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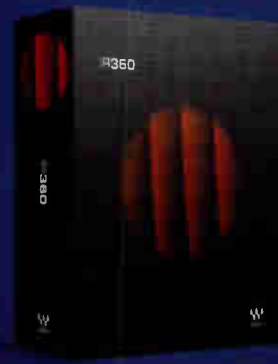
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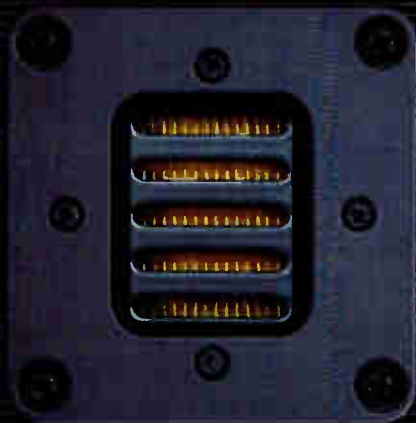
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World radio history

MIX

PROFESSIONAL AUDIO AND MUSIC PRODUCTION

NOVEMBER 2006, VOLUME 30, NUMBER 11



PAGE 26



PAGE 32



PAGE 42



PAGE 80

On the Cover: Marvin's Room on Sunset was a legendary hang for musicians and engineers in the '70s. The new "curator" has lovingly restored the facility and installed an SSL 9000 J and Pro Tools to complement a massive vintage gear collection. **Photo:** Edward Colver. **Inset Photo:** Steve Jennings



26 Outfitting Your Dream Studio

Mix brings back its popular feature on selecting gear for a studio on three different budgets. This year, we're financing, virtually, of course, a \$25,000 music room, a \$75,000 mix room and a \$150,000 tracking studio. How do your equipment picks compare to ours?

32 Microphone Preamp Technology

It's important to know how your gear sounds, but do you really understand how each piece works? Put on your surgical gloves and find out what's really going on inside your mic preamps. Plus, get the features and facts for new releases in that product market.

42 AES Report and TEC Awards Winners

Despite being only three days long, there was much to see at the 121st AES Convention (October 6 to 8, 2006) in San Francisco. Packed full of new DAWs, microphones and digital upgrades, this year's show put the "pro" back into pro audio. Held during the convention, this year's TEC Awards saw Steve Miller accepting the Les Paul Award and David Hewitt being inducted into the TEC Hall of Fame. Check out this year's winners.

80 Wireless Wonders

You do the math: shrinking amount of wireless frequencies for live sound applications and more wireless systems hitting the market each year. It's no wonder manufacturers continue to develop more efficient and user-friendly systems. *Mix* surveys this year's top-of-the-line offerings.

50 2006 Audio Education Directory

Mix's annual guide to professional audio educational programs and opportunities throughout North America.



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World Radio History

contents

sections

SOUND FOR PICTURE

- 74 **Dialog Replacement 101**
by Blair Jackson

LIVE MIX

- 88 **Live Mix News**
92 **All Access: Shakira**
by Steve Jennings



PAGE 94

- 94 **Tour Profile: AFI** by Sarah Benzuly

RECORDING NOTES

- 116 **Alison Krauss Produces Alan Jackson** by Elianne Halbersberg



PAGE 116

- 117 **Peter Frampton** by Michael Barbiero
118 **Classic Tracks: Public Enemy's "Fight the Power"** by Gaby Alter

COAST TO COAST

- 124 **L.A. Grapevine** by Bud Scoppa
124 **Nashville Skyline** by Rick Clark
125 **N.Y. Metro Report** by David Weiss
126 **Sessions & Studio News**
by Barbara Schultz

technology

104 Tools of the Trade



PAGE 106

- 106 **Field Test: Solid State Logic Duende DSP Processor**

- 110 **Field Test: iZ Technology RADAR V Hard Disk Recorder**



PAGE 110

- 112 **Field Test: Digidesign Hybrid RTAS Soft Synth**

- 114 **Field Test: Dangerous Music Monitor ST, Monitor SR Controllers**



PAGE 114

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ONLINE
EXTRAS

Visit www.mixonline.com for bonus materials on our "Audio Education Guide," AFI "Tour Profile," "Dialog Replacement 101" and more!

columns

- 22 **Insider Audio: Double Major**
by Paul D. Lehrman



PAGE 22

- 70 **AudioNext: You Can Take It With You** by Alex Brandon

- 100 **Tech's Files: To Preserve or Enhance?** by Eddie Ciletti



PAGE 70

departments

- 10 **From the Editor**

- 14 **Feedback**

- 16 **Current**

- 20 **On the Cover: Marvin's Room, Hollywood** by Tom Kenny

- 131 **Ad Index**

- 132 **Mix Marketplace**

- 139 **Classifieds**



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AES: Basics, Boutiques and Business

I'm still trying to catch my breath from the 121st AES convention in San Francisco (see our show coverage on page 42) and must say that this was one of the best AES shows in years. Convention chair John Strawn and his entire hardworking committee put on a brilliant event, with a perfect balance of papers, workshops, tutorials, master classes, technical tours and special events.

Always a show highlight, the AES exhibits featured hot new technologies such as Fairlight's remarkable Crystal Core DAW engine and Yamaha's DSP5D, which puts the power of its PM5D digital board into a rack unit. And the huge line for autographs wasn't for some guitar hero, but engineer Geoff Emerick, who was signing his new book *Here, There and Everywhere: My Life Recording the Music of The Beatles*.

The show floor also seemed mostly free of the cutthroat, price-is-everything mentality that lords over shows like NAMM and Musikmesse. Of course, AES is an end-user show and not a dealer or selling expo, but it's refreshing to hear attendees seriously talking about quality rather than quantity, or how-cheap-can-you-make-these-economics. And when new technologies do emerge—such as 64-bit processing or Intel's new quad-core CPUs—the emphasis is on using these breakthroughs to advance the state of the art. AES also had a strong showing by boutique manufacturers whose customers appreciate that a few extra bucks invested in decent parts will pay off in years of trouble-free operation. Innovations, from large and small companies alike, drive the industry and lead to better products.

Another welcome sign at AES was a well-rounded slate of tutorial programs, ranging from digital audio basics, mic techniques and digital interconnects and room acoustics. We aren't all experts in every field, and AES is an excellent platform for learning from the industry's best and brightest. And master classes on analog circuit design and PCB layout aren't usually found on your local PBS channel. Local pro audio dealer Cutting Edge presented a packed forum on equalizer design featuring Geoff Daking, Doug Fearn, Greg Gualtieri, George Massenburg, Rupert Neve, Malcolm Toft, Saul Walker and Paul Wolff. But interacting with other pros is hardly limited to the formal confines of workshops and tutorials—where else but during AES could you overhear two multi-Platinum engineers in the hotel lounge, debating preferences in kick drum mics?

Keynote speaker Robert Scovill set the right tone when he talked about opportunities in the live sound industry, a theme reflected in the seminar on the Business of Touring Sound. I'm sure there are some who would have preferred a two-hour lecture on phase-plug geometry, but occasionally bringing a bit more business savvy into this world of audio engineering isn't a bad idea at all.

Especially in our annual audio education issue, it's important to remember that audio engineering—whether designing circuits on the EE side, writing code or mixing a 5.1 track—requires a life of learning that doesn't stop when you leave your alma mater. Thanks, AES, for a great show.

George Petersen
Executive Editor

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A musician with long hair, wearing a white t-shirt with a red rose pattern and a dark jacket, is performing on stage. He is singing into a microphone and playing a yellow electric guitar. In the foreground, there is a blue Aviom Pro16 monitor mixing system. The background is dark with stage lights.

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Letters to Mix



HELLO, I'M STILL HERE

Not to be picky, but the Donny Osmond ("And They Call It Techie Love," September 2006 *Mix*) quote that Lucille Ball, Ray Bolger and Paul Williams are people that "aren't with us anymore" is only two-thirds correct. I'm in New York for ASCAP board meetings and I'm beginning to feel a bit like Mark Twain at his own funeral. Can you stop the rumors?

Paul Williams

Dear Paul,

Sorry about that! Maybe that performance where your character dies in the end of Brian De Palma's *Phantom of the Paradise* was so good that Donny assumed you weren't with us anymore.

Note: The good news is Williams is alive and quite well. Currently managed by Phil Ramone, this Oscar, Grammy and Golden Globe-winning composer of hits such as "We've Only Just Begun," "Evergreen" and "The Rainbow Connection" is on the board of directors of ASCAP and is currently writing the music and lyrics for the Garry Marshall musical *Happy Days*, followed by another musical based on the highly successful *Chicken Soup for the Soul* books. —George Petersen

DON'T FORGET LINUX

I just finished your editorial on "The NASCAR Studio" ("From the Editor," March 2006). I have been in the computer business for 20 years, and you are exactly right when it comes to the evolution of "bloatware." Configuring a usable DAW does indeed get tricky if not impossible with Microsoft's "Clippy" always popping up.

We differ on the long-term solution, however. It is not necessary for the OS companies to offer more options in their installs, although

this would certainly help overall. I have been using another OS called Linux. It is free, highly customizable (source included) and can run on almost any motherboard. Upgrades are easy, and leftover files are usually not a problem.

The lack of music software for this OS is a problem. There are many audio titles on the Net, but very few, if any, would rival Pro Tools. One DAW project for Linux is Ardour (<http://ardour.org>). It is free and supported by the open-source community. The user interface is recognizable, and it even supports plug-ins to extend its capability. As a suggestion, you should have one of your writers check this out, maybe even do a comparison. I firmly believe that when audio software vendors begin to generate products for the Linux OS, you will see an increase in their use due to the OS' ease of use and configuration.

Greg Tomalesky

Blue Sky Sound

NEUMANN CLARIFICATION

I wanted to correct a couple of mis-details in the description of the Neumann U87 in the "TECnology Hall of Fame" in the September 2006 issue. The text mentions "the U87 used the same K67 capsule as the U67." Actually, the original U87 used the K87 capsule, which was acoustically identical to the K67, but not electrically the same. The K67 was fitted to the mic with the introduction of the U87A version in 1986.

Also, the K87 (nor the K67, for that matter) does not "require" 60-volt bias and the batteries never "augmented the phantom power." The U87 could always run solely on 48V phantom power (P48), and, until the introduction of the "A" version, Neumann biased the capsule at approximately 47V. The batteries were an alternate powering technique for the mic so that it could be used in field recording and other situations where there was no phantom available—especially because at the time of the U87's introduction, phantom power (developed by Neumann) was still new and far from the ubiquity we find today. And, when running on batteries, the capsule was actually biased at about 45V—at least with brand-new cells in place.

The two major versions of the mic are the U87 and U87A, plus numerous small internal—and one not-so-small—revisions. The original U87 was produced in versions with both the Tuchel connector: U87 for the European market and the XLR-connector U87i with an "i" (international) suffix. There also was a little-known

"p" designation. By the introduction of the U87Ai, the Tuchel had been phased out in favor of the now-standardized XLR connector. Note that there were also some specially developed versions of the mic, including the U397, which runs on -9VDC phantom and the slightly more common modulation-lead ("T") powered U77.

Tony Merrill

Stephen Paul Audio

FREE IS STILL A GOOD THING

I'm writing in response to an article you published in February's issue "Bitstream." First of all, let's agree Oliver [Masciarotte] really does have issues with the FCC that continually cloud his thinking. I've been watching digital, over-the-air free TV for the past 35 months, and we still have 18 months to go with analog. I purchased my receiver at Circuit City for \$88 and connected it to my Sony 32-inch TV. Last year, I purchased a 42-inch 16x9 HD display and connected my receiver to it. I know what TV pictures look like from DISH and DirectTV, not to mention cable, and you will not see quality HD on any pay service like that of free TV.

As of today, here in Lancaster County, Pa., I receive NBC, ABC, CBS, Fox, Public TV, UPN and an independent in free digital over-the-air delivery with most in HD during prime time. Most of these over-the-air channels are now serving two digital streams, giving me not seven but 11 free channels of viewing—all in better quality than I could purchase from any pay service.

