demos like?

Six or seven songs on the record have some sort of string arrangement. He wrote predominantly on guitar. There were a couple of songs where he had a loop and maybe some sort of string idea. He has a guitar synth and he sometimes would play a suggestion of some texture that could be there, or some suggestion of what the drums might be about. It was hinted what they might be like, but there was also a lot of room for imagination.

What was influencing him in that direction? Is it the influence of the Cuban orchestras and bands who are getting so much exposure now?

I think it goes further back than that. I think it's more a Gershwin thing. I think David wanted to tax himself and see if he could write real, classic-style songs, but have them still be *him*. I think he wanted to go as far as he could go melodically this time, both as a singer and a writer. As a lyricist, he's always amazing, of course, but I think he was pushing himself melodically. The amazing thing about working

with David Byrne, I found, is that unlike a lot of first-time artists, he was wide open to being critiqued and to working on things. He might bring in a song and I'd say, "Well, this is really good, but I think maybe what you think is the chorus is more the setup for the chorus and you should work on evolving that idea." And he would go the next day and work on it and come back and re-present something that would be great. He worked *really* hard. I've seen kids making their first or second record who wouldn't begin to work that hard or be as conscientious about doing their craft.

Where did you work mostly on that record?

We did the pre-production in my home studio, and then we did the bulk of the live recording at the Cutting Room.

What's in your studio these days?

I'm in the process of building a real room at the moment. I have the new Sony DMX board and tons of outboard stuff—a Neve Prism rack and a bunch of Avalon gear, which I'm very fond of. I have four 737s, two 2055s. So lots of outboard gear and MIDI gear.

And Pro Tools, I presume?

Actually, no. I use Logic. Honestly, I don't even know how to open Pro Tools. [Laughs.] Everything I do is 24-bit, 64 tracks in Logic, and I find it really, really flexible.

How has programming changed for you in the past 10 years?

Phenomenally. When I look back at when I started, it was like the Stone Age. When you could program something in, say, an MPC-60 or an SP-1200, and manage to get the damn thing to lock to tape without it slipping and sliding all over the place, the day was a major success. Now you take all this stuff for granted. I remember back in '97, I was trying to make this very sophisticated record with a group called Swirl 360, which was a really cool record that wasn't a big commercial success or anything but was really good. I was taking live drummers and then making drum loops and locking it all up. It was like 48 tracks of analog and another 16 tracks running virtual. And it was really, really hard to do that kind of stuff even then.

Now, when everything went 24-bit and you have lots and lots of audio tracks, that's made a huge difference. It used to be that doing something relatively cool took a lot of work and a little luck for it to go down right. Now, you have more time to be creative and more time to do almost anything your imagination can come up with, because now the tools are right in front of you.

Now, any kid with a little money can buy a system where he can compete. He can make records that can be really interesting and creative and clever. And I think that's great. It makes it so it's not who has the most skill as an engineer. It's who has the best ideas. I mean, the reason I got into doing what I'm doing is that I was the biggest Beatles fan in the world, and I listened to those records and I wanted to be the guy who made records and who experimented with equipment and did interesting things with it.

How did you get involved with the Baba Men?

I was working with David on his record, and then he had to go to Europe to do something for his label [Luaka Bop]. We were going to have a couple of weeks off, and my friend Steve Greenberg picked up the phone and said, "Remember these guys I've signed, like four times—the Baba Men?" "Yeah, I know those guys." And he says, "I've got this amazing idea for a song and I want you to do it for me." I said, "Come over to my house and play it for me." And he comes over and plays me this Trinidadian version of this song, "Who Let the Dogs Out." I'm listening to it and looking at him like, "What are you *talking about*?" [Laughs.] What do you want me to *do* with this?" And he says, "This is really easy. You do a track like 'Whoops, There it Is,' [by 95 South] except for the year 2000. Big bass, interesting rhythmic stuff happening." So I worked on the track at my studio, and then he sent me down to Miami and I recorded the vocals. Believe it or not, it's cheaper for them to record in Miami than it is in the Bahamas, because the good studios there are so expensive. I took them [the vocals] back and Steve thought they were pretty good but they needed to be better. So we went back and forth a couple of times, and then during that process they ultimately decided their singer wasn't good enough and they hired some new guys, Rick Carey and Omerit [Hield], who were both really good—they could really deliver the song vocally. We did that at Circle House [in Miami]. Then we came back and recorded a little percussion and some guitar. We sent it over to a mixer, but we felt there was something missing from what he did, so I volunteered to mix it myself. Even though I've had people like Tom Lord-Alge and Chris Lord-Alge mix my stuff, for some reason I thought I should do that one—keep it real *vibe-y* and real raw.

So I mixed it and Steve thought it was pretty damn close. He came over, we tweaked it for about an hour and that was

it. It got mastered and then he started taking it around to people and got just the most amazing response.

After that, Steve called me up and he said, "Listen, you and I are close friends. Let me make a recommendation to you. I'm telling you—this is going to be a *huge* hit. You're going to be really hummed if you only have one song on this record. So if you can find another couple of weeks to go down there and work on some songs with them, I think it'd be great for you and them." So I did get another break from David [Byrne] and I ran down there [to Miami] for four or five days. I had some tracks that I brought with me. We wrote to them on the spot, came back and worked on that.

Was the song on the Shrek soundtrack done at the same time, or after?

No, that's more recent. It's really great to be part of that movie.

What have you learned about the group, now that you've worked with them for a while?

Actually, these days I'm working on songs for the next Baha Men record, so it's an ongoing thing. We have a nice way that we work together. I start a track, we bring it down, they contribute however they can—play on it, write on it—and that

seems to work very well. The band at this point have a sense of what they've become and they're psyched about it. At the same time, they're concerned about keeping a certain amount of real instrumentation in the records and they don't want to become too much of a pop thing—they want to keep the world music elements in there, and I do, too. That's a lot of what makes them special. I will tell you, no joke, these people are up there with anybody I've worked with. They are amazing musicians.

What else have you done recently?

I did a track on the O-Town record. I'm in the process of making a record for S-Curve with these four sisters from Florida who are really cool—the youngest is 13 and the oldest is 23 [The Beu Sister]. It's pop, but it's different than what's going on out there. The tracks have a sort of European influence; kind of like a Fatboy Slim or William Orbit direction. And they have an almost country sound in their vocals. I like the idea of making a lot of different kinds of records and not get caught up making the same one over and over again.

I also did this record for David's label, a group called Si-Se—amazing, man! I saw them last night at the record release

party and I'd never seen them play live before. I was blown away. The girl [Carol C.] is like a Latin Sade. It's got a world music thing but also a trip hop thing. It's the kind of record that could come out of nowhere and really be a big thing if people get to hear it. I produced half the record. It's very cool and cutting edge.

And you're setting up a studio?

Steve and the guys at S-Curve have been nice enough to give me some space in their building, so I'm in the process of building a room there. Gear-wise, I'm going to pretty much go with what I've already got, because I'm really comfortable with it.

I really love making records in unorthodox situations. For me, it always seems to work out better than if, say, I go to some really big commercial studio every day. When you book a room for \$2,500 a day, you tend to sit behind the console and jam all day long, because you've got to get it done in a certain period of time. The flip side is that when I work in my own room, I can work for a bit, take a break, clean my ears out, keep things fresh. So this will be ideal for me. I'm really looking forward to this. ■

Blair Jackson is senior editor of Mix.

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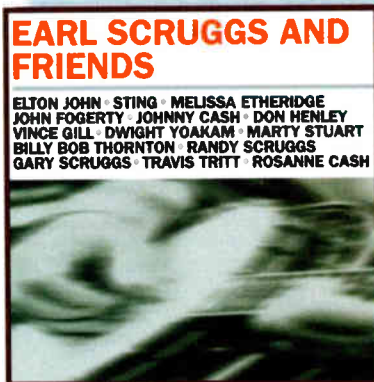
EARL SCRUGGS

A LITTLE HELP FROM HIS FRIENDS

by Elianne Halbersberg

Remember those old family driving vacations—mom and dad in the front seat, you and your brother or sister in the back, stopping every few hours along the scenic byways to see the sights? Now, imagine recording an album that way; the making of *Earl Scruggs and Friends* was a lot like that. Granted, the players traveled at 30,000 feet and not in a wood-paneled station wagon, but the premise was the same: Earl Scruggs; his wife and manager, Louise; son Randy Scruggs—an award-winning guitarist, songwriter and producer; and Ron “Snake” Reynolds, who recorded and mixed the album, packed up and traveled from city to city, studio to studio, to record the CD’s 12 tracks, which feature a variety of guests performing with the legendary banjo player.

With a career spanning



more than 50 years, Scruggs has received 11 Grammy nominations, recorded countless albums and is credited with bringing bluegrass music to international notoriety. Born in North Carolina, he began play-



PHOTO: PAMELA SPRINGSTEEN

ing banjo at age 4 and, as a 10-year-old, developed the three-finger style known as “Scruggs-style picking.” With Lester Flatt, his musical partner for more than two decades (beginning when they were members of Bill Monroe’s Bluegrass Boys), Scruggs had the first Number One bluegrass single, 1962’s “The Ballad of Jed Clampett,” also known as the theme song to *The Beverly Hillbillies*. In 1969, the duo parted ways, and Flatt died in 1979.

Scruggs’ sound diversified as his solo career gathered steam; today, at 77, he continues to record, perform and awe generations of music fans in every genre. Not only is Scruggs a musical legend, but so is his banjo: a Gibson Granada model manufactured in 1934 that he acquired in 1949. The banjo—and the extraordinary talent of the man playing it—is the tie that binds *Earl Scruggs and Friends*, the defining thread running through the album’s collection of styles. And, quips Ron Reynolds of the

rare instrument, “If he makes enough money off of this album, he might be able to buy a new one!”

Joining Scruggs on this unique project are Elton John, Sting, Melissa Etheridge, John Fogerty, Johnny Cash, Don Henley, Vince Gill, Dwight Yoakam, Marty Stuart, Billy Bob Thornton, Randy and Gary Scruggs, Travis Tritt and Rosanne Cash. They make *Earl Scruggs and Friends* a musical gumbo, from the all-out pickin’ fest of the instrumental all-star “Foggy Mountain Breakdown” to Yoakam’s hip, haunting sound on “Borrowed Love.” “Fill Her Up” is pure Sting—rhythmic and soulful—though banjo-enhanced. Surprisingly, it’s the Randy Scruggs original, “Somethin’ Just Ain’t Right,” that leans most toward a rock feel—further testament to Earl Scruggs’ broad musical tastes.

Reynolds calls the guest lineup, “The best of the best of artists and musicians. They didn’t participate in this album for money; they did it for love

—CONTINUED ON PAGE 290

DAFT PUNK

A JOURNEY OF
"DISCOVERY"

by Bryan Reesman

Daft Punk steadfastly refuses to obey conventional rules of dance music. Unlike so much of the homogenized club fodder today, their music is carefully thought out and sculpted. They prefer to sample themselves rather than routinely sample the music of others, and they take time recording their albums, as evidenced by the four-year gap between their debut *Homework* and their sophomore effort, *Discovery*, a CD that took more than two years to create. And while the lads could be considered gearheads, they are not consumed by the techni-



cal process of constructing their music; rather, they mesh the worlds of analog and digital sounds into an eclectic, tongue-in-cheek blend.

Listening to *Discovery*, it is obvious that this French group appreciates '70s funk and dis-

co, but by the production techniques they employ, and the interweaving of other genres, such as rock and '80s pop, the end product could only come from the current decade. The CD is a kind of retro-futurist manifesto. "A mix between the

past and the future, maybe the present," offers Guy-Manuel de Homem-Christo, on the phone from the Paris studio he shares with bandmate Thomas Bangalter. One tune exemplifying such an aural amalgamation is

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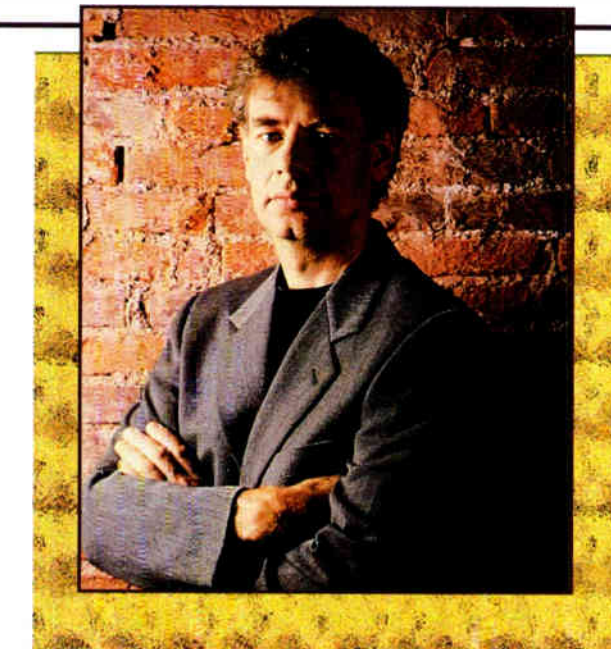
BILL BRUFORD

THE DRUMMER'S JAZZ
ODYSSEY CONTINUES

by Chris J. Walker

The British are different. Tea instead of coffee, soccer over football, cricket instead of baseball, not to mention driving on the "wrong" side of the road. So it should come as no surprise that the English approach to playing and recording jazz is a bit different, too. "We bring a particular Britishness to the classic sound of acoustic jazz," says drummer/producer Bill Bruford, speaking from his home outside of London regarding his latest project *The Sound of Surprise*.

The recording is essentially neo-mainstream jazz, but with some interesting compositional and rhythmic quirks that could only come from England. Bru-



ford characterizes it as falling somewhere between the current CDs of American saxophonist Joshua Redman and British bassist Dave Holland. It was recorded last fall with Bruford's longstanding group,

Earthworks, now in its unamplified "second edition" format since 1998. "It's in my background," Bruford continues. Referring to the titles of the tunes, such as "Revel Without a Pause," "Come to Dust,"

"Cloud Cuckoo Land" and "Never the Same Way Once," he says, "These are *not* American titles. Even the artwork is different; it's just not an American CD. Great American CDs there are, but we also feel now that jazz is an international sport. And there are plenty of guys in Europe eager to contribute."

Elaborating further, he notes, "From an Englishman, you'd expect economy, understatement, elegance and effortlessness. If I'm not any of those things, then shoot me. But if you listen to the recording, you'll find all those things all over it. I think American jazz is based more on the blues, or probably is closer to the blues. Usually, it's not long before some American jazzologist is going to play something pretty much approaching the blues. Not necessarily

—CONTINUED ON PAGE 292

OASIS ON DVD

CREATING THE SURROUND MIX FROM LIVE TAPES

By Phil Ward

Despite their relative lack of success in the United States, Oasis are still one of the biggest live acts in the world, and every UK concert is still a special—and often record-breaking—occasion.