Oliver mentions "wearable computers." With no wires attached, wouldn't it make sense that local over-the-air TV would be a point of connectivity for such a device? Or is it his belief that America will continually expect being technically dumbed down? Oliver, have you seen the pictures that are broadcast for free in HD? If not, fifth-generation receivers are available for around \$100. How can over-the-air HD even be compared to what's available on your PC or Mac, not to mention what the computer signal would look on a 50-inch or larger display, and you still have to pay your ISP? The truth is, the best-quality TV is free.

Don Horst

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A GOLDEN SUNRISE



Houston-based Sunrise Sound has added The Gold Room to an already extensive suite, which includes the SL Grey Room, Control|24 Green Room, sound effects creation in the Purple Room and the Mediatech Institute, a school for recording engineers. The Gold Room, designed by chief engineer Skip Burrows, is centered around a 32-fader Digidesign ICON D-Control console, racks full of outboard gear, and Genelec 1031 surround monitoring, as well as Yamaha NS-10s and Auratones.

"I spoke with every manufacturer in the world regarding diffusion and isolation," said Burrows, "and came up with a unique blend of products from RPG, Auralex, Pac International

and Acoustic Systems that provides a room that is both acoustically accurate and comfortable to work in." The Gold Room features two isolation booths for recording. The stone room has a warm, natural reverb, perfect for acoustic and electric guitars. Motorized curtains are used to dampen the reverb time and vary the acoustics. The second booth was designed to be acoustically neutral.

NEW COMPANY: DAKING PLUS

Geoff Daking and Dave Thibodeau have created a new joint venture, DakingPlus (www.dakingplus.com), which will provide high-end recording equipment through the application of digital control and automation to analog tone and circuitry. The concept provides engineers the option to combine modular pieces of DakingPlus analog gear into any configuration.

The initial product is the DakingPlus EQ500, an adaptation of the 4-band Daking A Range equalizer and will be available in versions to fit various manufacturers' rackmount module frames. Additional products, including microphone preamplifier and auxiliary bus modules, are planned to follow.

DOYLE JONES, 1928-2006



Behind the console: producer/former SugarHill owner Huey Meaux (left) and Doyle Jones. In front of the board: The Dawgs, circa 1965.

Doyle Jones was a SugarHill Recording Studios (Houston) engineer from December 1964 (then called Gold Star Studios) to January 1966, and has recorded a string of hits during his recording career, including Sir Douglas Quintet's self-titled album, Roy Head & The Traits' "Treat Her Right," the Pozo Seco Singers' "Time," and many others.

After leaving SugarHill/Gold Star, Jones started his own recording studio, Jones Recording, and recorded a number of hit records up to 1973, including tracks for Mickey Gilley, and Archie Bell and The Drells. Between 1973 and early 1974, Jones shut down the

studio and converted it to a cassette-duplicating house, which eventually became a notable CD-duplication facility called Jones CD Duplication. Jones' extensive tape library was recently transported to SugarHill for storage.

A GIFT OF A STRING OF PEARLS OHIO STUDIO CELEBRATES

Kopperhead's (North Canton, Ohio; www.kopperhead.com) 30-year anniversary was highlighted with the install of a Pro Tools HD Accel system (with Control|24 surface, 192 I/O with analog expansion and MIDI module) in the John Storyk-designed Master Studio's control room. Operating within a Mac dual-G5 system with dual monitors, the system offers a large assortment of plug-ins, including the Waves Diamond bundle; Dynaudio BM6A near-field monitors have also been added.



"We have always been known for our acoustic environment," Kopperhead president Lee Kopp said, "and we were certainly on the cutting edge of digital production with our early and substantial investment in the Synclavier Digital Music System. People are always blown away by the fact that a studio of this caliber is located in North Canton, Ohio, and have often referred to us as one of the best-kept secrets in Ohio. But our clients have come from all over the country, and it has been our ability to serve both local and out-of-state clients that has enabled us to achieve this level of success over the past 30 years."

KEEP ON TRUCKIN'

After being devastated by the effects of Hurricane Katrina, New Orleans' Truckfarm Recording Studios (located near the Ninth Ward in an area known as the Bywater; www.thetruckfarmrecordingstudios.com) has reopened and is currently working with three-time Grammy Award-winning producer John Chelew (Blind Boys of Alabama, Donovan, Charlie Musselwhite) and recordings for singer/songwriter Arthur Adams.



From left: co-owner George Ortolano, producer John Chelew and co-owner Jack Miele

NOTES FROM THE NET

GET YOUR MONEY

RoyaltyShare (www.royaltyshare.com) launched with a suite of Web-based services that provide end-to-end management of both mechanical and artist royalties. The RoyaltyShare Digital Advantage service aggregates and monitors digital sales data. The offering enables record labels and music distributors to consolidate, manage and interpret data from digital music and video revenue streams.

"RoyaltyShare came along at just the right time" said Dan Harrington, co-founder and president of Dualtone Records, an independent record label in Nashville. "We're excited about digital distribution, but we quickly realized that our existing royalty processes were not well suited to dealing with digital sales. Using RoyaltyShare's back-end systems to manage the massive amount of sales data is enabling us to pursue new revenue streams and pay our publishers and artists accurately and on time."

YOU'VE GOT MUSIC

Recently launched, AOL Music Now (www.aolmusicnow.com) digital music subscription service offers unlimited on-demand streams and downloads of more than 2.5 million audio tracks and thousands of music videos. As long as users maintain a portable, tiered subscription, they can access music and videos that have been transferred from AOL Music Now to PCs and compatible portable devices. The new service also features AOL Music-programmed AOL Radio with XM, offering more than 200 AOL Radio stations and select premier XM Satellite Radio channels.

The PC-only service works with Microsoft Windows Media Player (Version 10 and higher) and Winamp (V. 5.2.3 and above).

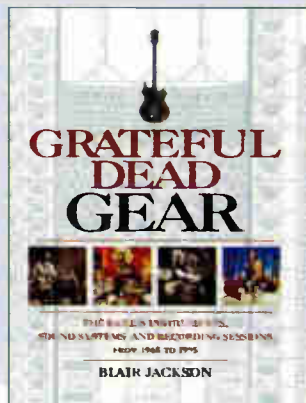
RUDYS REVAMP STUDIO UPGRADES

Denver-based producer/engineer Mark Obermeyer of Rudys Studio (www.rudysstudio.com) has recently finished a major upgrade to his recording facility, including the jump to Pro Tools HD3 and installing a Digidesign ICON D-Command control surface and ADAM S3-A monitors.

Obermeyer teamed up with Justin Preston of Dragon Studios (also in Denver) in 1999, and has since played host to some of Colorado's top talent, who have worked in the facility's three tracking rooms and a large control room. "We have finished well over 100 projects and are eager to continue to make new musical associations with dedicated and creative people!" enthuses Obermeyer. "We set up the studio to be competitive with the finest rooms in town at a lower price point, and we have been steadily booked since 1998."

BOOKSHELF

Just in time for the holiday season comes the perfect gift for all your Deadhead friends (and we know you've got some!)—*Grateful Dead Gear*, by Mix senior editor Blair Jackson. This book goes into great detail about the legendary band's technical side, including their musical instruments, live sound systems and recording techniques. It's all here in 300 pages and boasting more than 100 photos and diagrams, many previously unpublished. Backbeat Books, \$34.95.



INDUSTRY NEWS



Scott Ham

Darren DeVerna is PRG's (North Bergen, NJ) East Coast operations president...**Endless Noise** (Santa Monica, CA) named **Dayna Turcotte** executive producer... Recently assistant editor at **mad.house** (NYC), **Scott Ham** has been promoted to editor...Oxnard, Calif.-based **L-Acoustics U.S.** appointed **Jim Kinkella** to the newly created position of engineering services...**Greg Batusic** is **Line 6's** (Agoura Hills, CA) VP of sales; **Barry Mitchell** was promoted to the newly created position of director of sales, **Guitar Center**, and **Scott Lombardo** was hired as national accounts manager...New VP of sales for **CAD** and **Astatic** (Mentor, OH) is **Tony O'Keefe**...New promotions at **Harris Corporation's** (Cincinnati) Broadcast Communications division: **Chris Pannell**, national sales manager for RF and radio systems and consoles, and **Garrett Wood**, district sales manager for radio broadcast

systems. **Wes Hicks** joins as senior manager for channel development...New York City-based **Solid State Logic** hired **Arnold Scher**, product manager, and named **HHB Communications Canada** to distribute Duende in that country...**Telos** (Cleveland) news: **Kirk Harnack**, director of international business development; **Jim Armstrong**, director of Eastern sales; **Ken Skok**, Western region applications engineer; **Marc Johnson**, Eastern region applications engineer; **Roxanne Walters Bain**, sales; and **Mike Uhl**, director of Western sales...New distribution deals: **Pacific Island Audio** (Victoria, B.C.) represents **Auralex Acoustics** (Indianapolis) in Canada; **CharterOak** (Enfield, CT) adds Norway (**Soundware Norway**), Denmark (**Soundware Denmark**) and UK/Ireland (**ASAP**) distributors; **Dolby** (S.F.) new European distributors: **Audmax Ltd.** (Hungary), **Avitel de Vitor Alves Luis** (Portugal), **Moto Audio Sales ApS** (Denmark), **ProTechnica Ltd.** (Bulgaria) and **Soundata Oy** (Finland); and **HME** (San Diego, CA) adds **Technology K.A.R.** (Egypt), **Audiopro SRO** (Czech Republic), **Venuetech LLC** (United Arab Emirates), **Lydrommet AS** (Norway), **Audigys** (Greece) and **Gotham AG** (Switzerland).

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2006 Audio Education Directory

In addition to the full listings from these North American schools, peruse Mixguides.com/education, where you'll get additional articles on choosing the right school.



"Dialog Replacement 101"

ADR for animation, TV vs. features, the challenges of working on different kinds of films...Doc Kane, Jeff Gomillion and Charleer Richards-Steeves tell us more about recording dialog for picture.



2006 AES Report

Make sure you go to www.mixonline.com/aes to get more product news from the show floor, including mentions in the annual AES New Products Guide, nightly e-newsletters, blogs, podcasts, Tech Minutes and much more.



Tour Profile: AFI

Get an in-depth scoop on how front-of-house engineer Pete Keppler got into the live sound biz, as well as tricks he's using on the current AFI tour.

SPARS SOUNDBITES

WHAT STUDIOS LOOK FOR IN AUDIO SCHOOL GRADS

BY JEFF GREENBERG

At The Village, there is a system of "runners" that has been in place for many years. When I arrived, I felt it was a cumbersome and sometimes unfair structure that carried over from the recording industry's "golden" or dark ages. As far as I can tell, this system is a carry-over from when there were few schools—if any—that offered a structured education in audio recording and production.

After a couple of years here, I began to see the system actually worked quite well for the studios and the new employees. At this point, there are more schools, universities and programs turning out well-qualified graduates than ever, and most, if not all of these institutions, have placement departments that offer their students contacts, opportunities and, more importantly, tips on how to handle contacts, structure resumes and get through the interview process.

So, what are we at the studios looking for? We are looking for people who will fit into and contribute to our company. All companies have "cultures"—the people in the building, and how they interact with each other and with clients. It's clear we want someone who is eager, enthusiastic, intelligent and pleasant. The quality and extent of the education will become apparent once the person is hired; this is what will set this employee above the others. I look for someone who understands the concept of service: Having experience as a waiter can be an asset, as what we do is indeed a service.

Because a large part of what we do is music, a knowledge and understanding of music is always a plus. That ability can come in very handy when an engineer is doing edits and needs to communicate with the producer and artist about particular elements of a project.

Happily, analog is alive and well, and some artists will only record using tape and vintage equipment. A thorough understanding of all methods and techniques of our art is essential to anyone hoping to be successful in this business today. In addition, there are various brands and methods of digital recording, workstations and software that have their own learning curve and might be used together or in various stages of projects. An engineer must have a working ability of this huge and varied array of products, not to mention the endless universe of consoles and automation systems.