The DVD release, *Familiar to Millions*, captures the latest lineup of the band in full flight. A sell-out gig at Wembley Stadium in London, it was recorded by the former Manor Mobile onto a Studer 48-track DASH machine and transferred to Sony 3348 DASH at West London's Townhouse Studios, owned by Virgin Records.

There, renowned engineer Andy Rose set about creating both stereo and 5.1 mixes for the DVD, using an SSL 8000 G Plus console with a customized 5.1 monitoring section. He mixed down to 5-channel surround and 2-track on a SADiE system, with digital metering and PORTIA video monitoring. The .1 sub channel was left, and later filtered off at the mastering stage. Rose worked closely with songwriter and guitarist Noel Gallagher, who also produced the release. "They performed 17 songs, and all 17 songs are on the DVD," says Rose. "Nothing was overdubbed; it was amazing." Mark "Spike" Stent did the stereo mix for the CD release.

Rose had completed about 30 surround audio mixes prior to tackling Oasis, most of them live music performances. He is a veteran of the mobile recording scene in the UK, with particular experience in live TV shows. He started his career in the music business with Mobile One at the age of 22, and just six years later in 1983, he co-founded Fleetwood Mobiles, which is still going strong as part of the Sanctuary Group of recording services in West London, although the unit is now known as one of the Sanctuary Mobiles.

"I had the multitrack tapes to myself for a couple of days before Noel came," he says, "so I listened to them from top to tail. The only things we left out were bits of chat they didn't want, changing guitars, the usual things.

"Noel has the final say on everything," he continues, "although he's not a 'Let's try 2 dB at 5 kHz' kind of guy. He's just totally into recapturing the vibe of the gig."

Everything was recorded straight from the amps and mics to tape, with no EQ or gating. "There's no need if you are doing a live gig," explains Rose. "Record the band flat, and when you rewind and press Play, electronically and technically, it's as



Andy Rose at The Town House, London

if the band was playing again because you've got exactly the same parameters. Your faders, from which you are creating your mix, may be off tape, but it's the same thing as the live performance."

The Oasis camp very much liked the mix from the TV and radio broadcast of the concert. This was courtesy of mobile engineer Jon Lemon, an old friend of Rose's and the guy who provided the flat, multitrack recording. "So we aimed in that direction, but with surround," Rose says.

Each microphone was split away completely from the P.A. Once into the main active splitter, the signal to the mobile could not affect the P.A. sound, and the P.A. could not change the mobile sound. Isolated electronically, neither got in the other's way.

For 5.1, the guitars and bass were immediately spread wider than the front stereo mix, with the main bass right in the middle giving a strong focus. Both Rose and Gallagher were keen that the whole thing be like an "extended" stereo mix. "and if we put a bit of fairy dust behind it, then that was fine," adds Rose. To that

end, Rose decided to do both mixes together so that one didn't drift away from the other.

"The main difference is the rear audience, which I obviously didn't have on the stereo mix. I also had a delayed reverb—like a quadraphonic reverb—to give a sense of space. I changed the time of the rear audience as well, bringing it forward to avoid the slap-back of the drums, which aren't in time because of the delay towers. So there is time adjustment, but you still get this feeling of a big open sound at the back.

"Although the feel of the stereo mix was the main thing, you still have to respect the DVD format," he continues. "If someone has gone out and tripled their expenditure on a surround room, they'll want to get something out of it. DVD has got to do something to give you a real sense of something being around you, and a live gig is the perfect way. It gives you the opportunity to put this rear ambience behind you."

Because the tape was recorded flat, a lot of EQ was added at the mix stage, from both Massenburg and Avalon units. The only things gated were the tom-toms, "because they just sit there humming away," says Rose. However, the drums are laid out three times: the straight drum track, one heavily gated, and another heavily EQ'd. "I just fade in the effect, rather than have a gated snare," Rose explains. "So you have an open snare, to add just the right amount of cut. It's the same with the bass drum: I take a feed of it and seriously gate it, and seriously EQ it, and just add the taste. It's not all gated, or all EQ'd. You've got a bit of the air there, but not so much that it becomes intrusive. We also spent quite a bit of time working on an overall compression of the stereo drum group, just to give it a nice fat feel. We used the Chiswick Reach stereo model."

The only ingredients mixed with the bass in the center channel are heavily compressed drums and lead vocal—with no reverb. "You can hear the audience all the time, which creates the air," says Rose. "If you've only got a stereo track of audience, you can't create a good surround mix. It's no good trying to create a stereo sound out of a mono source—it will always sound poor. It's the same with trying to make quad, or 5.1, out of stereo.

—CONTINUED ON PAGE 294

MOUNTAIN'S "MISSISSIPPI QUEEN"

By Gary Eskow

In the late 1960s, it seemed as though every corner of the pop music playing field was covered. On any given day, an AM station might send out a bit of confection like The Archies' "Sugar, Sugar," follow it with the Fifth Dimension's version of "The Age of Aquarius" from the Broadway show *Hair*, pop in The Beatles' "Hey Jude" and end the set with some greasy funk, maybe James Brown's "Say It Loud (I'm Black and I'm Proud)."

During this period, the guitar gods, led by Eric Clapton and Jimi Hendrix, were attempting to deconstruct the very nature of popular music as it had been written, recorded and performed up to that point. For starters, the notion that song structure (principally the 32-bar form) must be worshipped was trashed. Although the material of Cream, the Jimi Hendrix Experience and countless other bands they influenced was built on traditional forms, the emphasis on extended solos often blurred them. (Although it may be argued that



L to R: Steve Knight, Corky Laing, Leslie West and Felix Pappalardi

huge East Coast following with his group The Vagrants. Although they never broke nationally, The Vagrants attracted some serious attention from the industry. When West left the group to record a solo album, Felix Pappalardi signed on to produce. Although most historians know that Pappalardi also produced Cream, the quintessential "power trio," his musical roots were far-reaching. "Felix was Dinah Shore's arranger at one time," notes West. "I didn't know anything about music when I met him. I still don't! Felix explained music in ways that I could understand."

After completing the solo album, West and Pappalardi decided to put together a band, and in 1969 Mountain was formed. Drummer N.D. Smart and keyboardist Steve Knight rounded out the group, who recorded their first album, *Mountain Climbing*, in 1970. This album, recorded and mixed at The Record Plant in New York City, featured a new drummer, Corky Laing. It yielded the memorable hit single, "Mississippi Queen."

At its heart, the song was just a simple variation on the standard I/IV/V blues form that every basement band was hacking away at. So what made "Mississippi Queen" so special that it's sometimes listed among the Top 50 rock songs of all time? One clue may be found in West's approach to music making.

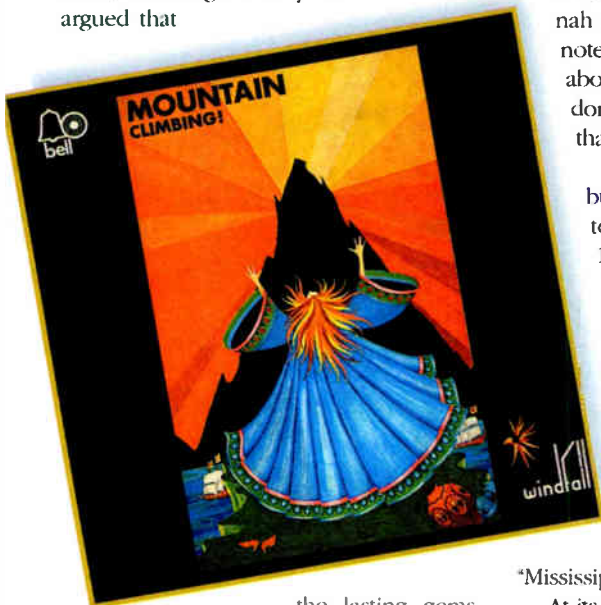
"I don't play over words or through lines," he says. "It's like an orchestra. The

first-chair violin stands up. Then the trombone has a solo. Everything has its place. Small little bursts you can sing back to yourself. I see guys playing all over the neck—long, drawn-out solos. I thought of a solo as a song within a song; it has to help the song. My whole theory is not to play anything you wouldn't say."

That philosophy is clearly at work throughout the 24 bars that make up "Mississippi Queen's" structure. Consisting of 12 two-bar phrases, the first 10 of these are memorable, one-bar guitar licks answered by a bar of vocals. The last two reverse the pattern. That's it! No wasted notes or verbiage, and no solo, although West, who has a distinct sound, was more than capable of spraying out his thoughts, paragraphs at a time, in concert. The brevity of these intensely musical licks helped lodge them in the minds of a generation of rock music fans.

It was Corky Laing who actually came up with the idea for "Mississippi Queen." Recently he recalled, "I had a band called Energy back in '69. Felix was supposed to produce us, but then Cream came along. Back in August of '69, we were playing at a funky beach club called 30 Acres. It was the hottest summer ever in Nantucket, and one night the power blew [out] across the entire island! I was in the middle of playing some dance tune when the bass and organ went down. I found myself rapping this song on the spot!

"You see, a buddy of mine had a girlfriend with him at the club who was visiting from Mississippi. She had on a see-through dress—I can still remember this; she was amazing! Look, there were also



the lasting gems from these groups are songs such as "Purple Haze" and "Sunshine of Your Love," which feature condensed solos that highlight, rather than obliterate, form.)

While the legends were experimenting, a legion of up-and-coming talent was taking it all in and preparing to make contributions of their own. One of them, guitar player Leslie West, was racking up a

Dexedrine's in my system, and I was on overdrive. I looked at this beautiful girl and began screaming this song, 'cause there was no power.

"Fast forward to the fall of that year. We were recording *Mountain Climbing* in New York City, and Felix kept saying that we needed one more good rocker. Leslie

had just moved to Park Avenue. He was having a lot of virgins just show up at his house at this time. It was great! On the day we decided to work on the song, Leslie blew off the chicks who were hanging around and we got down to business. He came out with a lick—you know the one. I was madly in love with The Band, and

I decided to put a 'Cripple Creek' feel behind it. Later on, I told Levon Helm that I felt bad about ripping him off, but he said that he didn't hear any similarity between the two songs, and that we didn't owe them any money!"

Being a producer, especially when you're also a member of the band, as bassist Felix Pappalardi was, can be tricky, especially when you have to criticize the artists you're working with. "We cut the track a number of times," Laing says. "I thought many of the takes were great, but Felix kept throwing them out, demanding that we polish the phrasing. Finally, we played it exactly right—or so I thought. Felix maintained that the time was strange, and asked that I give him some time he could hear. I was totally pissed; it was like the fourteenth take, and I thought we had it! So I started smashing the cow bell, very angrily. Felix said, 'Keep it right there!' That cow bell intro became a hook for the record. By the way, I've always used Latin equipment. I'm not a Latin drummer, but I'm very fond of the sound. Right from the beginning, I'd often use timbales instead of tom toms. I grew up in Montreal, and my mother turned me on to a lot of Cuban music. We didn't have a cold war with Cuba, so I guess it was easier from a cultural point of view to get into that music in Canada."

West has similar memories of how he and Laing wrote their most famous song. "When Corky brought me the idea, it was a one-chord dance song. We got real high, took out a napkin, and I came up with the main riff and the chords. Then we fit the words over the sound."

Mountain recorded basic tracks together at the Record Plant, with veteran engineer Bob D'Orleans at the board. "It really wasn't that involved technically," says Laing. "I was fond of the big boom directional mics. I used two different bass drums for tonal purposes. I do remember that the Record Plant had a standard mic cabinet back then."

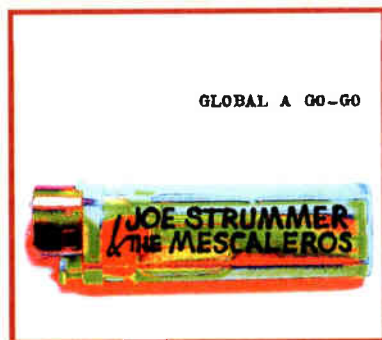
"Jimi Hendrix had just finished mixing his *Band of Gypsies* record, and I remember him walking in while we were mixing 'Mississippi Queen.' He put his head down and listened to the entire album and was very positive. Back then, the vocals and guitar solos were the only parts that were overlubbed. The energy of the music was in part dictated by the fact that guitar and bass players had huge amplifiers, but drummers had nothing—just their physical strength. I'd be out there with these monster players who had a wall of sound, sitting there bashing my head out! Come to think of it, that's how

Cool Spins

The Mix Staff Members Pick Their Current Favorites

Joe Strummer & The Mescaleros: *Global a Go-Go* (Hellcat)

When you think of The Clash, you probably conjure punky, bone-crunching rock, but in fact the band was always fairly eclectic—beyond the obvious reggae, ska and dub in-



fluences; have you checked out *Sandinista* lately? So it's no surprise that the post-Clash careers of Mick Jones (in various incarnations of Big Audio Dynamite) and Joe Strummer have been dedicated to fusing different styles, while still retaining the drive and political bent of The Clash. Strummer's wonderful second disc with The Mescaleros, *Global a Go-Go*, is rooted firmly in that tradition—it's a diverse polyglot of genres, all infused with that unmistakable, slightly reckless, but always endearing approach of his. "Late news breaking...this just in..." he says at the beginning of one song; "Extra, extra read all about it!" in another; and, indeed, the whole album has that Clash-like sense of urgency—it's the musical News of the Day. Strummer's provocative lyrics really do criss-cross the planet, touching on social issues, politics and globalization; there's lots to chew on...but it never loses the beat for a second. There are loads of acoustic textures and highly varied instrumentation (flutes and fiddles?), but also a dose of crashing power chords, anthemic vocal blends and modern sonic touches (loops, etc.). All in all, an extremely powerful state-

ment from one of rock's great provocateurs.

Producers: Scott Shields, Martin Slatery, Joe Strummer and Richard Flack. Studios: Battery (London). Mastering: Chris Parmenidis. —Blair Jackson

The Blind Boys of Alabama: *Spirit of the Century* (Realworld)

The Blind Boys of Alabama, who have been performing soulful gospel music since 1939, are wonderful enough on their own; the words "national treasure" don't even do them justice. But *Spirit of the Century* takes this old-time vocal group to a surprising new place. The Boys are supported by haunting, electric music from an exceptional collection of players with varied aesthetics: John Hammond (electric guitar and dobro), David Lindley (slide guitars and electric guitar), Charlie Musselwhite (harmonica), Michael Jerome (drums) and Danny Thompson (double bass). And the tracks on the release range from the most familiar traditionals arranged in new ways (e.g., "Amazing Grace" to the tune of "House of the Rising Sun") to moody spirituals from Tom Waits, Ben Harper and the Rolling Stones. This album should bring the beauty and depth of gospel music to a whole new audience.