Oh, how are your video skills? More and more projects at The Village—commercials, films like *Walk the Line* and videos—require cutting or mixing to picture. There are many material sources and methods an experienced engineer must be familiar with.

If that seems daunting, it is. Very few people can walk out of any school with all of those skills. This is where it can pay to be a runner. The people we look for are the ones learning and studying every time they get a break from their duties running. The ones with the manuals under their arms as they go home, they are the ones to watch.

Above all, we look for someone who loves music. What we do is an art. We practice the science of recording and manipulating sound, and when we do it well, we create magic. ■



Jeff Greenberg is the CEO of The Village.

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World Radio History

Marvin's Room

By Tom Kenny

Marvin Gaye loved being in the studio. He loved to write, play, orchestrate, sing, record, direct, produce, jam, party and sometimes just hang with musicians and friends. At various times in his career, it was a place of business; at other times a place of pleasure. For a few years, the studio was even his home. When it became apparent that his well-documented differences with Motown could not be repaired, one of his first orders of business was to build a private facility, the restored and re-invented version of which appears on this month's cover.

In the mid-'70s, Marvin Gaye's studio was the place to be in Los Angeles, the Studio 54 of the West Coast. If you got past the gate, one engineer recalls, you just knew you had entered someplace magical. And you knew you had arrived. Yes, the parties were legendary, at times running 24/7. Muhammad Ali would stop by. Diana Ross, too. Rock stars and beautiful women. Film stars and politicians. Everybody wanted in. But while the parties drew the crowds, it was the core cast of musicians that provided the soul. Musicians were always around, writing, playing, hanging out. They helped to create the sound of Gaye's evolving amalgam of jazz, R&B and soul. Gaye lived there for long stretches at a time, always making music.

Then in the late '70s, it all came crashing down, and Marvin lost the studio amid his mounting financial and legal problems. "He went into a deep depression," recalls his former wife, Janis Gaye, mother to his children Nona and Frankie. "The enormity of losing his studio was so devastating to him that he was never the same after that. We had gone bankrupt, lost our home, our cars—everything. But he was a broken man over the studio, and not just for the musical creativity, but for what he had done architecturally. It was very emotional for him, and for everybody around him."

The studio languished for a while before being rechristened Eldorado Studios in the late '80s and hosting a few hits, including Alice in Chains' *Dirt*. Then in 1997, guitarist/producer/former major-label exec John McClain stepped in and rescued the space from being turned into a digital photo lab.

"When I think of historic studios, this is it for me," McClain says. "Ray Charles, Jimi,



Janis Gaye, with her and Marvin Gaye's grandson, Nalan, in front of the Kadir Nelson mural.

Elvis, they all had a space, and here, Marvin just nailed it. He made it big so he could do strings and horns. He could do anything he wanted. I didn't know Jan [Gaye] then. I simply wanted to make it a Mecca for the Gaye family."

The reclusive and humble McClain downplays his role in the resurrection of the studio and the restoration of Gaye's name, saying he is simply the "curator" and wanted to treat the Gaye family right and have a place to hang out with his boys. To Jan Gaye, however, he has been a prince.

"At first I was really angry because they were using Marvin's name," Jan Gaye recalls. "Who is using Marvin's name? Nobody called. But then Nona [Gaye] got flowers on her birthday from this John McClain guy, celebrating her album, and we thought, 'Who is this guy being so kind when no one else is?' I'm wary of people and didn't know what to expect. Then when I walked through those doors, all the negatives fell away. I saw the marble etching on the threshold, then I came down the stairs and turned to the mural and just stopped in my tracks. I stared and cried and stared and cried. I knew then that he was all about Marvin."

Today, Marvin's Room is one of the most well-appointed and musician-friendly studios, a playground for those who seek the blend of vintage sound and modern production. Michael Jackson christened the studio in 1999 with his most recent album. Since then, engineer John Nettlesby and crew have hosted the

likes of Usher, Mariah Carey, Yolanda Adams, Lenny Kravitz, Mary J. Blige, The Game and Luther Vandross in some of his final sessions before he passed.

There's an 80-input SSL 9000 J; 32 channels of Pro Tools HD; 5.1 monitoring; Pultecs, Fairchild's, GML processing; along with everything else you could think of vintage and modern. In the studio are dozens of amps, keyboards, rhythm boxes and a wealth of music-making devices, all in perfect shape. There's a Hammond B3 and two Mellotrons. Prince's board sits upstairs waiting for a room. A 9-foot Hamburg Steinway sits in the center. As a bonus, the spirit and vibe of Gaye permeates the place, to the point that nearly every artist who has worked there has come out of the studio saying, "I felt Marvin with me on that track." In that sense, the studio has become a living legacy.

"This was always like a second home for Marvin, me and the kids," Jan Gaye says. "He fancied himself an architect, an antiques dealer, and he oversaw everything, from the colors to where the seats would go. This place became alive. It was a part of him."

The studio is merely the first part of the restoration of Gaye's story. An A-list film project is in the works, and Janis Gaye's story will be coming out in a book written by Regina Jones, co-founder of *Soul* magazine. Plus, there are some merchandising deals on the way with Michael Bolton's company. Finally, the world will see the genius of Marvin Gaye in all forms. ■

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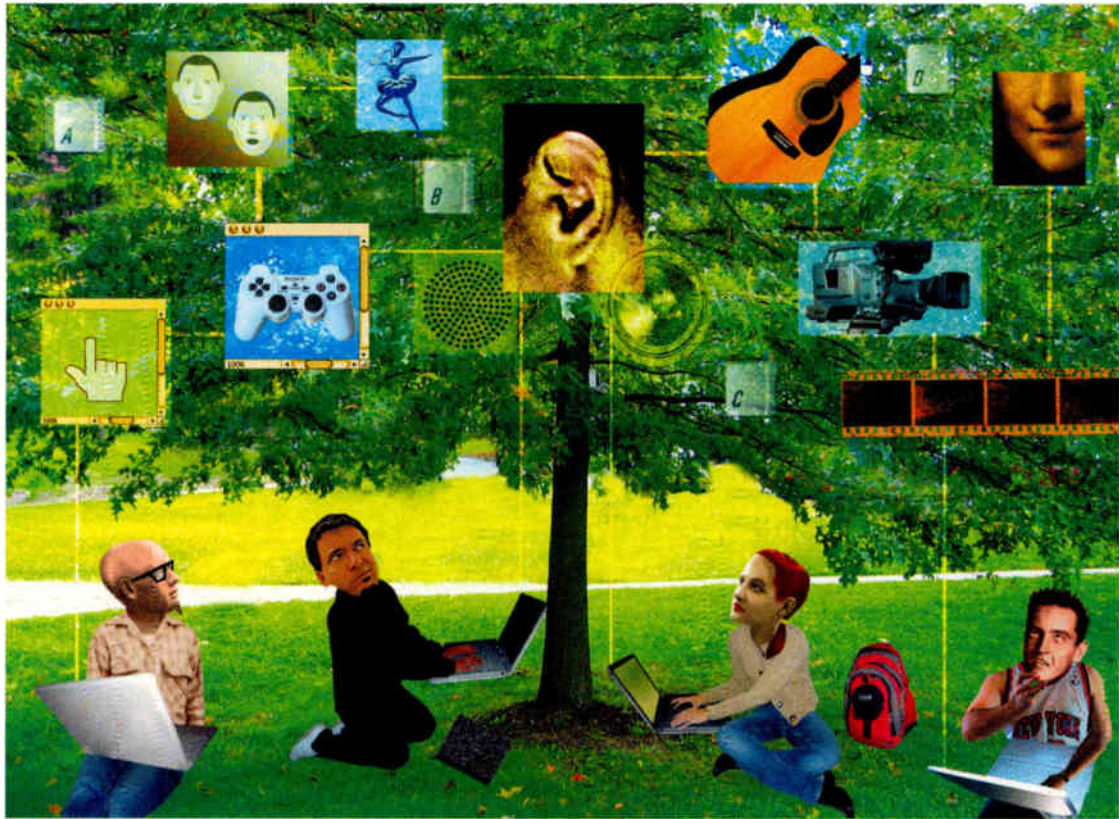


ILLUSTRATION: BEN FISHMAN

Ten years ago, it might have been the exception, but today, it's the rule: Schools that have courses in professional audio production are now also offering courses in visual media. Institutions that once boasted how many SSL consoles and Pro Tools stations they had are now touting their expertise in graphics, animation, advertising art, film and video editing, and Web programming.

This phenomenon is particularly true of commercial schools, but many more traditional institutions are moving along the same lines. It's in the nature of a large university that new courses and departments can't be created overnight, but faculty can encourage students who are majoring in one discipline to look into courses in other departments. In fact, many schools are creating cross-disciplinary certificates or minor programs that require students to work in multiple artistic fields.

In my own school, there is such a program, now almost 10 years old. To fulfill its requirements, students can choose among courses in art, art history, drama, dance, electrical and computer engineering, computer science, mechanical engineering, film, journalism and music. Students will do a “capstone” project, which can be a film, a magazine, an interactive Website, a sculpture, an

installation, a CD or any number of other forms as long as it incorporates elements from diverse media. There are a couple of required courses, but students, generally speaking, can take whatever courses they like within the program's guidelines and have the opportunity for independent-study projects with appropriate faculty.

This is a really good thing. It's safe to say that the majority of audio professionals will be involved with visual media at some point in their careers, whether they're editing dialog, music or effects for motion pictures; doing sound design for the Web; creating soundtracks for games; or working in some new forms that have yet to be invented. Therefore, it's extremely helpful to anyone entering the audio field to understand how visuals are created and manipulated so that they can talk to their colleagues and clients. Just as recording engineers, mixers and editors need to know the language of music to communicate with the folks in front of the microphones, they also need to know what's involved in generating graphics and animations, editing video and building the intricate structures of game design if they are going to be able to communicate with the people they collaborate with in those fields.

George Massenburg—who, with his plethora of production, design, consulting and education credits, can

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safely be called one of the most versatile and successful people in pro audio—is a great example of someone who has been stretching his horizons in the visual direction. These days, at every music session he records, he also arranges to shoot HD video. “I’ve given handheld cameras to young writer/directors who know what to do, and even more importantly what *not* to do, around musicians,” he reports. What ultimately happens to these videos he’s not really sure, but in the short run, they are an important part of the act’s electronic press kit.

Certainly, the advent of cheap hardware and software for digitizing, editing and authoring video has raised many young people’s consciousness about how they can create video. In turn, students are demanding that their schools give them a chance to learn these skills.

Can someone be equally talented and skillful in audio and video, and should schools be selling their curricula based on that assumption? To me, some programs that marry audio and video education, with the idea that their graduates will be able to go into either field with equal ease, might be guilty of raising false hopes. That’s because the skill sets, and indeed the brain functions, needed to work with visuals are quite dif-

ferent from those that are used in working with audio.

Massenburg is doing a lot of his own video production, but that seems to be more due to the inadequacy of others in the field than a strong desire to be a video editor. “I produce a [recording] session only when I can’t find anyone who appreciates what the artist is trying to do,” he says, “and it’s the same thing with video, except that entire industry is far less competent around music, which means I have to do the editing myself.” In the two schools where he is on the faculty, McGill University in Montréal and Berklee College in Boston, “We’re just starting to teach video technology and production methodology, and I think we’re better off addressing both audio and video in a coordinated manner. But then again, we’re just talking about music,” as opposed to narrative, persuasive or documentary filmmaking.

For a musician or audio student to learn enough about video to edit music videos is not that hard. I know; I’ve recently done it myself. I don’t generally consider myself a visual person, although I’ve done my share of advertising design, book layout and Websites, but last year, I taught myself how to edit video (to be totally honest, I started with a couple of lessons from one of my former

students) using first iMovie and then Final Cut Pro. As someone who’s been using Pro Tools since Version 1, I found the user interfaces of these tools generally pretty easy to understand, if occasionally frustrating.