Producer: John Chelew. Recording engineer: Larry Hirsch. Mixing engineers: Jimmy Joyson and Larry Hirsch (2 tracks). Studio: Capitol Studio B (L.A.). Mastering: Stephen Marcussen/Marcussen Mastering (Hollywood).

—Barbara Schultz

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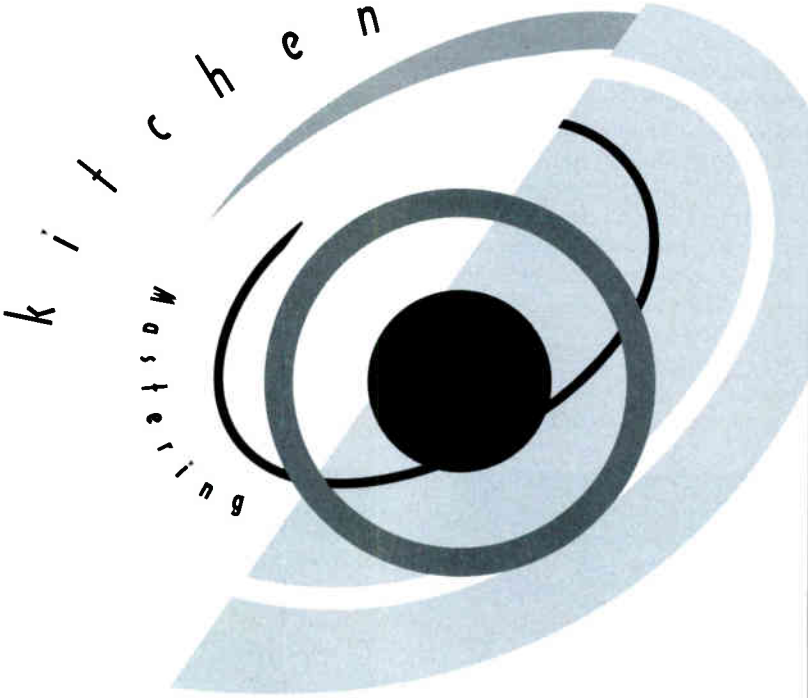
I play today! Felix let me put everything I wanted into 'Mississippi Queen.' Every part of my body was going full out. I was completely indulgent with the two-bass drum beat."

"Felix was a great producer," adds West. "When I'd go into the studio to overdub guitar parts, as I did on 'Mississippi Queen,' I'd start to think. Felix would say, 'Don't think; I'll think.' I remember that I filled up the little holes in that song with four or five different passes of fills. We patched together a solo, and then I had to learn the one we'd made, and go back in the studio to record it all over again. That's how I learned to answer myself! Eric Clapton does the same thing.

"Felix gave me choices on the guitar takes, but he made all the decisions on which vocals were keepers. I'd say the guitar and vocal sessions took about 40 minutes each. As I remember, I sang the verses down, and then came back and sang all of the 'Mississippi Queen' lines. The mix took care of itself."

The name of the group Mountain played on the girth (long gone) of its celebrated guitarist. Underneath it all, though, there was more than a touch of Vienna in West's musicianship. Listening to him warm up before an outdoor concert in Crystal Lake, England, in 1970, on a bill that also featured the Small Faces and Pink Floyd, I remember the delicacy that showed through even in West's most furious impulses. He had an uncanny ability to create harmonics of subtly differing nuances. "I discovered that eight different harmonics can be gotten out of any one note," West says. "It's all in the angle of the right hand. I designed some guitar picks recently that should be coming to market soon. One of them is made to help even the novice discover how to get those harmonics." West also used the pinky on his right hand to subtly modulate the volume controls on his Les Paul to soften the attack of pick on string.

Tragically, Felix Pappalardi was the victim of a shooting incident in 1983, but Leslie West and Corky Laing have remained active. West is currently producing an Atlantic Records band called Clutch with his partner, engineer Jason Corsaro. He recently completed an instructional video, *Leslie West Big Phat Ass Guitar*, that will be in stores in the near future. More information on him can be found at his Website, www.lesliewest.cjb.net. Corky Laing has his own band, Cork, which features Eric Schenkman, the Spin Doctors' lead guitarist. Their second CD, *Under the Radar*, will be released on King Biscuit Records in the fall.



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—FROM PAGE 284, EARL SCRUGGS

of music and because they respect and idolize Earl." A perfect example is Elton John, whose "Country Comfort," from his country-flavored *Tumbleweed Connection* album, was the first track recorded and opens the CD. Notes Randy Scruggs, "Elton is such a fan of dad's—he came in to the studio with a boxed set and asked dad to autograph it. The caliber of Elton's artistry is so professional; he is the true essence of an artist. What better way to kick off the project?"

The planning stages of the album took just over two years, with a year passing from the first note recorded to the mas-

its, let alone imagine all the packing and unpacking and logging of miles, Earl Scruggs denies any wear and tear, noting that, thanks to the ease of studio work today, "It was all so much fun to do. Every artist was exciting to work with and really fueled the flame. In the early days, we only used one mic stand and we would all stand around that one mic, then mix it ourselves. Now we have Snake behind the board to do all that work for us. And when Randy and Snake say it's right, it suits me. It's amazing how closely they listen. I never listen that close, and what's easy for me is not having to worry about technical situations or corrections. They

"For vocal mics, Melissa was an AKG C-12. Elton: a bunch of different vocal mics, because he has such a powerful voice. We had a Neumann U67 padded down. Don Henley was an Audio-Technica 4060, which he requested.

"Every studio had a different board," Reynolds continues. "Randy has a Neve 8232. At Tree, it was an SSL 4064 with G Plus. Conway, a VR 72 series. Ocean Way, a Neve 8078. TM, a Euphonix console, just for Don's voice. We mixed Sting at Sound Kitchen in their Neve room with a VR 60. Sear has a custom console that they built themselves. In Jamaica, we took over a Tascam DA-78 machine with a Mackie mixer and dbx 160 compressor for Johnny Cash's vocal narration, to monitor the tracks, and we used an Audio-Technica 4033 mic on his vocal.

"Machine-wise, almost everything was recorded on a Mitsubishi X850 32-track. We used a Sony 3348 at Conway for Melissa and Dwight. Sting's original track was cut on an X850 32-track at Randy's studio and transferred to 48-track for him to record in his studio and do what he needed to do. Then he sent it back on 48-track, and we stayed on the 3348 and mixed it at Sound Kitchen on that format."

"We used analog on Rosanne's vocals," Randy adds. "They were done at Sear and transferred to 24-track analog. And 'Foggy Mountain Breakdown' is on the Otari RADAR 2, a hard disk system, for editing and transfers."

Says Reynolds, "Anything that exists, we used it." With one exception: Pro Tools is *de rigueur* for most of today's recordings, but on this project, we chose not to use Pro Tools tricks, so we could keep everything as live and real as possible," Reynolds says. "We were looking to capture sounds, not create them, so most of what is on this album is first, second or third takes. The performances are live with very little overdubbing. I'm an old-school guy. I started in 1969 as a recording engineer in Nashville, and, fortunately, I grew up in the business and got in it at a time when the 'Nashville Sound' was a happening thing. I try not to let technology get in the way of music. Music is the most important thing, because without it, you've got nothing."

Foremost in Randy's mind was that the album not be merely a compilation or something spliced together where singing partners cut their tracks and send them in. "I wanted continuity," he says, hence the need for travel. "It didn't matter where we were," says Earl Scruggs. "It felt the same in each location, because the main people were always there. We'd just go in, I'd



PHOTO: PAMELA SPRINGSTEEN

Steve Martin and Earl Scruggs taking time out of their busy banjo-playing day.

tering. Mixing was mostly done at Scruggs' Sound Studio in Nashville, except for Sting's track, which was mixed at The Sound Kitchen in Nashville. Recording, however, was a different story. Yoakam's song was recorded at Conway Studio, Track Record and Dog Bone Studio in Los Angeles; Elton John's at Tree Sound Studio in Norcross, Ga.; Thornton's at Ocean Way in Nashville; Gary Scruggs' with Travis Tritt's, John Fogerty's and Marty Stuart's at Scruggs Sound; Etheridge's at Conway; Sting's at Scruggs Sound and at Steerpike Studio in Wiltshire, England, where he finished his vocal; "Foggy Mountain Breakdown" at Scruggs Sound, Leon Russell Studio in Nashville, Conway in L.A., and Sear Sound in New York City; Gill and Rosanne Cash's at Scruggs Sound and Sear; and Henley and Johnny Cash's at Scruggs Sound, TM Century in Dallas (Henley), and Cinnamon Hill Recording in Montego Bay, Jamaica (Cash).

Exhausting as it is just to read the cred-

catch it."

"The very first thing we did [in each studio] was, we wanted to make sure we had the best sound possible on dad's banjo," says Randy. "That's the thread throughout this project, so it was a shootout thing with several mics and configurations and distances."

"Earl has a banjo sound and style that is uniquely his," says Reynolds, "and that's what we tried to capture on this record. Earl and Louise and I would listen and compare notes. The consistent mic I used on each track was the Audio-Technica 4033 on Earl—it's real warm-sounding. On Randy's acoustic guitar, where available, I used two 4033s—one left-hand upper and one body; everything else floats with the studio, depending on what they have. On the fiddle, I used a tube mic for Glen Duncan; he's on all the songs. I used a Neumann M-249 when available, or a Neumann Tube 47 or 67. The rest of the mics flowed around.



Family photo: Scruggs and wife Louise are flanked by their two sons, Gary (left) and Randy.

play what I feel, and it seemed to work. Randy did the same thing, and it helped to stabilize the sessions a lot. It was a fun trip for me."

"My role and duties as producer and artist—and a lot of times in production, I participate in playing on certain tracks and as a songwriter—were to create a special album for dad, who does not have musical boundaries," explains Randy. "He does not fence himself in. He has a history of collaboration with players like Bob Dylan. At home, he'd have jam sessions with people like Linda Ronstadt and Neil Young. With a project like this, you set the stage but you don't overplan. My experience with this type of project is that it creates a life of its own." [Randy Scruggs also produced the Nitty Gritty Dirt Band's second volume of *Will the Circle Be Unbroken* and the *Red, Hot & Country* benefit compilation for AIDS research.]

There's a certain irony in the fact that artists such as Elton John, Etheridge, Fogerty and Henley turned in performances that are far more "country" than most of what is coming out of Music Row these days. This isn't lost on the album's creators, although making a country record was never the goal. "You can't deny there's a country feel to this," says Randy Scruggs, "but neither the performers nor any of us approached the project as being any format. It's *music*, bottom line. Melissa Etheridge—we literally gave her a standing ovation in the control room. She could have had 40 Les Pauls overdubbed at the same time or just a mandolin—it wouldn't have mattered. She gave the performance that the song needed, a musical performance from her heart."

With a wealth of recording experience to his name and a discography that is pages long, Earl Scruggs finds himself partial to this gem of a CD. "I listen to this album more than any other album I've participated in," he says, "and it never seems to grow old, which is great. I've listened to it practically every evening since we recorded it. It's fresh each time because of all the excitement I remember in the studio, starting off with Elton in Atlanta. Every track has some of that same excitement. Recording with all of these different people, each track hit a high peak every time we went into the studio." ■

—FROM PAGE 285, *DAFT PUNK*

the instrumental "Aerodynamic," a track that builds off a funky groove, breaks for some metallic, two-hand tapping on electric guitar, then fuses both approaches together before segueing into a spacier electronic ending. Somehow, it all works.

Discovery is an evolutionary leap forward from *Homework*. Whereas Daft Punk's debut worked off of minimal elements, repeating certain loops and musical phrases over 10-minute cycles, the duo's new album takes myriad ideas and crams them into three- and four-minute nuggets—except the closing track, a 10-minute piece called "Too Long" that serves as an in-joke for ardent fans.

"Every track has been worked really precisely, every track is a mixture of many different experiments and tricks," remarks de Homem-Christo. "It was much more complicated making this than *Homework*. It was really like jewelry

work, working precisely; so many different production techniques even in one track."

The individual moods of the songs vary as well. "One More Time" is a perky party tune featuring Vocoded male vocals from Romanthony. "Superheroes" sounds like a house variation on classic "Tangerine Dream," featuring a dreamy montage of looped vocals. On the mellower side, "Something About Us" explores a languid jazz/R&B vibe, while the interlude "Nightvision" offers a tranquil ambient experience enhanced by the gentle heart-beat rhythm of a muted kick drum. Ultimately, each composition is a world of its own.

A surprising and refreshing revelation about Daft Punk is that they play and sample their own instruments; there are live keyboards, guitar and bass involved. Many of those parts are then sampled and resampled, but de Homem-Christo estimates that half of the sampled material on *Discovery* was actually played live originally. "I play more guitar usually," he says, "and Thomas plays more keyboards and bass." But they both play all three instruments. "There's no ego involved. We don't argue about who's playing what. You can get the sound of a guitar with a keyboard, or the opposite. We don't really care about who's doing what as long as it's well-done. At the same time, when you use samples, you don't have this problem. When you use a sampler, nobody plays on it, so the problem of the ego of the musician is not really there. For everything that we do, no matter how you get to the results, the important thing is the result."

Discovery includes only four outside samples—not much for a contemporary dance record. "Around this, we play all the instruments, which are mainly vintage keyboards and guitars, so it's a mixture of a few samples and us playing around it. We don't always use the original sounds of the keyboards or the guitars, because we put on so many effects or distortions so that sometimes you think it's a guitar but maybe it's not."

The duo uses many different samplers, preferring warm-sounding analog gear, including a Roland S-760, an Ensoniq ASR X, a Roland MPC and an E-mu SP-1200 drum machine. They use individual pieces of gear, depending upon what they can lend to a track. "To get homogeneity, we put a sample on a sample, or we play guitar and keyboard parts and try to sample and resample to get a homogenic sound," explains de Homem-Christo. "It's really easy to sam-

ple something but really hard to find a good sample."

The French twosome also like to alter their original source material to create something new, whether it's a synth or a guitar. "We don't use too much of the original sound of the instruments; it's really more about how we put effects on it after that," he explains. "It's not like we're making a track and saying, 'Oh yes, I need a Flying V on this one.' We take a guitar we have [usually a Fender Stratocaster] and then try to make it sound different with the effects."

The key principle that de Homem-Christo repeatedly invokes in discussing Daft Punk's compositional approach is *bricolage*, a French term referring to the art of taking found materials (in this case, found sounds) and incorporating them into something new. "Sometimes we use an instrument in a way that it was never created for," he explains. "Some people might say, 'You're doing something wrong using this effect like that,' but we always try to do different tricks and techniques that are maybe a little bit wild for usual sound engineers. But by experimenting with some crazy ideas, you find some crazy sounds."

To get those sounds, the pair uses many vintage keyboards, including Korg, Roland and Moog gear from the '70s. "We use the big ones that were used in the '70s, like the Juno. It depends on how you use it—if you put a distortion effect on a Juno, you can't tell it's a Juno." Their main synths include a TR-909, TR-808, Juno-106, ARP Odyssey, E-mu 3 and AMS Phasers.

DP-4 and an Eventide Ultra-Harmonizer.

An important influence on Daft Punk's music is FM radio compression. The sound of compressed music over the airwaves has beguiled the duo since their early years, particularly the sonic attack in a powerful car stereo system, that "big



sound and enormous voice." De Homem-Christo observes that "on some other projects, we noticed that what we liked the best was the compression, so we began to learn how to use the compression and got into compressors and how to use them. Some people like the really good sound of a guitar, and we really like the

you don't have to have the most expensive equipment to make good music." To further his point, de Homem-Christo reveals that an early Daft Punk single (a pre-*Homework* release) was created simply using an Akai S01 sampler, an Alesis MicroVerb 3 sound processor, an Alesis MMT-8 sequencer and a Mini-Moog synth. "It sounded great to us," he says.

Given the complexity of their music in terms of sonic construction, does the Daft duo keep logs of everything that they do? "We remember most of the parts, but sometimes we don't remember exactly what effects were on it," admits de Homem-Christo. "Knowing that each track you get so much different stuff in it, it's hard to remember. Sometimes you get real nice stuff by random or mistake. It's a combination of mistakes and things done on purpose." Ironically, this emphasis on the sonic "bottom line" almost makes de Homem-Christo and his partner sound like businessmen, but the warmth of their music says otherwise.

When it comes to recording and mixing their music, Daft Punk utilizes a modest setup. "We never have gone to a big studio to do anything," says de Homem-Christo. "We have a small Mackie 12-channel mixer, and everything is done there by *bricolage*." They use Logic Audio on an iMac DV, and they record to a Sony DAT, direct into the iMac or Revox A77/B77 analog recorder, depending upon the sound they want. But even de Homem-Christo admits that he does not like to explain the band's technical process too in-depth. He does not want to give away too much. A good magician never reveals his secrets. ■

By experimenting with some crazy ideas, you find some crazy sounds.

—Guy-Manuel de Homem-Christo

In at least one instance on *Discovery*, Daft Punk used a vintage keyboard to evoke a specific artist from another era. "On 'Digital Love,' you get this Supertramp vibe on the bridge," remarks de Homem-Christo. "We didn't sample Supertramp, but we had the original Wurlitzer piano they used, so we thought it would be more fun to have the original instrument and mess around with it. We use mainly vintage synthesizers, like older electric pianos like the Rhodes, Wurlitzer, Clavinet. We didn't use the Clavinet on *Discovery*, but I usually use it in my studio." Effects units the duo used include a

sound of compression in general. That's one of the biggest loves we have in music-making, especially the U.S. FM radio sounds where the compression is making everything. Sometimes you like it so much that you're really disappointed when you buy the CD."

In their own music, Daft Punk uses a number of different compressors. "We have a really small compressor, the Alesis 3630, which is \$300. That's the main one we used on *Homework* and *Discovery*. The one we used the most is one of the cheapest ones on the market. It's really funny; it's the *bricolage* thing. Sometimes

—FROM PAGE 285, BILL BRUFORD

true here. Here, the improvisational quality comes more from contemporary classical or art music."

Bruford's latest contribution to jazz picks up where he left off with Earthworks in 1999, with *A Part, and Yet Apart*. Most important to the bandleader—a progressive rock icon highly regarded for his work with King Crimson, Genesis and Yes—was that the recordings sound like they came from the same band. "I'm thrilled with this band," he says, referring to pianist Steve Hamilton, reeds player Patrick Clahar and bassist Mark Hodgson. "We're a strong working outfit. Everybody is beginning to pull together so that the band has an energy and organic feel all its own. Whereby if you replaced anybody, it wouldn't be quite the same. And I like

that, especially coming from a rock background. I like that steady working band vibe."

That vibe is also the basis of his recording style. After painstakingly taking three months to create the compositions, Bruford and the group "road tested" them on a 22-city tour around the UK tweaking the new material. About eight months after Bruford originally conceived the project, the band went into the studio to record.

"It's a great way to record jazz," Bruford emphasizes, "because everybody gets familiar with the mechanics of the music during the tour. And the fun can start quicker as soon as you get the difficult bit about learning the music and so forth. Once you get that, it makes the recording of the album relatively easy. I heartily recommend that—it keeps your studio costs down, people know what they're doing and they know what they're going to get out of a solo on a given composition. Some of my favorite solos, for example, are Patrick's on 'Count to Dusk,' a very slow tenor solo. And I particularly like the polyrhythmic stuff on 'Triplicity,' which is a rather strange seven-note rhythm in 6/8."

Bruford adds that by playing the material live first, his compositions get to breathe and develop further, if necessary. After playing a selection several times, it often becomes obvious that an alteration of some type might be needed. When in a studio putting it down for posterity, it's often too late or too costly for creative changes. He explains further, "Sometimes you need the composition to tell you what it wants you to do. A month's worth of steady road work will help you do that."



Needless to say, the tracking and mixing of the CD, done at Livingston Studios in London last November, was a brisk affair. The previous Earthworks disc was also recorded at Livingston, which Bruford favors because of its spaciousness, great



mic selection and good-sounding booths. Sessions were completed in just three days and required very little out of the ordinary in terms of engineering expertise. "I try to forget projects once they're finished," remarks Mark Chamberlain, engineer for the recording. "Especially something you've worked on intensely. It was done in quite a small space of time; we recorded and mixed pretty close together. I personally like a gap between the two. Because of the time, that wasn't ideal."

"It's very much just four guys playing in a room with a lot of concentration. Really, it was about performances; that was the thing. You're trying to get as natural a sound as possible, without a lot of sequencers and all that other stuff. However, we did use a Sony reverb system, the 777, where actual samples from concert halls are used instead of algorithmic echoes. We chose some American hall in Chicago as a general ambience around everything."

Bruford's drum set, a 20-year-old Toma Star Classic, provided some miking challenges for Chamberlain. "His kick is set up differently from other people's," he says. "He plays it with a snare extensile, the hi-hat and remote pedal, and two tom-toms are on either side of the snare. They're tuned differently, so it is a bit weird. It's similar to a timpani setup and his cymbals are very low. So that's a bit of a challenge with the cymbal ring being very near the tom-tom mic and stuff like that. You have to address those items with very careful miking."

Recalling other aspects of the recording, Chamberlain continues, "I recorded the bass on two tracks, one with the compressor on and one without. So I'm never committed to either, and I can use the

original signal if there aren't any problems. The important things were careful mic techniques and getting it right to start with on tape. Also, with four people, the crucial thing was all of them being very comfortable in the studio with headphone balances. The simpler the sessions get, the more complex things like that become, because you've got four guys who want to hear their own mixes. And what they hear is crucial to how they perform. A lot of that was set up prior to the sessions and worked quite well. We used some clever wiring with the SSL and managed to split some of the channels. The board used for the sessions was an SSL with Massenburg mic amps. Sound quality is somewhat unique and differs greatly from what is usually expected from the well-known manufacturer. "It's quite old," Chamberlain points out, "and Jerry [Boys], the guy who runs the studio, has heavily customized the EQ and mic amps. It sounds unlike any SSL I've ever worked on. It's much, much warmer and the headroom seems better, so you crack it a bit more than you can normally."

Mixing was done efficiently on an Amek Rembrandt system in a much smaller room. Chamberlain had nothing but praise for the equipment, especially because he finished ahead of schedule. "The signal path is very simple. For the type of mixing we were doing, it was perfect, because it didn't over-complicate things. The computer does very simple automation such as muting and tightening things up. Normally, you record in a smaller room and mix on an SSL, but we didn't do it that way. We did it this way for the previous CD, and it worked really well."

Bruford typically would come in after everything was set up and go over mix-

ing details with Chamberlain. From there, it was solely in the engineer's hands, with Bruford having ultimate approval. Chamberlain sums up his working relationship with Bruford: "He knows what he wants to hear basically, and he'll let you know whether he's happy or not."

Of the mixing he notes, "We were doing three tracks a day and although there were only four people in the band, it actually was quite complicated. There were a lot of changes going on and a lot of housekeeping involved because of all the takes. Naturally, everyone had their favorite, so a lot of listening went on before I did the mixing. The challenge really was just trying to get the best that you can out of it. And it was different than most jazz, because it sounds quite big. There's a rock element to it, especially on the drums. So it's caught between two stones with the jazz thing and aggression on some of the tracks, which is quite nice. Getting that out is good, but getting it to sit with the quiet tracks is important, too. As we started putting tracks down, Bill starting worrying about the drums sounding too 'live,' so we started shutting the room down a little. So there's a bit of fiddling around from track to track, moving screens just to get more room on the overheads."

Bruford's many fans will, of course, be checking out his performance on the CD, and they might be surprised to hear that the immense, thundering electronic drum sound of early Earthworks albums has been exchanged for a natural, refined and spacious type of playing. He affirms his acoustic direction. "Certainly, as far as Earthworks is concerned, I think there was a golden age of electronic drums. In the '80s and mid-'90s, they were full of promise. And, frankly, my work with King Crimson and Earthworks took an electronic drum set about as far as it possibly could go in terms of live performance."

Still, he notes, "I feel that my role in this [second-edition Earthworks] is pretty prominent. It's not what you'd call a drummer's CD, where the drummer plays a solo every two minutes. There are two or three solos on the album; I think that's probably sufficient from me. I prefer to be deceiving—the guy in the back not doing much—but if you took away my contribution, you might find that the thing would collapse. If you're a young kid looking for blazing drums, you may have to look somewhere else. The real pleasure for me is sitting back with guys who played the music, listening to it and saying, 'Yeab!'" ■

—FROM PAGE 286, OASIS

"Sure, a lot of people do that. You can stick it into a Lexicon and take the two stereo channels out and make one a bit duller, one a bit longer, one a bit later and so on. You develop a spectrum, so that it's not the same reverb or signal at the front as at the back. It can make it appear that there is something going on. But there's this whole thing with desk manufacturers, where they assume that when you pan hard left you only want the signal in the left-hand speaker. When you pan in the center, therefore, it is just in the middle speaker, which sounds crap. One speaker doesn't sound nearly as good as monitoring from two.

"You can only get a blend using the divergence knob," Rose continues. "You can decide how much hard left is actually in which speaker, which is fine. But what you can't do is take the snare drum and have it coming out of the left and right, like I'm used to. This seems to be the case with all the desks I've tried, including SSL and Soundtracs. I've not tried Euphonix, though.

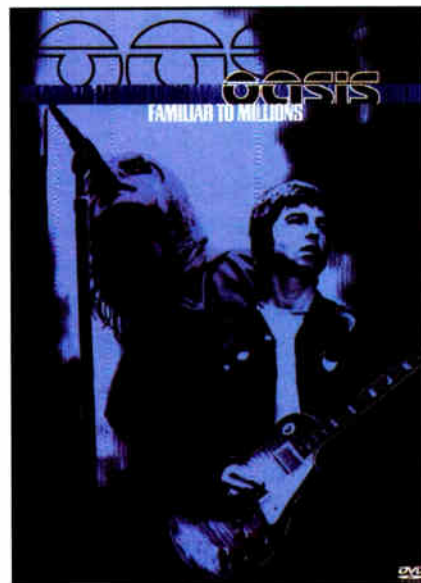
"We like that thing of sound—like a bass drum—coming from two speakers

**Oasis are a
rock 'n' roll band,
and it has to come
across as such.
No cleaning up,
no re-performances
or any of that nonsense.
Get the balance and
keep it exciting.**

—Spike Stent

but actually it appears to come from the middle. So what I have to do is get a series of stereo fields, and a quad group if I want it, and then send an aux to the center speaker. If you listen to the Oasis stuff, you'll hear that it's just bass, drums and voice in the center."

Rose also exploited the band's habit of using several amps on each guitar to gather a wide variety of sources from each signal. "Because they were always using more than one amp, there was a chance



to split each guitar, just to get a bigger source. When I do recordings myself, I always double-mic guitars, which is always an endless pain to all the P.A. guys who know me. I like to put up something that is completely different from whatever they use, to capture a different division of sound. So if they're using, say, a big fat Audio-Technica condenser mic, I like to show up with a dynamic. If they're using an SM57, I will stick in an U87, or something completely different."

Rose worked to a master DigiBeta of the finished pictures, offloaded into the PORTiA module of his SADiE system. Sync and time adjustments were therefore easy, and five tracks from the original 48 were forwarded to the mastering stage.

"I don't do it on six, I always use five. I don't do the .1. If you do a full-frequency mix, with all the bottom end you want for the full-range speakers, you don't need to. The .1 is made up in the process. All you have to do is filter off all the bottom end at the manufacturing stage and feed it into the spare channel."

Meanwhile, working at his own dedicated mix room at The Townhouse's sister facility Olympic in southwest London, Mark Stent was commissioned to prepare the traditional stereo mix for CD release. Accordingly, he concentrated on a few basic values.

"Oasis are a rock 'n' roll band, and it has to come across as such," he states. "No cleaning up, no re-performances or any of that nonsense. Get the balance and keep it exciting. Sure, I compress the shit out of it! Lots of different compression, loads of EQ. Sometimes, sonically, you have to bring it up to a certain level; try to make it sound as powerful as possible. It's not one single in-

redient: Take any element out and it would fall apart.

"I use the crowd quite a lot, pushing it for certain sections. I wasn't doing it to picture, but you get a sense in your head of what it was really like. Say, if the crowd is singing along in a chorus, I'll push that up. Seventy thousand people singing along is exciting.

"The only problem is the delay from all around the stadium, so you have to bring that back into time. Audience mics at the back of Wembley have a big delay from the stage—there was a big slap on the drums. You just have to bring it forward in time. Sometimes a slight delay can be nice, like on vocals. But it can be annoying."

Stent has clear views on the role, and perhaps the restrictions, of 5.1 surround in the current entertainment marketplace.

"I think 5.1 is great. The last one I did was *Dancing in the Dark*, the film soundtrack with Björk. I did it in 5.1, then stereo, then I had to bring the 5.1 mix down to Nicam stereo. I did it three times.

"It really depends on what type of music it is. There are gimmicks to be avoided, like panning things around a lot. For things like live gigs and movie soundtracks, 5.1 is perfect—the atmospheric stuff. Standard pop records don't lend themselves to 5.1, but you can create an atmosphere and make people feel like they were at the gig.

"You can do that in stereo as well—just ride the crowd and make it really exciting. In the past, people have cleaned things up too much—replacing tracks and so on. Then you lose the spirit."