I had a couple of videos of concerts I had produced with multiple cameras, along with a bunch of interviews that were destined for the “extras” on a DVD release with a tight schedule. Because I knew the music, editing the concert footage was fairly straightforward: Follow the lines of the various instruments and find a camera that was shooting whatever was making the most important sound at each moment, cutting more or less in tempo with the music. When there was no usable close-up shot, go for a wide angle. The process of editing the interviews was equally pragmatic: I had the texts all printed out, so I simply cut according to which parts of the text I wanted to use. As they were all one-camera shoots, I just used dissolves over the cuts. Not a lot of aesthetic choices here.

These videos came out fine, they augment the package nicely and people have responded well to them. But being able to cut a couple of concert videos doesn’t make me Martin Scorsese or Albert Maysles, or even Albert Brooks. I’m just

—CONTINUED ON PAGE 130

GT PROFILE

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TASCAM

Outfitting Your Dream Room

FANTASY STUDIOS AT \$25K, \$75K AND \$150K

By David Weiss, Kevin Becka and Barry Rudolph

Everybody loves a shopping spree. And though the same can't be said in, say, real estate or fuel, in pro audio, your dollar currently stretches farther than ever. With that in mind, we once again supplied three writers with imaginary gear budgets and asked them to come up with their dream studios. For simplicity's sake, we assumed that our planners already have a room and a computer. Also, listed prices are approximate—do a little sleuthing and you're sure to find even better deals.

THE \$25K MUSIC ROOM

If I suddenly had \$25,000 in cash to build my dream personal studio, rest assured I would not sniff at such a sum. To the contrary, a chunk of change like that available for music production would mean that my electronic-based music—for commercials, TV, film placements and personal artistry—had gone to the next level.

So with this budget, I'm me, just a little more successful. That means I need to work comfortably and quickly by myself 90 percent of the time, but with the ability to get quality recordings with a vocalist, guitarist or horn player at a moment's notice. I'm starting with a maxed-out computer (a Windows PC) and a room that supposedly sounds at least decent. In all hardware and software purchase decisions, my primary criterion will be the same: No one item will be allowed to bust the budget. All prices are street.

DAW AND MORE

This is not going to be a commercial studio where other engineers' work habits are much of a concern, so I'm going to go with the DAW I know and love best, Cubase SX3 (\$599.99). (Cubase 4 had just been released as this issue went to press.) To me, Cubase offers a scientifically approachable method of mixing, with tremendous flexibility once you get familiar with all the facts of its deep workflow. To get sound directly in and out of the machine, I'm selecting the RME Fireface 400 (\$999.97), which offers a great deal for the money: 24-bit/192kHz FireWire, active jitter suppression, and fully independent routing and mixing. Its SteadyClock feature allows it to be the sync reference for the entire studio. Expansion via an RME ADI-8 DS (\$1,799.97) will bring me up to a full 16 inputs and outputs (at 96 kHz), with all my AD/DA concerns covered.

The studio's emphasis will be on software, so I'll need

a few key suites in addition to Cubase. With its unparalleled loop-based arrangement capabilities, Sony ACID Pro 6 (\$379.97) is indispensable to my workflow, especially with its vastly improved audio and MIDI recording capabilities. Propellerhead's Reason 3 (\$399.97) and ReCycle (\$199.97) are also must-haves for creating grooves. I'll also get the full host of Spectrasonics virtual instruments, including Stylus RMX for drums (\$279.97), Atmosphere synth (\$369.97) and Trilogy for bass (\$319.97). Although it's no longer manufactured, I'll scour the ends of eBay to get the insanely original-sounding Hartmann Neuron VS synth (now approximately \$300).

Speaking of VST plug-ins, the Universal Audio UAD-1 Ultra PAK (\$1,199.97) will find a happy home in one of my PCI slots, providing plenty of its own DSP power for highly faithful re-creations of the 1176, Fairchild 670 and Pultec EQ, plus great reverbs and more. The Waves Masters bundle (\$675) will prepare me for the "mastering" phase. (Self-mastering is an oxymoron in my book.) I really like the look of the new Masterclick Tempo Timing Software for film and video composers (\$79.95). Also indispensable are the Kjaerhus Audio Golden Audio Channel (\$198), PSP Vintage Warmer (\$149), KVR Tone2 FilterBank2 (\$49) and a wide variety of freeware VST synths and plug-ins that I've tracked down on the Web.

OUTSIDE THE BOX

To interface with everything inside the box, I'll begin with the Novation ReMOTE SL 61 (\$599.99). I love the weighted feel of Novation controllers, and its Automap templates for Cubase and Reason (among others) will save me a lot of time in those programs. The Roland HandSonic 15 (\$899.97) is also a unique MIDI controller and sound source. I also demand the time-saving presence of the humble Creative Labs Prodikeys combination QWERTY/MIDI keyboard (\$49.99). Ditto the 3M Ergonomic Mouse EM500 (\$51.84), which allows your hand to mouse comfortably in a more neutral, "handshake" position. Instead of a large mixing surface, I'd opt for the USB PreSonus FaderPort (\$199.97), which fits one long-throw motorized fader and several transport and master control functions into a small-footprint package.

For a mic pre, my mission was to get two channels of very high-quality inputs, EQ, and limiting and/or compression for less than \$2,000. The Langevin Dual Vocal Combo (\$1,800.97) by Manley Laboratories fits the bill, giving me a highly func-

tional front end. Joining it will be the Daking FET II compressor (\$1,995), which will also be on hand to cover the outbound signal from my analog summing box—an essential tool for serious “in-the-box” mixers—which will be the Dangerous Music 2-Bus (\$2,649), still one of the best options for the money. The analog and digital Switchcraft 6425 (\$69997) patchbay will give me flexibility as I add gear.

When I’m recording live sounds and musicians, I don’t like doing it straight into the computer. For that insanely critical task, I prefer the a stand-alone workstation, especially the Yamaha AW1600 (\$999) personal digital studio, a portable unit that records 16 tracks at 24-bit resolution. A Quik-Lok QL-400 mixer stand (\$12999) will also be key.

Sound design will probably be on my menu, and for that I’ve found that the Line 6 PODxt Live (\$39999) delivers great, real-time, sound-twisting capabilities via the large, assignable pedal; plus, it’s a great amp simulator for my guitarist friends. Assuming they love live looping as much as I do, the new Boss RC-50 Loop Station (\$49997) looks positively lustful.

Time for mics! With a Soundelux U195 (\$1,080.97) and the venerable Shure SM57 (\$9997), I’m covered for 99 percent of the vocal and guitar recording situations, although this collection will continue to grow quickly.

Obviously, if I can’t hear all this correctly, what’s the point? The active JBL LSR4328P Pak (\$1399.97/pair) comes bundled with a measurement mic that allows the units to calibrate to the room. Along with the powered JBL LSR4312SP subwoofer (\$899.97), I’ll get full range and a solid upgrade path to surround when I get that first 5.1 job.

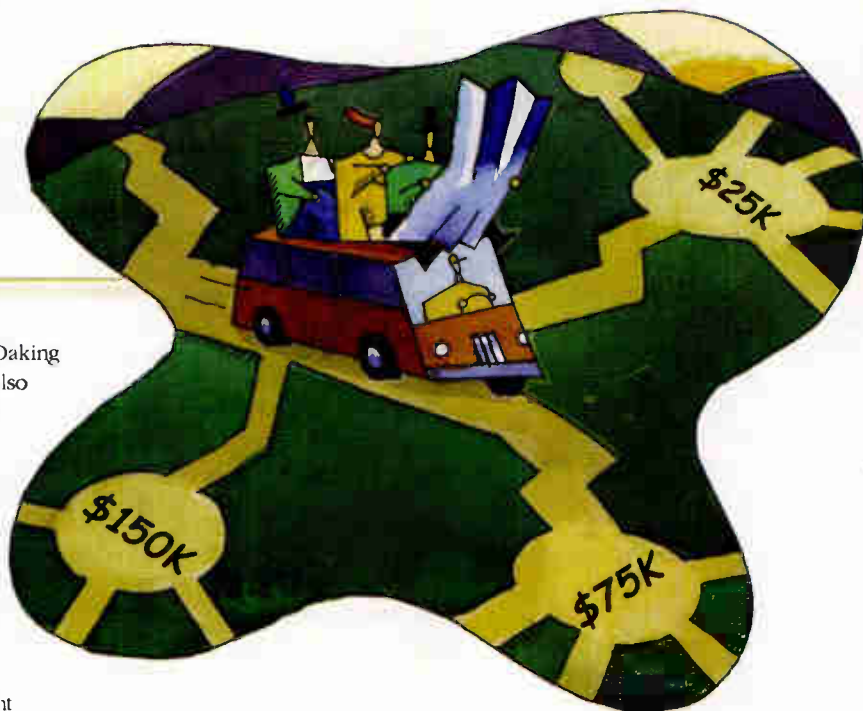
DON'T FORGET

Let’s not leave out the ergo-friendly furniture. The Raxxess ACD-30-45M (\$29997) is angled and configurable for future add-ons. Anyone who hasn’t tried a knee chair in the studio should: The Jobri Ergonomic Knee Chair (\$199.99) could save your back and butt in the long haul.

Talking about saving your butt, I believe that business-class remote online storage of all my precious music data is a must. A search for “remote data storage” sites like www.ibackup.com revealed a year of automatic 100GB backup for about \$1,000—a bargain for true peace of mind.

The total to this point is \$23,960.16, leaving me exactly enough headroom for \$1,000 worth of cables and unexpected items, plus two boxes of smelling salts (\$2.77 apiece) for reviving me when I walk into this beautiful room and find it waiting just for me.

—David Weiss



THE \$75K MIX ROOM

When I first started this feature, I thought it would be hard to put together a “dream” mix system for just \$75,000, but I was shocked at how much esoteric gear I could fit into a budget that was at one time what you’d pay for a single 24-track analog 2-inch machine. In my case, the “assumed” computer is a beefy Dual or Quad Core Mac G5 that supports a Pro Tools HD system and has plenty of RAM. However, to make my system sound as individual as possible, I’m leaning toward the boutique side of things with a lot of creative options outside the box.

THE SYSTEM

I’ll start with the basic Pro Tools HD3 Accel system (\$13,995) and some I/O. I opted for a single 192 I/O interface (\$3,995) and an Apogee DA-16X (\$3,495). The Apogee unit not only gives me a different flavor of conversion to send to the outside world, but I get the Big Ben C777 clock as a bonus and save \$500 toward a second 192 I/O. Besides, this is a mixing room and I don’t need to pay for the additional inputs I’d get if I simply went for a second Digidesign I/O box. The 192 I/O gives me eight analog outs, plus eight channels of AES/EBU and a S/PDIF output, all separately addressable. If I want to expand later, I can buy an extra eight inputs or outputs for less than \$1,000 with an optional card, in either digital or analog formats.

I will monitor through the new M&K 1611P near-field monitors (\$1,399 each); they offer a lot of bottom end and the image carries the typical razor-sharp M&K signature. To feed the M&Ks and give me control, I’ll use the new Dangerous Music ST monitor controller (\$1,899). It offers analog stepped-attenuator volume control, four input sources and three speaker outputs, should I decide to expand to mid-fields, programmable input gain offsets and assignable subwoofer outputs.

INSIDE AND OUTSIDE JOB(S)

I am in DAW land, so I'll need some plug-ins. A lot of free stuff comes with my Pro Tools HD3 purchase (see the list at www.mixonline.com); I'm also going to pack my system with some other great options. For starters, so I'm not taxing the system, I'm going to purchase a Waves APA44-M audio processing accelerator (\$2,400). This will keep my system running smoothly and give me lots of DSP headroom. This box only runs Waves plug-ins, so I'll buy the Waves Diamond Bundle (\$7,000) to give me a great list of options. I'll also get the Massenburg Design Works 5-band EQ plug-in (\$795) and the SoundToys TDM effects bundle (\$1,195), which includes nine plug-ins (EchoBoy, SoundBlender, FilterFreak, PhaseMistress, PurePitch, Speed, PitchDoctor, Tremolator and Crystallizer). I'll add Antares' Auto-Tune 4 (\$399) and Celemony's Melodyne Studio (\$699), and throw in the versatile Drumagog drum-replacement plug-in (\$249). For reverb, I'll get the Altiverb RTAS Convolution Reverb (\$595), plus the Princeton Digital 2016 Reverb (\$2,245) hooked up through the S/PDIF I/O of my 192 I/O.