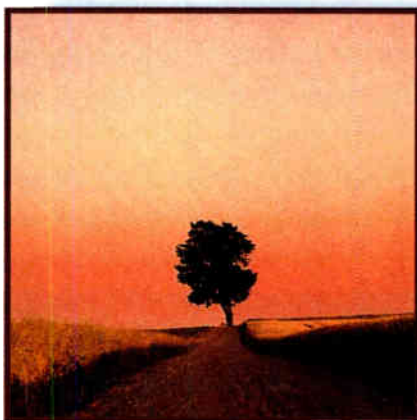
"The whole DVD thing is still a learning curve," concludes Andy Rose modestly. "It's not acceptable to give people just a stereo mix; they may feel ripped off—even though I'm sure that most people with DVD have not got the 5.1 system. But that will change, because it is a great experience." ■

—FROM PAGE 288, COOL SPINS

Various: *Windham Hill: 25 Years of Guitar* (Windham Hill)

When I reviewed the first couple of releases on a new label called Windham Hill a quarter century ago (!), founder/guitarist Will Ackerman was living above the garage of mansion in Palo Alto, Calif., and guitarist Alex de Grassi delivered his first album personally to my house in Berkeley; that's how funky the operation was. Ackerman's label subsequently revolutionized the business of selling acoustic-based instrumental music, influencing scores of oth-

er independent labels, and created a number of "stars" in the acoustic music universe. This lovely Silver anniversary compilation brings together tracks from the label's finest acoustic guitarists, including Ackerman, de Grassi, the late Michael Hedges, Steve Erquiaga, Snuffy Walden and others. Tracks range from highly emotional pieces (such as Ackerman's gorgeous but heartbreaking "The Impending Death of the Virgin Spirit") to more light-hearted romps ("Larry World" by Russ Freeman) and the jaw-dropping pyrotechnics of Hedges' "Aerial Boundaries." Somehow it all flows together coherently—credit to executive producer Dawn Atkinson, who chose the tracks—making this an always engaging and moving listening experience. A fine introduction to this unique strain of Americana. (A companion



volume compiles some of the best Windham Hill pianists, including George Winston and Liz Story.)

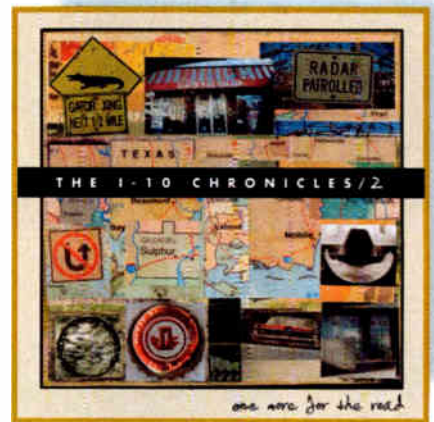
Executive producer: Dawn Atkinson. No individual recording credits listed. Mastering: Chris Bellman/Bernie Grundman Mastering.

—Blair Jackson

Various: *The I-10 Chronicles/2 One More for the Road* (Back Porch/Virgin)

This is Vol. 2 in a series of new recordings of great roots road songs. Of course, there's no shortage of material for this type of collection. The trick is in matching artists and songs in a way that's fresh and compelling, and this CD manages to be affectionate and vibrant. Here are some highlights: Dave Alvin layers acoustic and electric guitars with his deep, understated vocal to create an almost anthemic version of Merle Haggard's "I'm a Lonesome Fugitive." Raul Malo of The Mavericks leads a '50s doo-wop rendition of Haggard's "Tonight the Bottle Let Me Down." And Adam Duritz and Dave Immergluck (of Counting Crows, but billed here as "the Devil and Bunny Show") play a rollicking acoustic version of John Hiatt's ballad "She's Crossing Muddy Waters."

Producers: John Wooler, Randy Jacobs and Sally Browder. Engineer: Sally Browder. Record-



ing studios: Ocean Way (Hollywood) and RecordOne (L.A.) Mixing studios: RecordOne Studios and Steakhouse (L.A.). Mastering: Bernie Grundman and Narada Mastering.

—Barbara Schultz

Odetta: *Lookin' For a Home* (M.C.)

This one's a natural: The veteran folk singer Odetta has been singing the songs of Leadbelly (Huddie Ledbetter, 1889-1949) since the early '50s, so who better to do an entire disc of tunes popularized by him? Odetta is in full command on these 15 tracks, her sure vocals soaring over the relaxed backdrop of various acoustic instruments (and toe occasional orhan and electric guitar). The expected classics are here—"Godnight Irene," "In the Pines," "Bourgeois Blues," "Rock Island



Line," "Midnight Special," etc.—but the arrangements are not always what you'd expect—this isn't merely a folk recitation; there's been some real thought and care put into these interpretations. Gatemouth Brown helps out on a track, and harmonica ace Kim Wilson and pianist Henry Butler appear on two each. A fine collection of great story-songs and deep blues.

Producers: Mark Carpentieri and Seth Farber. Engineer: Fred Guarino. Studios: Tiki Studios (Glen Cove, NY), Unique Recording (NYC), Westrak (NYC).

—Blair Jackson ■

COAST TO



PHOTO: MAUREEN DRONEY

SPARS boardmember Bill Dooley taking a break inside Extasy North.

NY METRO REPORT

by Paul Verna

A booming metropolis: When Metropolis DVD was formed in 1999 as a joint venture between London's Metropolis Studios, New York mastering powerhouse Sterling Sound and new-media pioneer David Anthony, the goal of the enterprise was to offer clients a full spectrum of DVD-related services, from conceptualization to authoring to audio mastering. Two years later, Anthony—who serves as president of Metropolis DVD—can point to a string of successful, high-profile projects that illustrate the clarity of the original vision. Among them are DVD releases by Moby, the Beastie Boys, Super Furry Animals, Sugar Ray, Def Leppard, Jay-Z,

Hanson, Hootie & The Blowfish, The Corrs, Brandy and Insane Clown Posse.

At the same time, Anthony has been surprised by some trends in DVD authoring, particularly the artists' involvement in the process and their preference for DVD-Video over DVD-Audio. "The focus on DVD-Video is interesting to us," he says. "There's DVD-Audio, which is meant to be a much higher-resolution audio format, but there's no putting the genie back in the bottle when it comes to visuals. That's why we're seeing artists like the Beastie Boys, Moby and Super Furry Animals take full advantage of DVD-Video."

On those projects, the artists chose the DVD-Video format because it allowed them to make powerful visual statements. The Moby project, for instance, is a visually enhanced, surround sound pres-

—CONTINUED ON PAGE 300

L.A. GRAPEVINE

by Maureen Droney

The Society of Professional Audio Recording Services has been making new waves in the Los Angeles studio community, thanks largely to the efforts of Extasy Recording's director of recording Bill Dooley, who is also a member of SPARS's board of directors. Two recent luncheon meetings attracted capacity crowds of industry movers and shakers from studios, labels, manufacturers and rental companies. The focus of the meetings, aside from some high-quality networking, was hot-button topics: a forum on equipment leasing hosted by All Media Capital, and one on hard drive issues such as archiving and ownership, hosted by Glyph Technologies and Recorded Media Supply.

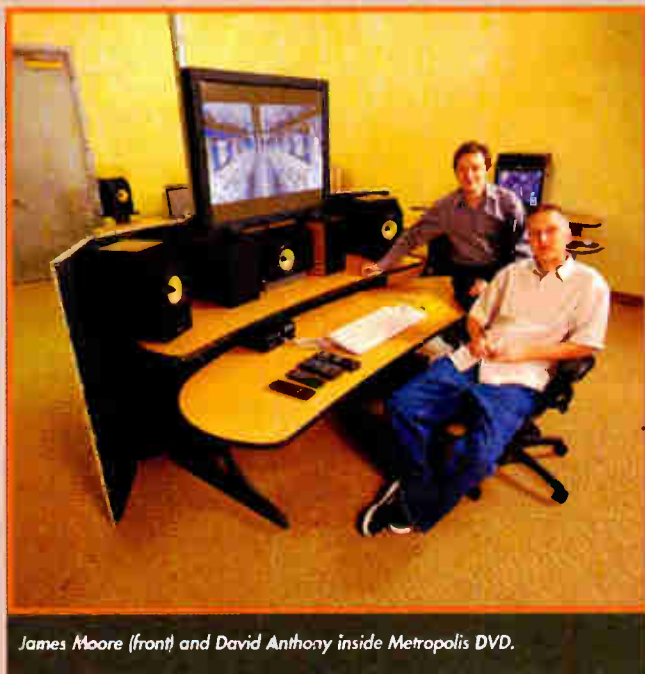
At both meetings, Dooley made a strong case for the re-

juvenation of SPARS into a vital organization and a strong force to deal with issues and problems of our industry.

"This is not about a bunch of stodgy guys smoking cigars and making decisions for everybody else," he comments. "During its history, SPARS has been instrumental in lobbying for a number of things, including sales tax code changes. The organization is dedicated to improving the business environment for audio production services, and there are levels of membership for everyone, from individual to corporate. There are many benefits, not the least being that members share practical, hands-on business information.

"As a commercial facility, you're up against a lot," Dooley continues. "We all have common problems, whether you're in New York, L.A., Florida, Chicago or Nashville. We all have to keep our places

—CONTINUED ON PAGE 298



James Moore (front) and David Anthony inside Metropolis DVD.

COAST

NASHVILLE SKYLINE

by Dan Daley

I swear, I don't make this stuff up: Treasure Isle Recorders, one of those still standing of the longer-toothed generation of significant Nashville music studios, came up with an inventive way to generate new capital. Studio owner and co-founder Fred Vail put a 20% stake in the 21-year-old studio facility up for bids on the Internet auction site eBay in April. He re-listed the facility twice again, in June and July. Directly and indirectly as a result, Vail now has four new partners, and the studio, as of July, had \$90,000 worth of new investment capital already spent on microphones, outboard gear, a RADAR recorder, and a 50% down payment on a new Trident 80 5.1 console.

Reaction to Vail's move around Nashville's studio community was a mixture of astonishment and head-shaking. "So it's come to this," said one studio owner. Pro audio Internet chat rooms were a national Peanut Gallery for the online show, garnering comments like, "I wonder, is this going to be like Jimi's guitar?"

However, in light of the Chapter 11 bankruptcy filing of Emerald Recording in June, Vail's move seems more inspired than desperate. "There were three ways I could have raised the cash I needed to upgrade the studio and stay competitive," Vail told me. "I could go with a loan and be leveraged and in debt; I could take it out of cash flow, which would take years the way the market is now; or I could look

for new investors. Decent classified ads in national publications like *Billboard* or the *Wall Street Journal* would have cost thousands of dollars. On eBay, it costs \$22 for 10 days. It's kind of a no-brainer."

While the studio had been a successful enterprise for much of its life, and the site of work by artists including Dolly Parton, Johnny Cash, Isaac Hayes, Linda Ronstadt, Sheryl Crow and Rodney Crowell, Treasure Isle had experienced severe domestic turbulence. The facility was founded by Fred Vail with his brother Morgan, each of whom controlled 40% of the studio's shares, and partner Dave Shipley, who owned the other 20%, according to Fred Vail. Friction between them led to Fred Vail's departure from the studio in 1994, though he retained his share of ownership. After lengthy legal wrangling, Fred Vail bought his brother's share from the estate last year after Morgan passed away in 1997. Shipley sold his share to Vail last year.

After a half-decade away from the business, Vail says he returned to the studio to find that the entire economic landscape of Nashville's music industry had radically changed from 1994, the year country music achieved its highest market share ever. It has lost half that since then, and a once-thriving studio market was now consuming itself. "I felt like Rip Van Winkle, waking up and seeing how the world had changed," Vail says.

Vail assessed the situation, decided he wanted to come back to the studio business, and figured he needed to up-

—CONTINUED ON PAGE 301



The Musical Biography of Quincy Jones was recently mastered for a four-CD, 74-track box set for release on Rhino Records. Pictured (l to r) are audio supervisor Jeff Magid, Quincy Jones and mastering engineer Bernie Grundman.

SESSIONS & STUDIO NEWS

NORTHEAST

Victims In Pain: Seminal '80s NYC punk outfit Agnostic Front spent the summer at Big Blue Meenie Recording Studio (Jersey City, NJ). The band tracked and mixed their latest album for Epitaph Records, the follow-up to 1999's *Riot, Riot, Up-*

start. The new album, *Dead Yuppies*, is out now. The engineer on the session was studio owner Tim Gilles, who was assisted by Erin Farley and Coady Brown. Tracking took place in Studio B, which is equipped with an Amek Mozart, and the album was mixed in Studio A, which houses an Amek 9098i. All of the production was handled by Agnostic Front frontman Roger Miret...Engineers Erik Steinert and Axel Niehaus

—CONTINUED ON PAGE 302



Engineers Axel Niehaus (left) and Erik Steinert taking a break at Avatar Studios, where they mixed the new album from Foxy Brown.

—FROM PAGE 296, L.A. GRAPEVINE

booked and our equipment current, we have to keep a good staff and we have to keep clients happy. People in the industry come from all different backgrounds—business, technical, marketing, promotion or artist management. Through SPARS, it's sometimes like you are meeting people who are thinking outside the box—or at least your box! It can give you insights on how to make your business better—something we all need. Because, as we all know, there isn't much profit margin in the recording business, and you really need to maximize yours to survive."

In the Larchmont Village area of Hollywood, Skip Saylor Recording continues to expand. In July, an SSL 9080 J Series console was installed in Studio A, and Studio B is now home to a refurbished version of the popular SSL 4080 G Plus that was previously in Studio A. Meanwhile, owner Skip Saylor has taken possession of the adjacent property and started construction on a Vincent Van Haaff-designed 5.1 mix room that will house the SSL Axiom-MT console that was, for the past two years, garnering a loyal clientele in Studio B. Whew! No wonder Saylor and studio manager Rollin Moon were looking a little weary on the day I visited; that's a lot of console-moving in a very short time.

Why add the 9k? "It's the console of the day," says Saylor. "The highest number of clients use it, know it, understand it and request it. But I also have a number of clients who still prefer the G Plus. And I have other clients who really want the MT. Now we'll have something for everybody."

Upgrades, both technical and cosmetic, have been going on pretty much constantly over the past two years at Saylor. Custom outboard racks were constructed for both rooms to hold the vast array of gear the studio is known for. Studio A's lounge was upgraded, and two new lounges were added to Studio B. Now, Studio B has been acoustically revamped to sound more like Studio A with the help of Van Haaff, its original designer.

"When I first built Studio B, I didn't own the property," Saylor notes, "so we couldn't build it exactly as I wanted. With what we've just done, we have evened out the sound of the entire room. Now, you can go just about anywhere in the room and hear the same mix. Studio B has always been a good room for the engineer, but now it's a good room for the people sitting in the back as well."

The 80-in G Plus, which was installed in 1991 and is fitted with Ultimotion, was recapped and reconditioned by Mad Labs



Pat (left) and owner Buddy King hanging out next to the recently installed "Raven" SSL G-Plus Classic at Soundcastle.

PHOTO: MAUREEN DRONEY

before its installation into B. The main monitor amps in B were also changed to a lot more power, going from 800 watts a side to 1,300. "The board is like brand new," says Saylor, "and the extra power allows the bottom end to develop much better. Now it's much more defined and in your chest."

Saylor's engineer management company, HitMixers, has also continued to expand. Its roster now numbers 13, and includes new additions Jon Gass, Keith Cohen, Booker T. Jones III, Tomny D, and Brazil's leading mix engineer, Enrico De Paoli, as well as longtime clients Chris Pura, Danny Romero, Keston Wright, Taavi Mote and Claudio Cueni, among others. One of Saylor's stated goals is, as he puts it, "to put the luster back on the recording industry," and he sees the symbiotic relationship of his studios and management company as integral to that goal.

"I think that everybody who makes records for a living right now would agree that we—engineers and studio owners—are currently seen as relatively insignificant to the process. With accountants at major corporations making musical decisions, often that basic marriage of engineer and studio is not seen as the key part of the business that it truly is. You know, The Beatles had their room at Abbey Road, and Brian Wilson had his at United Western, where their labels let them create. The studio and the engineer always have been, and continue to be, important. And the overall sound is important. One of the things that seems to have been forgotten is that all the great records that maintain good catalog sales to this day—The Beatles, the Beach Boys, the Motown hits—were very well-recorded. They still

stand up, while the bad-sounding records of those days are gone.

"What people need to realize is that when labels weren't quite so concerned with this minute's bottom line, they actually did a better job of selling music. Extra time, care and effort will get a better product now, and better catalog sales later."

An SSL 9080 J Series has become the first Solid State Logic installation ever in the historic 6000 Sunset Boulevard complex that is home to Cello Studios. The desk, fitted with multiple custom options requested by chief engineer Gary Myerberg and studio manager Candace Stewart, is housed in Cello Mix, a suite that was previously the longtime home of producer/engineer Scott Litt. Cello Mix went online July 23, with its inaugural date hosting a 5.1 live mix of Red Hot Chili Peppers with engineer Ed Thacker. On the day I stopped in, setup was under way for some Rusted Root sessions with engineer/producer Bill Bottrell.

"We knew that people, from R.E.M. to the Chili Peppers, loved the comfortable, open aspect of the room," comments Myerberg. "It's always been a great creative space. When it opened up, we looked at our client base and saw that if they went somewhere else to mix, at least 75 percent of the time it was to a 9k. But Candace and I firmly believe that we can't have a room that is application-specific. We needed a room where people could mix, overdub and also do multiformat work. The 9k was our choice, but doing 5.1 work on a stock board can be problematic. Fortunately, we had the advantage that other people, especially at film studios such as Todd-AO and Fox, had

developed modifications. Working with SSL L.A.'s Brian Baer and Patrick MacDougall, and with Steve Drummond and others in England, we combined those mods with our own into a package to make a true 5.1 console."

Those modifications included making both large and small faders on each channel available to the subgroup buses at the same time, selectable LCR panning per channel, and a 12-channel center section with de-select to the sidechain, in effect making the SSL "quad" compressor a 12-channel compressor.

"The mods are based around a re-route," Myerberg elaborates. "Buses 41 to 48 can now be sent through the center section to the ABCD subgroup stereo buses. On the regular J, you can't get both the large and small fader on the same channel to the subgroup buses at the same time, but with this inject we can. Also, SSL has a brilliant software quad panner, but it was limited in how and where it could pan. We now have the flexibility of panning into any quadrant, and that dovetails into the center-section compressor. Each stereo subgroup bus is independently selected to track the master fader, so now we can have up to a 12-channel compressor. In addition, we've dealt with the problem of LFE subwoofer material taking over the sidechain by adding buttons that can de-select those subgroup buses from the sidechain—whatever you select to be your subwoofer can blow by and not drive the sidechain."

West Coast Studio Services' Scott Hasson, who has worked with Myerberg on projects for Bob Clearmountain, Bruce Springsteen and A&M Studios, consulted on the room's infrastructure design and also wired it. Although the basic structure of the control room was unchanged, to add a bit more liveness the wood floor under the console was enlarged and modifications were made to the perimeter trapping. The main Ocean Way-style monitors have been fitted with new components and new amps: Krell home theater standard with 800 watts a side for the woofers, Classe's 150s for the midrange horns and a McIntosh 2300 for the high-frequency drivers. Near-field monitors are now powered by a 5-channel Class-A Aragod X5 with 200 watts per channel.

The J Series complements the other three highly customized consoles in the Cello complex: Studio 1's 80-input Neve 8078, Studio 2's 40-input 80 Series and Studio 3's 40-in 8078. "We don't want our clients to ever have to look outside Cello for anything they may need," concludes studio manager Stewart. "Whether it's

tracking, mixing or 5.1, we want them here, and we will embrace anything, technically or otherwise, that will help make that happen."

Meanwhile, over in the always-happening Silver Lake area of the Hollywood Hills, Soundcastle Studios is now home to a "Raven" SSL 4080 G Plus "Classic" console, the first of its kind. Housed in Studio II since January, the console has been used since then on projects for Eric Benet, Debra Cox, Brian McKnight and Busta Rhymes, among others.

Soundcastle owner Buddy King, who two years ago installed a 9080 J Series in his tracking and mix room, Studio I, worked with Solid State Logic to develop the G Plus "Classic" custom features. Those include: LCR surround panning with two programmable joysticks, 5.1/7.1 compression and master fader, stereo AFL, patchable VCAs that track the master fader, and a custom Martinsound MultiMax 5.1/7.1 monitor panel. In addition, the console has been configured with eight extra effects sends per channel for a total of 12. According to King, these features, along with the smoothness of the J Series-style faders, "make for a real nice package." While Studio II received new cosmetic treatments at the time of the console's install, in deference to clients who are content with its sonics, no major changes were made to the control room.

The unique look of the quite stunning console was achieved by resurrecting the "Raven" black color scheme of early SSL consoles and fitting the small faders with silver knobs. About the aesthetics of the desk, King says, "We wanted VU meters and, when we were talking about the look of the desk, SSL senior VP Phil Wagner suggested the black Raven color that they haven't done in years. It was a great idea, and when it was finally done, we found that it looked very contemporary.

"To me, this is the equivalent of having an older Neve and an SSL," he continues. "Our music clients really love analog consoles; they feel that there are some sonic characteristics that the digital consoles just won't obtain. Our J has been very successful, but some of our clients are really loyal to the G Plus. So, for a new console, we wanted the character of a G Plus, but with some of the features of the J Series. People said I was crazy, and maybe I am, but we did a lot of research in the market, and we decided that this hybrid was right for us. It's been a long time since we've heard a new 4000, and boy does it sound good! It still gets that crunch that the rock 'n' rollers and the R&B people like. Now what a lot of our clients are doing is track-

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Jurassic 5 producer DJ Nu-Mark was recently in the refurbished Studio B of Skip Saylor Recording mixing tracks for the group's forthcoming album on Interscope. Pictured are Nu-Mark, flanked by assistant engineer Ian Blanch (left) and engineer Anton Pukshansky (right).

ing on the J in Studio I and mixing on the G Plus Classic.

"Our industry is a bit screwy right now," King observes, speaking with the perspective of over 30 years in the business. "Look how everyone couldn't wait to go digital so that everything could be archived digitally, until we found out that when digital goes wrong, there's nothing to be done. Now we're back to archiving to analog. Digital is quick, but quick isn't necessarily better. I suspect that digital will happen with recorders, and that project studios and smaller studios will go all-digital because analog costs more. But people on the higher end are going to continue to want some of that analog sound. We find that from jazz and rock to hip hop and R&B, our clients like either the J or the G Plus. So for now, we've got the best of both worlds!"

Other new console news: Atlantis Studios in Hollywood has replaced its Neve VR with an SSL 9080 J Series, fitted with a 959 center section modified for 5.1 surround. Studio manager Michelle Moore reports that the main speakers in the studio built to house the studio A have also been upgraded and now sport TAD components. Acts in since the console install include Warner/Reprise artist Bobby Ross Avila with engineer Neal Pogue and producers Shavoni and Buster Brown, producer/engineer Tom Rothrock working on projects for BongLoad Records, and engineer Brad Gilderman mixing the soundtrack to 'N Sync's upcoming feature film.

In the Fairfax District, Cherokee Studios has taken delivery of the largest API Legacy ever assembled. The fully automated 80-in desk, which will be housed in Studio One, has full dynamics on every channel, and replaces the Trident A-Range console that has lived in Studio One for the past 17 years. "We've had three Tridents in that room over the past

25 years," says Cherokee co-owner Dee Robb. "And this is the first console that we've heard that fills the bill of replacing the A-Range. It's hand-built in the traditional manner, with discrete amplifiers, and it fits the sonic philosophy that we've always had here at Cherokee."

In other changes at Cherokee, a 96-channel SSL 4000 G Plus with automation is now online in Studio 2. The studio itself is being refurbished by George Augspurger as a 5.1 room with all-JBL monitoring.

North Hollywood's Track Record has also purchased a new SSL 9080 J Series desk that will be housed in its tracking and mixing North Studio, replacing a 60-channel Neve V3. The very busy Vincent Van Haaff of Waterland Design Group is consulting on design and acoustical enhancements for North's control room. Track, as the two-room Lankershim Boulevard facility is often referred to, has had a busy 2001, playing host to projects for Dishwalla with producer Greg Wattenburg and engineer Brian Scheubel, Crash Radio with multi-Platinum producer Matt Serletic and engineer Noel Golden, and Warren G with engineer Booker T. Jones, among others. ■

Keep those cards and letters coming folks; e-mail L.A. news to MsMDK@aol.com.

—FROM PAGE 296, NEW YORK METRO REPORT
entation of his popular album *Play* (V2 Records). Titled *Play—The DVD*, it features multichannel remixes of album tracks with club-like visuals based on footage Moby shot on a digital video camera. There are also mock-documentary segments in which the artist interviews himself in various guises. "It's fundamentally different from a collection of videos," says Anthony.

The Beastie Boys took a filmmaker's approach toward their new DVD, *Beastie Boys Anthology*. They collected images from various sources—including a film library—and collated them into an interactive, audio/visual montage that can be customized by the viewer. They also commissioned DJs to remix material on the album; those remixes are also presented interactively.

The UK alternative rock band Super Furry Animals went a step further than Moby and the Beastie Boys in that they conceived, recorded, mixed, authored and mastered their DVD as a surround sound product from the ground up. (They also released a Red Book Audio version on CD.)

The extent to which all three of those artists participated in the authoring process

behind their DVD offerings suggests to Anthony that the digital revolution that began with computer-based audio workstations has now migrated to the visual side. Also, the fact that those three high-profile titles—as well as several other prominent releases from top-name artists—were done in the DVD-Video format raises questions about how important sound quality is to artists and consumers. "We're living in a time of real extremes," says Anthony. "On the one hand, kids are happy as can be to have 5 gigabytes of MP3s; on the other hand, there are audiophiles who would really love to hear master-quality audio on DVD-Audio discs. So the record industry is asking itself, 'What format suits the music?'"

While the industry continues to wrestle with that question, Metropolis DVD is keeping busy delivering state-of-the-art products to its clients and exploiting synergies between its affiliated companies. For example, the Moby, Beastie Boys and Super Furry Animals titles all underwent 5.1 channel audio mastering in-house: The Moby and Beastie Boys DVDs were mastered in surround by Sterling principal Ted Jensen, while the Super Furry Animals project was done by Metropolis' Mike Gillespie in London. Furthermore, the stereo version of the Beastie Boys album—which preceded the DVD—was mastered by Tom Coyne, another of Sterling's engineers/co-owners.

"One of the reasons we set up Metropolis DVD as a separate company from Metropolis and Sterling is that DVD posed so many non-audio issues," says Anthony. "But there's a real honest synergy between audio mastering and DVD authoring, especially as it relates to these music projects. A lot of our music clients have realized that having the ability to get both addressed at the same time in a very respectful way has its advantages."

A switch at Quad: If anyone can be self-effacing and bold at the same time, it's Quad Studios owner Lou Gonzalez. On the one hand, he is as down-to-earth as they come—a simple, no-nonsense guy who learned almost everything he needed to know while growing up on a farm. On the other hand, Gonzalez got his first big break in the industry by bluffing his way into a top-notch studio, wears a rhinestone-studded denim jacket to trade shows, and was one of the first studio owners in the world to install a large-format digital console in a big room. Go figure.

Now, after much soul-searching and numbers-crunching, Gonzalez has made a decision that reflects both his bold streak and his down-to-earth wisdom: He re-

placed that digital board—a Solid State Logic Axiom-MT—with an SSL 9000 J, which he calls “the best-sounding console ever built.” Asked why he switched back to a 9000 J after trying the Axiom, Gonzalez says, “I always like to try new stuff, because you gotta try new stuff if it’s a good thing to offer your customers. But the board didn’t lend itself to the way our engineers like to work. It’s not that there’s anything wrong with that particular board; it’s a fantastic piece of technology. But the digital offerings from the other manufacturers haven’t made it either on a mass level.”

Quad’s newest 9000 J—modified with a feature that allows multichannel mixers to control up to four submixes from the master fader—will join three other 9000 Js throughout the Quad complex, which encompasses five studios in New York and four in Nashville. In New York, Quad is an all-SSL facility, with 9000 Js in Studios A, B and 3; a G Plus with Ultimatum in the Penthouse Studio; and a small E Series board in Studio C. (Don’t ask Gonzalez to explain the logic behind Quad’s studio nomenclature; he says it “just evolved that way.”) In Nashville, the rooms carry the comparatively simpler names of A-D, and their console offerings are as follows: an SSL 9000 J, a Neve 8068, an “off-brand” board that Gonzalez says will probably be replaced, and a Pro Tools workstation that, at press time, was in the process of being installed.

As he continues to tune and fine-tune his small empire of studios, Gonzalez maintains an optimistic outlook for the future, despite a current flatness in the recording market that he says is the result of a soft economy. “The softness started in July 2000,” he observes. “However, 2000 was only bad if you compare it to 1999, which was our best year ever. If you take 1999 out of the equation, 2000 was just as good as 1998. So it’s not like we’re in death land. We’re doing fine, and we’ll be doing even better when the economy picks up a little.” ■

Send N.Y. news to pverna@vernacularmusic.com.