For fader control, the CM Labs MotorMix 2 (\$1,849) will give me the ability to grab some real faders during the mix. To keep everything quiet in the room, I'm going to put the computer and other noisy gear inside the Noren AcoustiLock vCAB 16-rackspace unit noise-reduction enclosure (\$2,787).

Clean power lowers your noise floor and makes it easier to hear fine detail. I'm using two Shunyata Hydra Model-8 power conditioners (\$1,995 each), offering a total of 16 analog and 16 digital AC power taps for my system. I've thrown in 16 Shunyata Venom Power Chords (\$99 each). The Hydra provides 2,400 watts at 20 amps of clean power, plus 60,000 amps of surge protection.

I'll also need to sum back to the analog domain and do some processing, so I've chosen an SPL Mixdream summing box (\$3,795), which offers 16x2 summing through Lundahl LL1539 transformers and some additional dynamics processing. I'll also add a Tube-Tech SMC-2B multiband compressor (\$4,995) to put one last tube touch on the signal. The Tube-Tech splits the signal into low, mid and high bands, giving me the ability to compress each to taste and then mix the three outputs.

For that last mastering touch, a GML 8200 4-band parametric EQ (\$5,000) is pulling triple-duty. If I don't use it across the final 2-mix as a mastering EQ, I can use it to beef up the kick and snare drum across an insert on the SPL Mixdream, or use it inside the box by employing Waves Q-Clone (\$1,000). This lets me use a convolution-

based version of this studio classic as much as I want. For some extra punch across the kick and snare, I've got two Empirical Labs EL8 Distressors (\$1,500 each).

To store the mix, the Benchmark ADC-1 192kHz/24-bit stereo A/D converter (\$1,775) gives me an excellent way to get into the Tascam DV-RA1000 DSD master recorder (\$1,499). The Tascam records directly to DVD+RW and CD-R/RW media; offers a USB 2 connection to a PC for use as a DVD data drive; has balanced AES/EBU I/O; balanced XLR and unbalanced RCA I/O; word sync I/O (Big Ben, here we come!); RS-232C serial control; and SDIF-3 DSD I/O for external conversion and processing of DSD audio. To get back to my monitor section, I'm using a Benchmark DAC-1 192/24 stereo D/A converter (\$995). This can be sent back to Pro Tools via the AES/EBU inputs on the 192 I/O for archival possibilities or remix options. Sometimes that extra dB of vocal is easiest to get by taking your 2-mix back into the box and just adding a bit more on another channel, after first lining it up with sample accuracy.

I've priced this system out at full retail, so I've used this cushion to pay for interconnects such as XLRs, RCAs, etc. With all the boutique options I've built into my dream room, I guarantee it will sound sweet.

—Kevin Becka

\$150K TRACKING STUDIO

Like Becka's fantasy mix room, there will be no console in my fantasy tracking studio. I'll center it on outboard recording chains—classic mic preamps, EQs and compressors that define the recorded sound.

MODERN CONTROL ROOM

The principal modern touches here are a DAW, storage and UPS. I'd start with Pro Tools HD3 Accel PCIe (\$14,000) running on a 3GHz Mac Pro with two Dual-Core Intel Xeon "Woodcrest" microprocessors, 6 GB of RAM, a 30-inch Cinema HD monitor, two extra Maxtor 500GB internal archive drives and Digidesign Custom Qwerty keyboard with color-coded Pro Tools shortcut keys.

Because I'm not doing final mixes, I'm only interested in a couple of pieces of extra software beyond the suite that comes with Pro Tools. To be a full-service tracking room, the ability to supply universal audio and session files to outside studios is key. I'll do this with the Digidesign DigiTranslator 2 (\$495). DigiTranslator 2 delivers reliable, accurate conversion and exchange of OMF, AAF and MXF audio files, video files and sequences directly from Pro Tools. Another useful piece of software is Digidesign's new X-Form (\$495) AudioSuite™ plug-in for time stretch-

ing and formant-correct pitch shifting.

For power line integrity, the Furman SB1000 UPS/Line Regulator provides up to 1,000VA or 600W of stabilized power—even during brownout or serious over/under-voltage condition—and provides three minutes of backup time. This will be the best \$630 you'll ever spend if it keeps your session "alive" just one time during a major outage.

I want to record at least 24 tracks simultaneously, so I'd get three Mytek 8X192 AD/DA I/O boxes (\$3,945 each) and Pro Tools interface cards at \$795 each). The Mytek uses 64x oversampling (128x at 44.1/48 kHz) for 24-bit PCM audio out to a 192kHz sampling rate. The newest low-jitter chip technology used by Mytek precludes buying an external clock. The 8-channel units have an integrated master clock with six outputs, and 16x2 analog summing stereo bus built in with a master-quality 1dB per-step attenuator.

Tracking sessions consume vast amounts of hard drive space, and running out of room is unacceptable. For storage, I'd go with Studio Network Solutions' 2,000GB globalSAN™ X-4 2TB RAID 5 storage system with Gigabit Ethernet (\$7,000). At 1 Gigabit/second, the X-4 offers more bandwidth than the fastest USB or FireWire systems available.

A rock band coming into the control room from the studio after spending hours tracking on loud headphones are going to want to hear playback at concert level. Let's rock at any volume level with the ADAM S2.5 powered monitors (\$4,250/pair) and a Sub 12 subwoofer (\$1,749). For stands, I'll use the Sound Anchors Adjustables (\$450/pair).

For tracking, I monitor off the stereo bus in Pro Tools—I derive all my headphone mixes there and, of course, each new song's mix and particular headphone balance is stored in the session file. I like monitoring Pro Tools in the control room using a Crane Song Avocet Class-A monitoring controller (\$2,800). The Avocet has switching for three different monitor speakers, three +4dBm analog inputs and three digital inputs. With its own mastering quality, up-sampled 192kHz D/A converter, all incoming digital audio sources (Pro Tools mix bus, CDs, DATs, Internet audio) can be precisely compared in terms of apparent loudness, spectral balance and dynamic processing.

RECORDING CHAINS

DAWs, computers and OS software may come and go, but the timeless constant you'll always find in any worthwhile recording studio control room is a collection of great analog outboard gear. My fantasy analog processing is divided into two outboard racks: American and English.

For me, API is the epitome of the "Ameri-

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can" solid-state sound. I like the punchy sound of API's Class-A/B amplifier blocks, especially for drums and bass. Starting with the API 500VPR 10-slot rack with power supply (\$949), there would be room for four 512C microphone preamps (\$795 each), two 560 Graphic EQs (\$795 each)—which are best for kicks and snare drums—two 550B 4-band EQs (\$1,195 each) and two 550A 3-band classic EQs (\$1,695 each), both great for everything else.

Big-sounding and all-American, Manley Laboratories' Mic/EQ 500 combo single-channel mic preamp and passive high/low-EQ unit (\$2,900) was conceived for recording vocals, acoustic and electric gui-

tars, and even orchestral primary mics. I like them for vocals, drum overheads or any orchestral instrument.

GT Electronics' Vipre (\$3,499) is a variable-impedance all-tube mic preamp that sounds huge on everything—especially vocals, guitars and drums—and is the ticket for impedance-sensitive ribbon mics. I will buy a pair of these.

For smooth overall tube equalization for vocals or keyboards, I'd spec two Mercury Recording Equipment EQ-H1s (\$1,795 each). The EQ-H1 is based on the famed American Pultec EQ and has a transformer-balanced I/O, with a single-ended gain makeup amplifier. No tracking studio would be complete

without a pair of good compressors. I'll start with two Universal Audio 1176LNs (\$1,995 each)—the classic FET peak limiter. Representing the British are the reissued AMS Neve 1073 modules (\$3,750; I'll buy four units)—classic Class-A units. To match the American rack, there should be four channels that are great for anything, but especially electric guitars, vocals and drums.

I couldn't get by without a Trident S80 Producer Box with two channels of Trident Series 80 modules (\$3,933 for two channels). I love them for their hard, "in-your-face" sound. The Brit rack continues with four channels of Helios 1r Twin-Type 69 Mic Pre/EQ in a "lunchbox" (\$6,950). They're great for hyped-sounding vocals and guitars.

Lastly, the EMI Studios sound is represented by Chandler Limited's TG Channel MKII Abbey Road Special Edition unit (\$2,350). These Class-A/B amplifiers with EQ were used for The Beatles' *Abbey Road* album, Pink Floyd's *Dark Side of the Moon* and others. For English compression, I'd like to have a pair of vintage Neve 2264E compressors (\$3,500 each). These are the coolest-sounding units on drums and guitars—a little squashy and just full of vibe.

Finally, a pair of Tube-Tech CL1B compressors (\$2,500 each) will sound very clean under huge reductions—it's my fave tube unit for vocals, bass guitar, and electrical and acoustical guitars.

OUT IN THE STUDIO

In the recording area, the headphone system has to be loud, clean and mix-flexible. Mytek Technologies' all-analog Private Q 12-channel headphone distribution system comprises a distribution/power supply rack (\$995), five satellite mixing stations (\$695 each) and snap-on DL-DL cables. The mixing stations mount easily on a mic or music stand, and deliver 2x 30W Class-A sound. Lastly, I'll take five sets of AKG K 271 headphones (\$284 each).

For starting my mic collection, I've picked a few great units that deliver consistently excellent results: a Sennheiser e901 boundary mic (\$389) and e902 dynamic (\$359); two Shure SM57s (\$316 each); three Sennheiser MD421 II dynamic mics (\$1,530 each); a Neumann KM 185 hypercardioid (\$949); a DPA 3532-T stereo microphone kit (\$8,000); two Soundelux E250s (\$6,000 each); two Royer R-121 ribbon mics (\$1,898 each); and a Schemps CCM4 L ST100 stereo pair (\$3,416).

I still have a bit of money left, so I'm allotting \$4,000 for my patchbay, racks and wiring (granted, there's a lot of D.I.Y. here), and \$1,174 for miscellaneous accessories: cables, mic stands, DI boxes, and, of course, lava lamps and incense. —Barry Rudolph ■



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Microphone Preamplifier Technology

GOING INSIDE THE BOX

by Eddie Ciletti

There are preamps for every purpose and budget, some with “color” and some transparent. And while some designs may have similar origins, the fact is that a mic preamp can be built from tubes, transistors and ICs, with or without transformers, plus options like built-in converters, DSP, USB and FireWire. With that in mind, let’s pop the hood and explore the options.

THEORY OF RELATIVITY

Preamps need a wide range of gain to accommodate signal levels. Ribbon mics need the most gain, dynamics a little less and condenser mics need the least of all. Capturing a potentially small signal requires a low-source (output) impedance of 50 to 200 ohms, as well as sufficient current to drive a long cable and still arrive at the destination with more signal than noise. Impedance is resistance with a (frequency-sensitive) resonance component. The microphone expects to see a load 10 times its output impedance; not quite a “match” in a technical sense, but the goal is to preserve the signal’s level and integrity.

Tubes, transistors and op amps are active devices that can make gain happen. Voltage gain can also be passively accomplished via an input transformer—with the trade-off of decreased current. A transformer comprises two coils of wire: primary and secondary. Each coil has a number of “turns” (wire wrapped around an “iron” core). The two sets of wires don’t make an electrical connection, and yet the signal still passes between them. Science is cool!