—FROM PAGE 297, NASHVILLE SKYLINE
grade the two-room studio to remain competitive. There are not a lot of takers in the studio business in Nashville at the moment. Hence, the decision to take a flyer on eBay.

The results have been mixed, and not unlike a dating service: Vail had his share

of inquiries from the merely curious, to those he suspected wanted to use a small ownership in a Nashville recording studio as an entree into the music business. This didn’t discourage Vail. In fact, his spin on the experience is quite the opposite. “It’s like selling anything,” he says. “You go door to door selling Fuller brushes and you don’t make a sale on the first 30 doors you knock on, but the more you knock on, the better your chances of finding a sale.”

After re-listing the studio a second time, Vail ultimately got an investor from Wisconsin who was willing to acquire 42% of the business, but was unable to meet all the initial payments and took a much lower equity position in the studio based on the amount he did apply. And a friend of Vail’s and two of that person’s friends also took small shares. To date, he has sold 14.5% of the studio’s shares, bringing in \$90,000, which would extrapolate the overall value to about \$600,000. In a third listing round, Vail is offering blocks of the studio at various minimum bids: 6% for \$42,000, 9% for \$60,000, 16% for \$100,000, and 20% for \$127,500.

Vail’s assessment of the music business is generously optimistic. In the description of the studio in the eBay listing, Vail tells prospective bidders that they can expect a return on investment of between 16.5% and 20% in the first year, rising to between 24% and 26% by the fourth year after investment. Despite the huge erosion in profitability in the studio business in general in the last decade, and particularly in Nashville, which has lost several major facilities to bankruptcies, Vail maintains that the projections are realistic. “My [monthly] nut is under \$6,000,” he says. “I don’t need 19 days a month of bookings to break even.”

And Vail should not have been surprised if many of the inquiries he received from the eBay listing were specious or starry-eyed; his description of the studio and music industries is unabashedly rosy: “Current worldwide revenues from within the music industry are approximately \$40 [billion],” and that “U.S. album sales were close to 40 million units during the final week of Christmas. Additionally, approximately 1,000,000 albums were sold on the Internet during this same one-week period.”

The description fails to mention the numerous record label closings in Nashville, including Asylum, Virgin and Arista Records, or the thousands of pink slips the record industry distributed in the wake of massive consolidations, or the fact that the

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entire music industry's 2000 was saved during the holiday selling season by The Beatles *One* compilation, distorting the actual sales picture, which is reportedly down 4% at mid-year. Or that those Internet sales were paltry compared to the tens of millions of rips from Napster-like sites. It also fails to mention how changes in digital audio technology have rendered the studio business vulnerable to any talented and ambitious kid with a Pro Tools rig and a spare bedroom.

As a prospectus, Vail's eBay listing would not have passed SEC inspection. But on the auction block, caveat emptor is the main regulation to be observed. And if Vail is putting a rosy spin on the music business, well, isn't that what the music business has always been about, anyway? A capacity for self-delusion has always been a condition of entry. The chances of becoming wealthy and famous in the music industry are less than winning the Powerball lottery, yet every day thousands of people decide to spend their lives pursuing just that. And Fred Vail's approach is innovative; whether or not he sells his studio shares at the price he'd like, he will have projected the studio's name far beyond what a brochure could do for the same money. ■

Check it out on eBay: Item #1618264475. I can't wait to see what comes next.

—FROM PAGE 297, SESSIONS & STUDIO NEWS
finished up the latest Foxy Brown album, *Broken Silence*, on dueling SSLs at Avatar Studios (NYC); the effort is set for release on Def Jam. . . Out at Music Factory Mix Studio N.Y.C., Paswell (Fugees) put on the production cap and handled sessions with new artist Heather Liverpool, C&C Music Factory and worked on the soundtrack for the forthcoming film *Hoop Soldiers*. . . Recent happenings at Bias Recording (Springfield, VA): Engineer Jim Robeson recorded the song "Swept Away" for Mary Chapin Carpenter—set for release on Columbia/Sony. Robeson is also working with recording artist Scott Reiss, and he has just finished producing and engineering for singer Colleen Shanley.

SOUTHERN CALIFORNIA

A busy summer at Marcussen Mastering: Studio owner/engineer Stephen Marcussen finished albums by The Cult with producer Bob Rock and the Black Crowes with producer Don Was. Marcussen Mastering also opened their new Studio B with mastering engineer Dave Colins. Colins' recent

credits include Fu Manchu, Adema with producer and new Virgin recording artists Moth. Colins also mastered the *Jay & Silent Bob Strike Back* soundtrack for Universal Music. . . In Image Recording's (Los Angeles) Studio A, engineer Chris Lord-Alge is in mixing the new LP for Chris Isaak with producer John Shanks. Steve Kaplan is the second engineer working on the session. Lord-Alge also finished mixing the upcoming CD from the Butthole Surfers for Hollywood Records. Rob Cavallo was in to produce with second engineer Matt Silva. . . Sage and Sound Recording (Hollywood) recently hosted artist Michael Gurely, who was in tracking and mixing for an upcoming Vanguard release. Co-producer Scott Gordon also engineered and mixed the project. The Flying Tigers were tracking some new material for an upcoming Atlantic release. Phil Kaffel and Basil Rathbones were tapped to produce. Kaffel also picked up an engineering credit; second engineer Dave Ashton was in to assist. Steffan Fantini also stopped in at Sage and Sound to work on the score for the upcoming feature film *Mercy Streets*. . . Producer Greg Wattenburg brought Dishwalla to Track Record (North Hollywood) for an extended stay. Engineer Brian Scheubel and assistant engineers Ai Fujisaki and Bryan Cook overdubbed guitars, drums and vocals for the Santa Barbara-based band's third release. Warren G also returned to track his new release for Universal

Records. Engineer Booker T III and assistant engineer Zach Will fed Warren's sound through Track Record's SSL 6000 E. Producer Matt Serletic (Santana, Aerosmith, Matchbox 20) tracked Crash Radio in Track Record's North Studio. Serletic, engineer Noel Golden and assistant engineer Fujisaki tracked 12 new songs with the band.

SOUTHEAST

Reflection Sound Studios (Charlotte, NC) hosted Al Kooper, who mixed some previously unreleased material with producer Bill Szymczyk (Eagles) in Studio A. Engineer Dave Puryear assisted on the sessions. Material mixed included some unreleased Kooper/Mike Bloomfield '68 concert recordings from the Fillmore East. An album is scheduled for release early next year. Kooper also worked on some unreleased original and cover tunes, which are set for release on an upcoming boxed set this fall. Also at Reflection Sound, producer Steven Haigler mixed the new Skid Row album with engineer Tracey Schroeder. The album, due out later this year, was recorded at Jon Bon Jovi's studio in New Jersey as well as at Reflection. . . Bluegrass songbird Alison Krauss was camped in the Neve room at Seventeen Grand Recording (Nashville) working on a children's album. Gary Paczosa and Jason Lehning shared engineering duties, with Thomas Johnson assisting. Dolly Parton spent some time in the Neve room as well with



Linkin Park stopped in to have a little fun with Baywatch's David Hasselhoff inside Studio A at NRG. Pictured here are (bottom row, l to r) Rob Bourdon, Chester Bennington, Mike Shinoda, Brad Delson, Joseph Hahn, (top row, l to r) producer Don Gilmore, Hasselhoff, John Ewing Jr. and Dan Certa.



Sound on Sound's Studio E with a Mackie 1604-VLZ and Pro Tools

her producer Steve Buckingham and engineer Neal Cappelino. Producer Scott Rouse worked on a Charlie Daniels' project with Paczosa and assistant engineer Johnson. Producer Jeff Teague and engineer George Tutko worked with singer Andi James; they returned to put the final touches on a project for talented country newcomer Kyle Long. Singer/songwriter Shana Morrison, daughter of Van Morrison, was laying down tracks for her upcoming album on Vanguard. Steve Buckingham produced the project with Paczosa and Johnson in to assist.

NORTHWEST

Me'Shell N'degeocello, who was recently nominated for three California Music Awards, has dug in for the long haul at Hyde Street Studios (San Francisco). She is with producer Allen Cato and engineer Erik Dyba, laying down some fresh cuts for her next full-length album. NorCal natives Cake also mixed some tracks from their current album *Comfort Eagle* at Hyde...Rainstorm Studios (Seattle, WA) hosted pianist Jack Stewart, who was in recording his first album. Paul Speer engineered the project. Staff engineer Steve Carter kept busy tracking a new release with the November Group. Dance group Reality Front were in to mix a new single with Speer. Jamaican artist Shan Coleman started tracking a new album with engineer Carter at the console...Glenn Sound's (Seattle, WA) Glenn Lorbiecki produced original music compositions for Microsoft in collaboration with Cabaret Productions and Immerse Creative. Zoe Knight, Glenn Sound's newest engineer, worked on a trailer for the independent movie house, The Grand Illusion.

STUDIO NEWS

Sound on Sound Recording (NYC) recently brought its new Studio E online. The new room is touted as a versatile suite designed for Pro Tools editing, recording, pre-production, sound design and mastering. The room is equipped with a Mackie 1604-VLZ mixer, ProControl and 5.1 monitoring...Ecstasy Recording Studios (Los Angeles) has announced the addition of mastering engineer Nancy Matter to its staff. In recent years, Matter has owned and operated Moonlight Mastering in Burbank, Calif...JamSync (Nashville) has recently opened two new suites in its facility on Nashville's Music Row: the DVD authoring suite and the "Elvis Room," a 96k audio production and sound design suite. The DVD room includes Sonic Solutions' DVD Fusion and Apple's DVD Studio Pro authoring systems, as well as Final Cut Pro for video editing. A 5.1 THX home theater monitoring system using a Studio Technologies control system with LSR Series monitors by JBL and Velodyne subwoofers completes the suite. The 96k Audio Production and Sound Design Suite is built around a Steinberg Nuendo system, racks of vintage synthesizers (Moog, Oberheim, etc.) and high-resolution analog processing from Millennia and Avalon...The Tape Gallery (London) recently upgraded its Studio 2 with the installation of a Soundtracs DS-3 64-channel digital console. ■

Please submit your Sessions and Studio News for "Coast to Coast" and "Current" to Robert Hanson. Submissions can be sent via e-mail to RHanson@primedia.com; fax 510/653-5142 or snail mail: 6400 Hollis St., Suite 12, Emeryville, CA 94608. Photo submissions are always encouraged.

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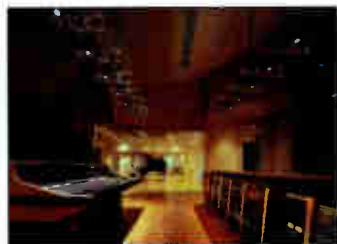


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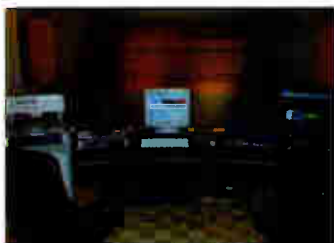
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—FROM PAGE 26, PROJECT THAT WOULDN'T END TV station. He knows his stuff. In early 1998, he put together his first DV editing suite, using a Mac-based program called "Edit DV" from a company then known as Radius.

Radius, for a long time, was one of the most important makers of monitors and video cards for Macintosh computers (remember the Pivot?). Edit DV, in fact, began life as an A/D video editing program called RadiusEdit. In that incarnation, and in its initial DV-only form, it was available only on the Mac, but it didn't take long for Radius to see the handwriting on the wall. "Since they were a Mac company, Mac development there was originally ahead of PC development," says Woolf, "but they looked at the market, and by the time that Edit DV 2.0 came along some 18 months later, they had put PC development ahead. The Mac people were livid.

"There's no question in my mind that the Macintosh architecture is better than Windows for DV," he continues. "They're designed for this kind of work, although the gap is closing, and Windows 2000 is a major improvement. Unfortunately, our initial Edit DV experience was with the first Macintosh G3s, which had just come out and had terrible bugs in their onboard video, which you couldn't get away from, even if you were using a dedicated video card. When Radius brought out its PC version, we jumped, which set us on a path we've been forced to continue down." Howard's lab (in the room next to mine), with 10 Windows 2000 workstations, would today be all Macs, probably running Final Cut Pro, were it not for those bugs.

Other companies were trying to bring Adobe's Premiere into the DV world, with new drivers, plug-ins and machine control, but Radius got there first. The big boys in nonlinear video editing, Avid and Media 100, were using a completely different storage format, a form of M-JPEG, and told DV users that they would have to transcode their signal in order to use their systems. "They tried to convince people that DV-to-DV transfers were somehow 'missing something,'" says Woolf, "which, of course, was ridiculous, since it's a direct data transfer." It wasn't until very recently that Avid came out with a DV system, but even now they don't make their own hardware for it.

The first version of Edit DV was actually two programs, much like the first, awful version of Digidesign's Pro Tools. "Moto DV" was the software that controlled the video decks and captured the video into

the computer, while Edit DV was the editing program. Soon after Woolf had committed to the PC base, Radius—then known as Digital Origin—came out with Version 2.0 of Edit DV, which combined the two programs. It wasn't a bad program, although it had some interesting glitches. Perhaps the worst was that the next version was very long to follow—almost exactly two years, which is two centuries in computer product-cycle time—and was even worse. In the meantime, Digital Origin had been bought by Media 100.

ON TO THE STORY

A year ago September, I was invited by the Acoustical Society of America to present a paper on a recent musicological project I was involved with at their convention in California that December. I was flattered that they asked, but with no one to pay my expenses, it didn't seem like something I could do. I asked the com-

**It was late November,
and it was a week
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California, but I
still hadn't even seen
a rough cut.**

mittee whether I could submit a video instead. They said, "Sure," and thus my fate was sealed.

I called up Howard and presented the idea to him, and he was very enthusiastic, lining up three students to help with the editing, and even using his connections to get some funding from the university provost so that I could get paid for writing the film and he could buy some new equipment.

I'm not a filmmaker, and I don't even play one on TV, but I've done music and sound for dozens of documentary films, and I know more than a little bit about how they're put together. So I was going to write the script, and, in my best friendly professor voice, narrate the film. Howard and the students were going to shoot me talking, log and edit a large amount of footage I already had relating to the project, and shoot new footage

where necessary: interviews, location shots and quite a few stills. Howard and I were going to be co-producers, but he was going to make most of the editing decisions. When he had a rough cut done, we'd go through it together. I'd offer suggestions, and he would make a final cut. Sounded pretty straightforward.

Howard and his students stuck me in front of a blue screen and shot me and recorded my narration, and over the next couple of weeks logged and digitized all the footage, while he and I went back and forth over the script, cutting down my 45 minutes or so of copy into something that would fit the 20-minute slot allotted to me. But then, for some reason, I never got to see any of the edited footage. Howard kept assuring me that it was going to be fine, but every time I asked, it seemed it wasn't quite ready for me to look at yet.