In a tube preamp, it’s necessary to match the mic’s native low impedance (lo-Z) to the vacuum tube’s higher voltage level and very hi-Z high impedance (in the megohm range). At the preamp input, the transformer steps up the impedance and the signal level by a ratio that is physically accomplished by the number of turns. The ratio is dependent upon, and determined by, various characteristics of the active circuitry that follows. Optimizing the transformer’s ratio will minimize the noise. For example, the ratio can range from 1:2 (for the Analog Devices AD797 op amp) and up to 1:10 (for vacuum tubes). Beyond 1:10, the performance suffers, with the trade-off being a highly colored signal.

IN THE LOOP

The source of voltage gain can be a single tube or transistor. Devices are daisy-chained for more gain, the target being as high as 70 dB. Each voltage gain stage has a side effect of reversing the signal polarity. Once there is more gain than needed, a portion of the output signal can be mixed with the input signal in a process called negative feedback. This reduces gain with the added benefit of lowering distortion, improving bandwidth, raising the input impedance and lowering the output impedance. The more negative feedback, the less color a circuit will have.

Knowing how your gear behaves can help you get more from it. To “interrogate,” apply a sine wave to the input and increase the gain while either monitoring on a scope or capturing on a workstation. Make sure it is the preamp that’s overloading and not the destination (converter). Negative feedback circuits are less forgiving when overdriven and clip hard, while circuits without feedback can have a smoother transition before running out of headroom. Many vacuum tube output stages, such as preamps by Manley and D.W. Fearn, will overload differently when driving a bridging, hi-Z input vs. a lo-Z, 600-ohm device. That “difference” can be a color option.

VACUUM TUBE OR SOLID-STATE?

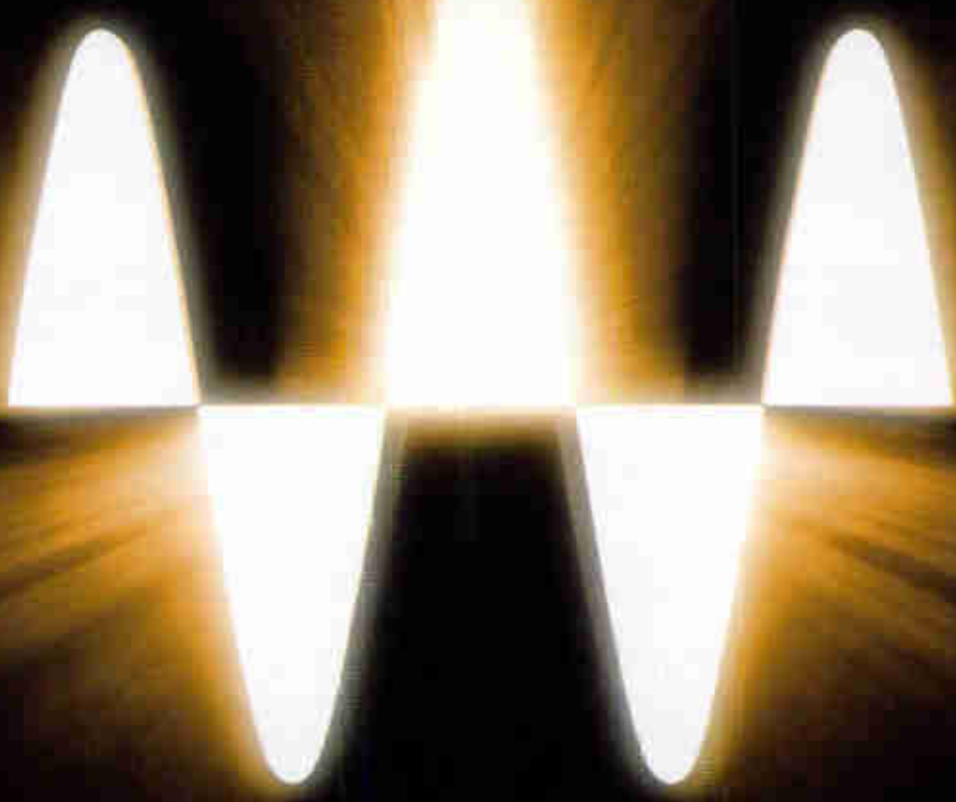
The answer might not be what you’d expect. It is possible for solid-state to emulate the Thermionic, simply by keeping the circuit simple and minimizing the feedback. The Neve 1066/1073 preamp and its clones (like the Great River) is a simple circuit made “clever” by its single-knob gain control: a rotary switch. There are three gain stages, the last of which is also the output amplifier. The input transformer and the first stage provide the initial voltage gain. As more gain is needed, the gain switch routes the output from the first stage into the second stage. The gain of each stage is tweaked along the way so each step is in 5dB increments.

Lacking an obvious pad, input attenuation is accomplished on the secondary side of the transformer and integrated into the gain switch. More often than not, the input pad, when user-accessible, is typically on the primary (mic) side of the transformer. The



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New Mic Preamps, at a Glance

Here's a look at nearly 50 new mic preamplifiers that have debuted or begun shipping in the past year. This chart focuses mainly on studio preamps rather than systems built into digital snakes, stage boxes for consoles and the many DAW front ends with built-in preamps, such as units from MOTU, Lexicon, Digidesign, TC Electronic, M-Audio and others. Also, unless otherwise noted, all include 48VDC phantom powering, input pads and polarity-reverse switches.

Product/Website	Retail	Channels	Outputs	Topology	DI	Signal Processing	Notes
A-Designs Pacifica www.adesignsaudio.com	\$1,995	Two	XLR analog	SS	Yes	No	Based on the sound of classic Quad-8 preamps with transformer I/Os
A-Designs MP-2A	\$2,700	Two	XLR analog	Tube	Yes	4 tone settings	Transformer I/Os; single-channel version available
AEA TRP (The Ribbon Pre) www.ribbonmics.com	\$835	Two	¼-inch/XLR analog	SS	Yes	HP filters	Designed for ribbon mics with 84 dB of gain and no phantom power
Aphex 230 Master Voice Channel www.aphex.com	\$799	One	XLR and ¼-inch analog; AES and S/PDIF digital	Hybrid	No	Parametric mid-EQ, Big Bottom and Aural Exciter enhancement	Transformerless transistor front end with tube second stage
Aphex 1788A	\$4,999	Eight	XLR; optional digital TDF/ADAT/AES	SS	No	Microphone output limiters	Controllable via MIDI, LAN, Mac/PC software, Pro Tools or hardware remote
API Audio A2D www.apiaudio.com	\$1,995	Two	XLR analog, S/PDIF and AES digital	SS	Yes	Onboard ADCs	Two Model 312 pre's and 24-bit, 44.1 to 192kHz ADCs with sync for running multiple units
ART Tube MP www.artproaudio.com	\$129	One	XLR and ¼-inch analog; USB digital	Tube	Yes	HP filter; FET limiter	
Buzz Audio ARC1.1 www.buzzaudio.com	\$3,500	One	XLR analog	SS	Yes	4-band EQ with parametric mids, compressor, limiter	TRS sidechain access
Buzz Audio elixir	\$895	One	XLR analog	SS	Yes		API rack-compatible module
Chameleon Labs 7602 www.chameleonlabs.com	\$699	One	XLR analog	SS	Yes	HP filter; 3-band EQ	\$100 separate power supply can power two 7602s
Chandler Germanium www.mercenary.com/chandler.html	\$1,150	One	XLR analog	SS	Yes	"Thick" LF rise switch; feedback control adds THD	Class-A, transformer balanced
D.W. Fearn VT-15 www.dwfearn.com	\$4,950	One	XLR analog	Tube	Yes	HP filters, 3-band EQ, compressor	
Focusrite ISA 430 MKII Producer Pack www.focusrite.com	\$2,995	One	XLR analog; AES, S/PDIF digital	SS	Yes	4-band EQ with parametric mids, Air band	Transformer-based with variable impedance
Grace m801 www.gracedesign.com	\$4,895	Eight	XLR analog	SS	No		Updated version of original 801
Groove Tubes SuPRE www.groovetubes.com	\$1,799	Two	XLR analog	Tube	Yes	Variable impedance-matching, HP filter	Custom nickel-core I/O transformers
Helios 1r Stereo Type 69 www.helios-electronics.com	\$4,500	Two	XLR analog	SS	No	3-band EQ	
JoeMeek oneQ www.joemeek.com	\$799	One	XLR analog; AES, S/PDIF digital	SS	Yes	3-band EQ, enhancer, opto-compressor, de-esser	
JoeMeek twinQ	\$999	Two	XLR analog; AES, S/PDIF digital	SS	Yes	3-band EQ, opto-compressor	"Iron" transformer in/out switch
LaChapell Audio 992 www.lachapellaudio.com	\$3,495	Two	XLR analog	Tube	Yes		Transformerless and extended gain version also available
Lipinski L-409 www.lipinskisound.com	\$1,095	One	XLR analog	SS	No	Multiple outputs fed from different transformers	
Little Labs LMNOPRE www.littlelabs.com	\$1,680	One	XLR analog	SS	Yes	LF resonance control for countering proximity effect	Output transformer bypass switch
Mackie Onyx 800R www.mackie.com	\$1,299	Eight	D-sub 25 analog; AES, S/PDIF, ADAT digital	SS	Yes	HP filters; onboard 24/192 ADCs	

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World Radio History

Product/Website	Retail	Channels	Outputs	Topology	DI	Signal Processing	Notes
Manley TNT (Tubes-No Tubes) www.manleylabs.com	\$3,000	Two	XLR analog	Tube/SS	Yes	HP filter, impedance matching, "color" switch	One tube and one vintage-style solid-state preamp in one rack for studio versatility
Matrix Audio Systems T0-2 www.matrixaudiosystems.net	\$1,495	Two	XLR analog	SS	No		No IC, all-discrete op amp design with transformer I/Os; also available as TD-1 with electrically balanced out.
Mercury Grand Pre www.mercuryrecordingequipment.com	\$2,000	Two	XLR analog	SS	Yes		Sowter transformer I/Os; also available in single-channel version
Mercury M72s/1	\$3,500	One	XLR analog	SS	Yes		Based on sound of vintage V72 modules
Millennia Media HV-3R www.mil-media.com	\$4,999	Eight	XLR analog	SS	No		Remote-control cable over Ethernet and MIDI; Pro Tools plug-and-play compatible
PreSonus DiglMax FS www.presonus.com	\$799	Eight	¼-inch TRS, Lightpipe (ADAT/96k SMUX)	SS	Yes		24-bit digital outs, analog direct outs and insert points on every channel
PreSonus ADL 600	\$2,295	Two	XLR analog	Tube	Yes	3-stage highpass filter switch	Anthony DeMaria design
Reso Audiotechnics Pre 873 www.axidistribution.com	\$1,995	Eight	D-sub 25 analog; digital optional	SS	No		Remote control via MIDI, front panel, software or via Pro Tools
RME Micstacy www.synthax.com	\$3,995	Eight	Analog TRS and D-sub; ADAT/AES digital; MADI optional	SS	Yes	Onboard 24/192 ADCs, analog/digital limiters	Remote control via MIDI or MADI, with storage/recall of all presets
Rupert Neve Portico 5032 www.rupertneve.com	\$1,895	One	XLR analog	SS	No	3-band EQ, sweepable HP filter	
Shadow Hills Industries GAMA www.shadowhillsindustries.com	\$4,995	Eight	XLR analog	SS	Yes	Steel/nickel transformer or transformerless outs	All-discrete, 24-volt op amp design
Solid State Logic XLogic Channel www.solid-state-logic.com	\$3,840	One	XLR analog (AES/EBU and S/PDIF optional)	SS	Yes	4-band EQ with parametric mids; SSL G/E switchable	Same preamp as SSL 9000 K Series consoles
Solid State Logic XLogic E Signature	\$4,040	One	XLR analog; optional 192kHz digital	SS	No	4-band EQ with parametric mids; Listen Mic comp., VCA dynamics	Variable Harmonic Drive circuit; recreates E Series console sound
Studio Projects SP828 www.studioprojects.com	\$799	Eight	¼-inch analog	SS	No		Stereo L/R output and headphone out
Studio Projects VTB-1	\$179	One	XLR and ¼-inch analog	Tube	Yes	HF filter; tube blend control	
Thermionic Culture Earlybird 2.2 www.thermioniculture.com	\$4,550	Two	XLR analog	Tube	No	Stereo Pullet passive EQ	Upgraded output transformers and selectable bass/mid-frequencies
Toft Audio Designs AFC-2 www.toftaudio.com	\$799	Two	XLR and ¼-inch analog	SS	Yes	Onboard 4-band EQs	
Tonelux/Genex Remote mic pre/A/D www.tonelux.com	N/A	48	D-sub 25 analog; optional AES/Lightpipe/MADI	SS	No	A/D converters	Modular system with up to 48 remote-controllable preamps with A/D in a four-rackspace case
Trident S40 www.tridentaudio.co.uk	\$2,500	One	XLR and ¼-inch analog	SS	Yes	4-band EQ; compressor/limiter	
True Systems PSOLO www.true-systems.com	\$749	One	XLR and ¼-inch analog	SS	Yes		
Universal Audio S0L0/110 www.uaudio.com	\$935	One	XLR analog	SS	Yes	Switchable HP filter	Class-A circuit from company's 8110
Universal Audio S0L0/610	\$935	One	XLR analog	Tube	Yes	Switchable HP filter	
Vintech Model 273 www.vintech-audio.com	\$2,600	Two	XLR analog	SS	Yes	2-band low/high shelving	1,200/300-ohm impedance matching
Wunder Audio PAF0UR www.wunderaudio.com	\$2,795	Four	XLR analog	SS	Yes		Custom I/O transformers
Wunder Audio PEQ1 Rev A	\$2,450	Two	XLR analog	SS	Yes		Custom I/O transformers