Now it was late November, and it was a week before we were supposed to send the finished video out to California, but I still hadn't even seen a rough cut. One evening, I was scheduled to give a lecture to some music department students and faculty, during which I hoped to show a "preview" of the video. As I was about to start the lecture, and the tape hadn't arrived yet, Don, one of Howard's student assistants, came in breathlessly and said that the film would be late. "Something went wrong when we were printing it to tape," he gasped, "and we have to do it over again." Fortunately, I was lecturing on two different topics, so I just reversed my planned order. An hour later, Howard arrived with a videotape.

We put it in the projector, and what I saw was 12 minutes of jumpily edited material, with flash and "ghost" frames around the edits, audio that kept jumping up and down in level, not to mention side to side between channels, sync that went in and out, and stills full of vibrating black lines. It was pretty awful, and I was pretty scared.

What had happened? Well, as Howard put it, the system "hiccupped." It happened during the rendering process, which is the step you have to take after you're done editing, during which all of the crossfades, wipes, sound level changes, zooms, pans and other effects are saved in separate, re-processed files that the manufacturer calls "generated media." Once all those files are created, the program is printed to tape. "There's a lot of room for real wacko things to happen during rendering and printing," explained Howard. "If you followed the instructions from the company, you would put all your files—pointers, clips and rendered video—on the same C drive. But this

goes against the oldest law on the books, which is that you keep those files on separate disks." Sound familiar?

"If they're all on one disk, when you want to print the program has to do three things at once. And even though we had dedicated disks for clips and rendered video, the longer and more complicated the movie, the more calls from the program to the drive bus. You can end up with a roadblock, everything coughs and then you lose data, including your clip files and the pointers. This is what happened during what we thought was innocuous 'save' after rendering. Everything froze, and when we rebooted and went back in to Edit DV, the clips acted like they were totally corrupted, even from backed-up versions. The funny thing was, that when we played the clips in Quick-time, outside of Edit DV, they were okay—which was of no help, of course."

Howard managed to reassemble a version of the program in the space of an hour, leaving all of the effects out, so that we could show it that evening.

All during the next weekend, Howard and Don literally worked night and day to get the piece back to where it was before the printing disaster, starting the assembly process from scratch and constantly running into file-corruption fallout—and almost ruining their Thanksgiving in the process. On the afternoon we were supposed to ship the final cut to California, Howard burned three copies of the DV tape, and then made a VHS copy of one of them so I could watch it and finally see what I hoped was a reasonably finished cut.

I made the mistake of not looking at the tape until that night, and imagine my horror when I saw timecode numbers prominently displayed on the left half of the picture. One of the folks, harried to the point of distraction, forgot to shut off the Display switch on one of Howard's cute little DV decks during dubbing, and it was generating visual timecode while it recorded. Howard couldn't be sure whether the copy he sent to California had the burn-in or not, so late that night he ran off yet another copy, checked it to make sure that it was clean and sent it off in the morning, Same-Day Delivery to California. By this point, for what we were paying FedEx, I could have gone to the convention in person.

Next month: It ain't over 'til it's over. ■

Paul D. Lehrman is Web editor for Mix and its sister magazines, but that doesn't mean he has to be nice about inferior entertainment media or crummy tools.

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—FROM PAGE 22, FUN, FUN, FUN

can ask for the type of music I want at any time. Right now it's blues.

BUT SOMETIMES I'M JUST NOT HOME

And that's when I break out my Zoom PS-02 Palmtop Studio. Okay, this sounds a bit too ambitious to be real, but it kinda is. No bigger than the palm of your hand (and over a year old), this crazed-looking silver artifact has actually been instrumental in the creation of several new songs that I have done this year. I have this twisted belief that one way to keep from slipping into a rut is to get different pieces of gear from time to time that, by the very nature of how they sound or how they work, influence your creative process. So I got this, and it certainly did.

The PS-02 is a tiny 3-track studio with bounce and SmartMedia card storage. You can record several versions of a guitar or a vocal, and choose the best later. It also has a drum and bass machine built in, so you can build a bed real fast and get to the good stuff right away, before it leaks out of your mind and is lost forever.

It can be a bit complicated, as it does

so much with limited surface area for controls, but it is well worth learning. It even gives you giant effects on vocal and guitar (yes, I have actually used its internal mic to scratch vocals).

The bottom line is that I have several more songs in the can now than I would have had if I didn't have this thing, and I captured them all on the road—in cars, planes and cruise ships.

BEAN THERE, DONE THAT

POD Version 2.0. This giant kidney bean has earned a place on my office desk as an instant path to certain sounds for my guitar. While never as sweet or expressive as the real thing, the POD can do a pret-

**As I am apparently
mellowing somewhat,
I find that I am now
able to enjoy toys that
may not be 24-bit
perfect, or may not
have a 150dB
dynamic range.**

ty good job of emulating most amp/effect setups that you might want to play through. With all kinds of advanced user-twistable parameters available in the newest version, I have even worked out several presets that I use live.

This thing is pretty nice, and the fact that you can go from one setup to a totally different one in a second makes it incredible for trying that new idea through every amp and effect you can think of until you get the one that sings.

WARNING, HOT PLATE!

THD's Hot Plate is absolutely the sweetest-sounding, most-expressive, power-soaking device that exists.

Warning! Before we go any further, I must tell you that my little brother runs THD, so you might think my opinions would be biased. Well, the truth is, they are. Because he is my *little* brother, I am pretty hard on him as far as performance goes. I have always shredded him relentlessly when I thought I heard a little bad dirt here or a muffled harmonic there. And he does the same to me. We have this sort of, "I can hear subtle trash you can't

hear" competition going on, and everybody benefits.

I am one of those guitar players who gets the best tube amp possible, and then gets something to dump 90% of its power so that it will sing like an angel. For me, the Hot Plate is that thing. I never play without it. See for yourself, and then try to forgive the annoying similarity between these last three paragraphs and a crass paid advertisement.

I CAN'T HEAR YOU...

Several years ago, I found a small, light and shockingly good set of active noise-canceling earphones in an obscure little corner store in an obscure little corner country. I got them so that I could actually *hear* when I arrived at my destination to produce and engineer an album in Finland. I searched for years to find something, and have spent as much as 2 kbucks for heavy systems with half-hour battery life that didn't really work well at all.

Then I found this wonderful little device. I have guarded it with almost insane zeal, as I have never seen it again, anywhere.

Well, six months ago, they showed up in Sharper Image, for the same 50 bucks that I spent on mine.

If you travel and wish to remove the bulk of the energy that fatigues and deafens you on those five-hour flights, then pick up a set of NoiseBuster Extremes. They don't get rid of everything by any means, but they work far better than anything else that you would ever want to drag around. They weigh a couple of ounces, the battery lasts forever, and they even have an input for you to listen to those nasty MP3s as you wing your way to fame and fortune.

TOYS ARE TOYS

Cool toys can be fun or make your life easier, or maybe even make you a bit more productive. Really cool toys do all that and might actually make you smile as well.

Perhaps one of the items I've touched on here might do this for you. Of all the toys that I have played with recently, I picked these because they *did* make me smile, literally. There were more, but I have used all my space for this issue. Note that I spared you the 200 totally lame new toys I tried.

And, of course, you *have* a Palm, right? ■

SSC SEZ: He who dies with the most toys better have a really good will and lots of lawyers, while he who dies with the most friends never really dies at all.

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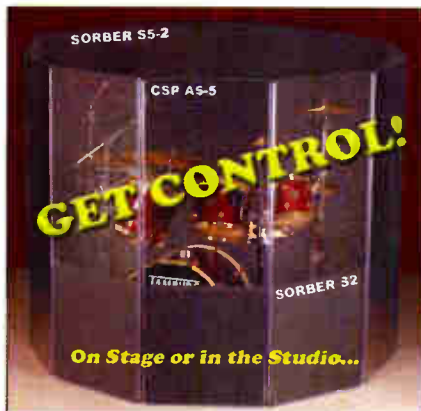


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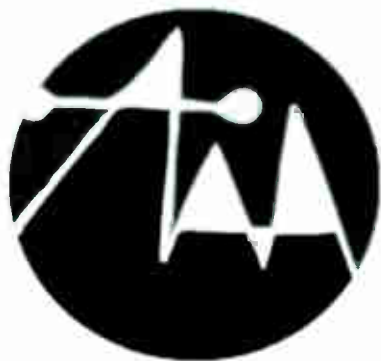


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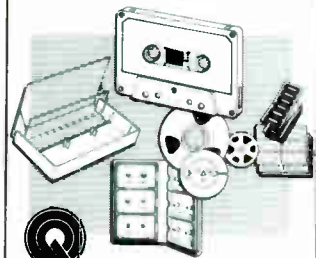
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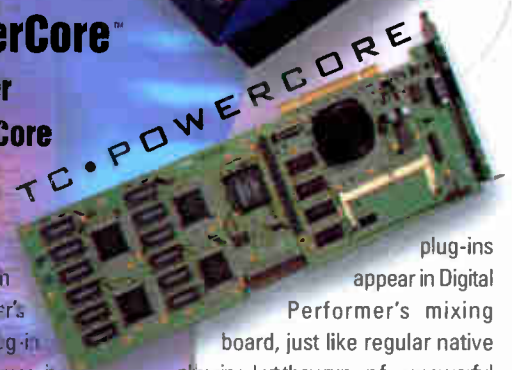
The Radical Technologies SAC-2K sets a new standard for hands-on control of Digital Performer with a custom plug-in for DP automated controls. Within minutes, you'll achieve a whole new level of interaction and creativity that you never thought possible with fader groups, mix automation, plug-in automation (up to 12 parameters at once), transport with jog/shuttle, solos, mutes... it's all just one touch away.



and easy, one-touch access to every element of the recording process in Digital Performer with responsive, touch-sensitive

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TC•PowerCore is a major breakthrough for Digital Performer's real-time MAS plug-in environment because it provides DSP turbocharged plug-in processing. At last, the renowned TC TOOLS/96 studio-quality FX package (included), with TC MEGAVERB, TC Chorus/DELAY and TC EQ^{sat}, can be at your fingertips in Digital Performer, plus other TC | Works plug-ins such as TC MasterX and TC Voice Tools (sold separately). These powerful



plug-ins appear in Digital Performer's mixing board, just like regular native plug-ins, but they run on four powerful 56K DSP chips on the TC•PowerCore PCI card. It's like adding four G4 processors (equal to 2.8 gigahertz of extra processing power!) to your computer. Run 12 studio-quality TC plug-ins with no hit on your CPU power, and run other native plug-ins at the same time! TC•PowerCore is an open platform, so it will also run plug-ins from other respected 3rd party developers, too (details TBA).



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LEXICON 480L

TEACHING AN OLD WORKHORSE NEW TRICKS

For more than a decade, the Lexicon 480L digital effects system has retained its status as a standard workhorse in the industry, and with continual hardware and software updates, it remains a viable production tool. Here are a few favorite tricks for the Lexicon 480L that we've developed over the years at JamSync.

USING THE SAMPLER

The 480L's sampler programs that use one machine can capture up to three seconds. This function allows you to tweak without tying up your main playback machine.

Put the 480L in Cascade mode. Load the FWD&REV 1.5 sampler (Bank 7, Preset 5) into Machine A. Load your reverb or effect into Machine B. Set the wet/dry mix in B to 100% dry. Capture a short sample (about 250 milliseconds) by hitting the REC button. Go to page two and trim the head and tail by repeatedly pushing the Cue button while adjusting the HEAD and FWD TIM sliders. Set the "<>" (Play Order) slider to the maximum value. Set the REV TIM slider to its maximum value. Then, go to page three and set the LEVL REV to "off." Go to page four and set TLV to Continuously. Push the Play button to start playback of the loop. Go to Machine B and set mix back to the normal setting (usually 100% dry).

Tweak the effect. When you have finished, change the machine configuration back to your normal mode.

MULTIPLE SOURCES FOR COMPLEX, REALISTIC REVERBS

Try using the Cascade mode and Illusion to create a complex reverb that approximates a natural environment. Illusion is a 40-tap delay effect with randomly modulating voices—sans pitch variation. Feeding it into the reverb creates the illusion of many more sources. Set the machine mode to Cascade. Load Illusion (Bank 5, Preset 1) into Machine A.



Load Large R Hall (Bank 11, Preset 1) into Machine B. Adjust the mix control of Illusion to change the feel of space. Warning: This approach requires some fine adjustment to get it right once you've found the area of the fader that approximates the sound you need.

SHAPE + SPREAD = NEW SOUNDS

You can create almost any desired envelope using Shape and Spread. The effect is similar to the ADSR (Attack, Decay, Sustain and Release) or envelope generator controls of a synthesizer. Start with Large R Hall (Bank 11, Preset 1) or Large Hall (Bank 1, Preset 1). Set pre-delay to zero. Set spread to 128. Adjust shape. Low values resemble plate reverb, while middle values (around 128) sound more like halls. Values around 190 sound like gated reverb, and above 190, the reverb has a reverse build, with amplitude increasing rather than decaying.

Want something really wild? Go to page two and set the DCO to Effects to unlink the size control. When the size control is linked, it works to keep the reverb sounding somewhat "natural," and it changes the RT and Spread values. Unlinked, anything goes. Try a very small size with a long decay time.

REAL-SOUNDING SAMPLES

To make percussion and drum samples sound as if they were recorded

in a room, start with Ambience (Bank 13, Preset 2). Turn the RTL Level off. Adjust "size" to get the correct size of space. Adjust wet/dry mix on console to set distance of "virtual microphone" from instruments. Add back RTL Level of reverb as desired.

3-D REVERBS USING PANORAMA

An interaural crosstalk cancellation program, Panorama resembles listening to headphones, except the sound image is outside the head (unlike most headphones) for a 3-D effect. Material that has a strong out-of-phase component will seem to surround the listener. It's almost like having virtual surround speakers, so you can use it to create the illusion of surround reverb. Set the machine mode to Cascade. Load a reverb into Machine A. Load Panorama (Bank 9, Preset 0) into Machine B. Adjust Panorama speaker angle (ANG) to change the 3-D impression.

WHAT'S MY SETUP?

When many people have access to the 480L and they change configurations, it's easy to start a session with the wrong setting. For instance, if the last person left the machine set to analog, then you won't see or hear your digital input. Push the CTRL key. Move the STA slider on page one. You'll see the status of key settings scroll by. ■

K.K. Proffitt is co-owner, with Joel Silverman, of JamSync, a multichannel surround mixing, mastering, DVD authoring and encoding facility on Nashville's Music Row.

BY K. K. PROFFITT

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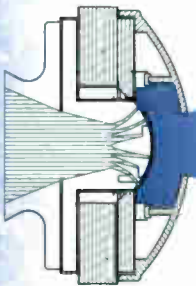
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