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THE NEW WAY OF BUSINESSSM

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Neve transformer can obviously take the level because it doesn't need an input pad.

AC/DC

Most of the time, we are only concerned with amplifying alternating current (AC) audio signals. But a circuit that amplifies beyond the subsonic and into the realm of direct current (DC) is called an operational amplifier or op amp. (Übergeeks, please don't be offended by this oversimplification.) Op amps were originally designed to perform arithmetic operations—part of an analog computer, hence their inherent need to be linear. Op amps, in both discrete and IC form, have the potential

to be the least colored (vintage IC op amps being excused from the competition).

Ever wonder why a mic gain pot makes a noisy thump when turned past 75-percent rotation (about the 2 o'clock position)? Most op amps are bipolar-powered—they run on ± 15 to 20 volts DC—so that the inputs and the output live right in the middle at a virtual zero volts. Large amounts of AC gain also increase the DC gain, nudging what was virtual zero into the micro- and milli-volt "error" range, creating what is called a DC offset.

DC on a switch or gain pot can make either sound "dirty" when engaged or rotated. Better op amp-based preamps (discrete

or IC) include a DC servo. This is a circuit that isolates the signal's DC component and mixes it back into the preamp—out-of-phase—so that it will cancel or self-correct the problem. If, for example, a +1-volt offset is at the output of the preamp, then applying it to the negative feedback node (the inverting input of an op amp) would produce a -1-volt offset at the output: $1 + (-1) = 0$. The John Hardy MPC-1 is one example of this implementation.

HEAD OF THE CLASS

Tube preamps are mostly Class-A, as are many solid-state preamps, such as those from Crane Song and Avalon. There are two types of Class-A: single-device a la Neve 1066/1073 and dual-device. Class-A means that the active device(s) are "on" and working through 100 percent of the signal cycle. Class-A/B, also dual-device, is more efficient, because each device does a little more than half the work.

The "issue" people have with Class-A/B is the potential for what can happen at the zero crossover point: One device shuts off as the other comes on. It's a low-level crossfade. Class-A is more popular among purists because there's no crossover distortion. Circuitry that is biased Class-A runs hotter than your garden-variety chili pepper, so pay attention to ventilation.

TRANSFORMER OR IRON-FREE

Transformerless preamps have existed since the mid-70s, back when transformers were being singled out (and removed) for detracting from the signal. For both transformers and transformerless (as well as digital technology), considerable design and component improvements have taken place since then. While there are some excellent transformers, generally speaking, transformerless preamps have the potential to be more transparent. Let's just say there's a preamp for everyone.

There are plenty of transformer-free, op amp-based preamps in affordable consoles and interfaces. They're okay if you don't ask them to work too hard, but rotate the gain past 75-percent rotation and performance will diminish. The obvious solution is to own multiflavor preamps to tackle any job. If you have a gain-challenged preamp, then compensate by using hotter mics or sources that are particularly hot (drums, guitars, screaming vocalists).

Both color and transparency have their place. Transparency is like the truth. Sometimes it's so revealing it can hurt, but what doesn't kill us makes us strive to understand and make things better. ■

Eddie Ciletti is Mix's "Tech's Files" columnist.

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*If you purchase any version of Auto-Tune 4 after September 15, 2006, you will be entitled to a free upgrade to Auto-Tune 5. See our web site for details.

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The 121st AES Convention

PUTTIN' THE PRO BACK IN PRO AUDIO

By the Mix Staff

After some drizzles and a wet start the first day, the 121st Convention of the Audio Engineering Society (www.aes.org) took off to become one of the best shows in years. In addition to the 400-plus exhibitors jammed into San Francisco's Moscone Center, convention chair John Strawn and his committee put on a brilliant event, with a great lineup of sessions, papers and technical tours. Exhibitors were pleased with the excellent turnout, both in numbers and in the quality of the attendees—with lots of serious users and fewer tire-kickers. Clearly, pro audio is back on track.

DAWS ALIVE!

Fairlight's (www.fairlightau.com) DREAM II may have changed all the rules of DAW/digital console design. The groundbreaking Crystal Core system used in DREAM II employs cutting-edge FPGA (Field-Programmable Gate Array) technology to redefine the price/performance ratio of digital production. A single CC-1 PCI card can handle 230 audio channels (each with eight bands of EQ and full dynamics control), 72 user-definable mix buses (mono to 7.1), 192-track recording, integrated HD video and up to 220 physical I/Os.

Digidesign (www.digidesign.com) previewed Pro Tools 7.3, a Universal Binary release featuring user-interface improvements such as savable window sets and upgraded looping functions. The new version also offers integration with Sibelius notation software, which was recently purchased by Digidesign.

Optimized for multi-core CPUs, Cakewalk's (

Cakewalk SONAR 6 Producer Edition is optimized for multi-core CPUs.

walk.com) SONAR 6 Producer Edition is a powerhouse, taking a giant step ahead of earlier versions, with a new Synth Rack, high-performance VC-64 Vintage Channel effects, AudioSnap timing correction, Active Controller Technology for seamless mapping of external devices and more.

Steinberg's (www.steinberg.net) Cubase 4 represents another significant upgrade. The focus here was on improving audio quality (32-bit floating-point audio engine) and making it easier to use with SoundFrame, which combines track presets, instrument tracks and the MediaBay database.

Synthax (www.synthax.com) was showing V. 9 of Magix Samplitude and Sequoia. New features include a video engine (Sequoia), hybrid audio engine, advanced dual-CPU support, track and score editors, and tons of effects improvements and additions.

CONSOLES

Available with 48, 72 and 96 faders, SSL's (www.solid-state-logic.com) Duality large-format analog console offers full DAW integration, a split signal path, E and G equalizers, onboard dynamics, moving fader automation and 5.1 panning—all with the SuperAnalogue K Series sound.

AMS-Neve (www.ams-neve.com) celebrated its 45th anniversary by launching the PS/1 PowerStation, a single-user, slim-line, 384-path version of the DFC Gemini post console. The PS/1 integrates with Pro Tools, Nuendo or Pyramix environments as a combined digital console/DAW controller.

Wunder Audio's (www.wunderaudio.com) Wunderbar is a 12 to 60- (or more) channel modular console design based on its popular PEQ1 preamp/EQ modules, with comprehensive metering and a full master section. An ingenious new summing bus lets users choose a Neve, API or Wunder-flavored output.

Rupert Neve has returned to console manufacturing. Of-



SSL managing director Antony David unveils Duality.



ferred in expandable 16/32/48/64-channel versions, the Model 5088 from Rupert Neve Designs (www.rupertneve.com) is a fully discrete, 8-bus mixer with 135 dB of dynamic range.

The Tascam (www.tascam.com) DM-4800 64-channel digital console has 24 buses, 12 auxes and 24 studio-grade preamps (more can be added via expansion cards), and can be completely repatched at the flick of a switch.

Yamaha (www.yamahaproaudio.com) has a free upgrade shipping with its DM2000 consoles, now monickered the DM2000VCM. It includes a suite of five plug-ins that emulate legacy processors and more.

Universal Audio (www.uaudio.com) has partnered with Euphonix founders Scott and Rob Silfvast to design UA's Desktop Console System (DCS) family of DAW "expansion and enhancement" products. The first two products in the DCS Series are the Remote Preamp, featuring two trans-impedance-type mic preamps, a headphone amp with reverb and EQ (for monitoring only), plus MS decoder; and the Monitor Master, which provides input switching and other monitor functions. These units combine a base station with a remote that keeps controls within reach.

Frontier Design Group (www.frontierdesign.com) turned heads with its new AlphaTrack fader/DAW controller. This \$249 USB bus-powered desktop control surface has transport keys, jog/shuttle, a motorized fader and touch-sensitive encoders. It's XP and OS-compatible for Pro Tools, SONAR, Cubase, Reason, Digital Performer, Nuendo and other apps.



Universal Audio DCS

STUDIO MICS

New mics just keep coming. Designed for Podcasting, RØDE's (www.rodemic.com) Podcaster end-address dynamic has a USB output, tailored-for-voice response and built-in headphone amp for monitoring. Another new USB design, the \$149.95 MXL006 from MXL Microphones (www.mxlms.com) is a cardioid mic large-diaphragm condenser capsule. SE Electronics (www.seelectronics.com) showed a clever dual-output condenser mic that works via an XLR or through a USB port that powers the mic and connects to your DAW. It also has a headphone out with a knob that lets users choose the direct vs. mix output to the cans for zero latency monitoring.

The David Royer-designed MA-200 large-diaphragm condenser mic from Mojave Audio (www.mojaveaudio.com) uses Jensen transformers and JAN 5840 tubes for an airy top end. And Mojave's MA-100 small-diaphragm tube mic is \$995, including cardioid and omni heads. Based on the famed M49, Wunder's CM49 multipattern tube mic comes with the original AC701K tube and M7 capsule. The power supply on Chameleon Labs' (www.chameleonlabs.com) TS-2 can alter the capsule voltage, letting users tweak the mic's sonic characteristics. Chameleon also debuted the TS-1 small-capsule tube mic, which accepts AKG 451E capsules and pads.

API (www.apiaudio.com) showed the Swedish-made Ehrlurd tube mic, which has a unique triangular capsule.

Crowley and Tripp's (www.soundwaveresearch.com) \$745 Naked Eye ribbon mic features a bright-side/dark-side design for choosing the color of your recording by simply rotating the mic. Inspired by the RCA BK5, the Telefunken (www.telefunkenusa.com) RM-5C *cardioid* ribbon mic has a 30 to 18k Hz bandwidth and a sweet spot that hugs the mic—perfect for up close work.

Telefunken's new CM 7151 mic is based on the historic R.F.T. bottle mic and comes with a NOS Telefunken EF12 tube and a new M7 interchangeable capsule, and accepts Neumann M7/M8/M9 heads and newer lollipop capsules from BLUE and JZ/Violet. Red Microphones' (www.redmicrophones.com) new Type A tube mic lets users attach a variety of Red capsules along with compatible capsules from BLUE. KorbyAudio (www.korbyaudio.com) showed a dual-tube, bottle mic amplifier with a line-level output that works with its KAT Series interchangeable capsules.

A new grid for DPA's (www.dpamicrophones.com) 4003, 4006, 4051, 4052 and 4053 mics alters frequency response, making the mics more versatile than ever. Charter Oak Acoustic Devices (www.charteroakacousticdevices.com) has a program where mic owners can have their mics customized post-purchase, tailored for specific recording situations. It's "up periscope" with Earthworks' (www.earthworksaudio.com) new P30 C and P30HC periscope mics. The frequency

MIX CERTIFIED HITS

AES' TOP 10 AUDIO PRODUCTS

- Beyer Headzone
- Cakewalk SONAR 6
- Fairlight DREAM II
- Korg MR-1000
- Rupert Neve Designs 5088
- Solid State Logic Duality
- Steinberg Cubase 4
- Universal Audio DCS
- Wunder Audio Wunderbar
- Yamaha DSP 5D

response spans from 30 to 30k Hz, and a mini-gooseneck design lets them tuck into the tightest spots.

Surround miking was big. Holophone (www.holophone.com) showed its entire line of 5.1 mics. Schoeps' (www.reddingaudio.com) MDMS U passive matrix box for double M/S recording can create a direct LCRS or 5 surround output using only three mics. The SoundField DSF-2 (www.soundfield.com) features all the things that made the company popular with broadcast and post users, along with a digital output that enables long cable runs. Sanken's (www.plus24.net) WMS-5 sur-

round M/S mic has five outputs (L, C, R, Ls, Rs), with the matrix circuitry contained within its 8.3-ounce mic body. Core Sound (www.core-sound.com) announced TetraMic, a less-than-\$1,000 miniature surround mic.

Zaxcom (www.zaxcom.com) showed two handheld mics: The ZFR800 has on-board recording to removable Mini-SD memory; and the TRX800 combines the same Mini-SD recorder with a wireless transmitter for fail-safe backup in live or live-to-tape production. Both mic bodies accept screw-on heads from Shure or Neumann.

Listening to mics at a tradeshow is

IN MEMORY: DON PEARSON



The TEC Awards ceremony included a brief tribute to audio luminaries who died during 2006 and Ultra Sound founder Don Pearson was inadvertently omitted from the presentation. *Mix* regrets this error. Pearson, who passed away last January, was an educator/innovator/live mixer extraordinaire and will not soon be forgotten.

AFFORDABLE HIGH QUALITY PORTABLE MIXING



Introducing the new MX422 Field Mixer from Rolls Corporation. Designed for the professional broadcast market but affordable enough for the individual home enthusiast, the MX422 offers the features and benefits of portable ENG type mixers costing four times as much.

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- Switchable 1 kHz setup Tone
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- Canvas case included
- Rolls PS27 external power supply included

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usually pointless, but to spotlight its KMD small-diaphragm digital mic system, Neumann (www.neumannusa.com) mounted two KMD cardioids in a glass case with a music box mechanism. Even over headphones, you could tell the KMDs handled the transients of the pinging tines with no problem and captured all the harmonics and decay. Nice!

ANALOG ROCKS!

There was some activity in digital out-board gear, but the main push at AES was analog, particularly from smaller boutique companies. D.W. Fearn (www.dwfearn.com) showed the VT-15, (\$4,950) a mono, all-tube mic preamp/DI/compressor/LC equalizer in a single box. A hip switch can instantly reverse the order of the EQ and comp in the chain. Manley Labs' (www.manleylabs.com) \$3,000 TNT puts two preamps—one tube and one discrete solid-state design inspired by vintage British consoles—in a single unit, offering user more flavors from which to choose when tracking.

Chandler (www.chandlerlimited.com) exhibited some Beatle love with its EMI Curve Bender stereo EQ and stereo EMI TG12413 Zener Limiter. Issued in celebration of the 75th birthday of Abbey Road Studios, the four-rackspace units will be \$4,500 each.

John Oram (www.oram.co.uk) and David Manley Design-Paris announced a new Oram by DMD-Paris line of co-branded, high-end tube products. The line includes the MMPEQ1 mono preamp with 4-band EQ; SMP1 dual-channel pre with DI inputs; and the MVCMP1 mono vintage compressor with mic/line preamp.

DON'T TAKE OUR WORD FOR IT...

Here is what the PRO'S are saying about the latest microphone from **MXL:**

The **MXL V69M Mogami Edition** large diaphragm, Tube microphone, has a classic sound that will enhance vocal and instrument performances in any recording environment. The extremely low noise FET output circuitry, wide dynamic range and warm, airy, tube sound makes the V69M a perfect complement to all analog and digital recording devices. The MXL V69M comes housed in a deluxe flight case with a pop filter, shock mount, and dedicated power supply. The V69M is internally wired with Mogami cable and is supplied with Mogami Tube and low-noise studio microphone cables. All at a price that's unbelievable! Audition one today at your local music or pro-audio retailer. You will not believe your ears.

"It was detailed throughout the frequency spectrum, and from a near-whisper to a wail, the V69 caught every nuance. The Marshall MXL V69 Mogami edition is an excellent microphone, and when you factor in the low, low price, the price performance becomes downright amazing."

Scott Burgess, Pro Audio Review

"So, we tested the V69 against - count 'em - 11 other popular condensers, ranging in price from \$169 to \$5,000 list... both the engineer/producer and the singer picked the V69 over the other 11 mics. None of them had the same combination of classic tube warmth and top-end air of the V69."

Fett, Songwriter Magazine

"If you're looking for a mic that performs like it costs a bunch more, give the V69 a very close look. You'll be thrilled at how little money you have to shell out, and you'll be even happier at how well it does it's job."

Mitch Gallagher, Editor Eq Magazine

"Soundwise, I was very impressed that the V69 could hold its own against an industry standard like the U47. It struck me as very versatile and of higher quality than other budget tube condensers."

Pete Weiss, Tape Op Magazine



Tel.: (310) 333-0606
Toll Free: (800) 800-6608
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PLUG-INS

Got plugs? In what is the biggest audio software bundle of all time, Waves' (www.waves.com) new Mercury Collection offers 91 processors and more than 200 component plug-ins. In addition to nearly the entire Waves catalog (the SSL Series is not included), Mercury includes Waves' new V Series emulation of vintage EQ and comp/limiters and adds MaxxVolume, a new dynamics processor.

The buzz over at McDSP (www.mcdsp.com) was the ML4000 limiter plug-in. Available in single and multiband configurations, the app features a multiple-stage brickwall limiter with continuous knee control. The multiband version has a 4-band gate, expander and compressor fed into the same limiter algorithm found in the single band.

TC Electronic's (www.tcelectronic.com) Unwrap mastering and up-converter algorithm will soon be available as a PowerCore VST or Pro Tools HD Accel plug-in. Originally developed for the company's flagship System 6000, the app provides fast stereo-to-5.1 up-conversion when there is no time to do a conventional 5.1 mix or when multitrack source material is non-existent.

The Fraunhofer Institute (www.fraunhofer.de) demo'ed its new MPEG surround technology. It's not quite a product as yet, but when it is, it will be impressive. Stay tuned.

STUDIO ESSENTIALS

Korg (www.korg.com/mr) showed two portable, pro high-res stereo recorders. The pocket MR-1 handles 1-bit/2.8MHz recording/playback; the tabletop MR-1000 delivers up to 1-bit/5.6MHz—double that of DSD standards. Both decks have balanced mic and line inputs and support DSDIFF, DSF and WSD 1-bit formats and multibit PCM format (BWF) up to 24-bit/192kHz. Included Mac/PC software can convert 1-bit recordings into WAV and AIFF formats at various bit rates and vice versa.

Tascam's (www.tascam.com) DV-RA1000HD stereo master recorder provides a pro solution for capturing high-res audio to DVD or hard disk at up to 192kHz/24-bit PCM formats or Direct Stream Digital audio. It has a 60GB hard drive, so projects can be recorded and then burned to CD or DVD.

Headzone from beyerdynamic (www.beyerdynamic.com) provides realistic 5.1 surround reproduction from stereo headphones. Also, an ultrasonic head-tracking system locates the orientation of the listener's head with respect to the source material and adjusts the audio accordingly.

Designed for the wide bandwidth of DSD and high-sampling PCM recordings, Sony's (www.sony.com/professional)

MDR-7509HD headphones feature "Auro-nomic" circumaural drivers that eliminate pressure on the ear during extended use. They were comfortable, sounded great and sealed out the buzzing AES floor.

Alter Media was showing Studio Suite 8 (www.studiosuite.com), which runs on FileMaker 8/8.5 and shows off a leaner and meaner user interface, plus new features such as dashboard overviews, 12 levels of security and e-mailing directly from the app.

Glyph (www.glyphtech.com) was packing them in the booth with its new line of FireWire 800 products. The 800 units feature SATA drives, which are said to offer 10 to 15-percent track count improvement in a DAW environment.

At Vintage King's booth, we finally got a peek at Barefoot Sound's (www.barefoot-sound.com) MicroMain27 monitor, which "breaks down the barriers between near-field, mastering and main monitors" with its combination 1-inch soft-dome tweeter, dual 5-inch mid-bass drivers and dual 10-inch subs housed in a single enclosure.

Noted studio designer Chris Pelonis

(www.pelonissound.com) demo'ed his amazing Pelonis Signature Series PSS110P studio monitors. The stereo or surround systems are based on custom 10-inch Tannoy coaxial drivers and have the most serious passive crossover design we've seen—or heard. A subwoofer is optional.

Hosa (www.hosatech.com) debuted its Session Series digital near-fields, with digital domain bi-amplification and USB and RS-232 inputs for remote PC control of volume and 6-band EQ. Retail is \$899/pair.

Digital Audio Denmark (www.digital-audio.dk) has upped the bar on sample rates with its AX24 DXD ADC/DAC box. The unit is scaleable with a mic pre option and several I/O options. Everything is sampled at 5.6 MHz/5-bit (!) and then downsampled to 44.1/48/88.2/96/176.4/192/384 kHz, DSD and DXD (24-bit/352.8kHz).

LIVE SOUND HITS

The DSP 5D from Yamaha essentially puts the functionality of its acclaimed PM5D-RH digital console—less the control surface—into a rack unit that's controllable from your PM5D. Priced under \$30,000, a single DSP



2006 TEC AWARD WINNERS

OUTSTANDING TECHNICAL ACHIEVEMENT

ANCILLARY EQUIPMENT

Shure E4 Earphones

DIGITAL CONVERTER TECHNOLOGY

Digidesign Mbox2

MIC PREAMPLIFIER TECHNOLOGY

Neve 1073 DPD

MIC TECHNOLOGY/SOUND REINFORCEMENT

Groove Tubes GT Convertible

MIC TECHNOLOGY/RECORDING

Neumann TLM 49

WIRELESS TECHNOLOGY

Shure UHF-R

SOUND REINFORCEMENT LOUSPEAKER TECHNOLOGY

JBL Professional VRX932LA

STUDIO MONITOR TECHNOLOGY

JBL LSR4300 Series

MUSICAL INSTRUMENT TECHNOLOGY

Vienna Symphonic Library Symphonic Cube

SIGNAL PROCESSING TECHNOLOGY/HARDWARE

Rupert Neve Portico 5042 Tape Emulator

SIGNAL PROCESSING TECHNOLOGY/SOFTWARE

Waves SSL 4000 Collection

WORKSTATION TECHNOLOGY

Digidesign Pro Tools 7

SOUND REINFORCEMENT CONSOLE TECHNOLOGY

Yamaha M7CL

SMALL FORMAT CONSOLE TECHNOLOGY

Digidesign D-Command

LARGE FORMAT CONSOLE TECHNOLOGY

Neve 88D

OUTSTANDING CREATIVE ACHIEVEMENT

TOUR SOUND PRODUCTION

Alison Krauss + Union Station, featuring Jerry Douglas

REMOTE PRODUCTION/RECORDING OR BROADCAST

Cream, Royal Albert Hall

Television Sound Production

24, Fox

FILM SOUND PRODUCTION

Walk the Line

STUDIO DESIGN PROJECT

Studio at the Palms, Las Vegas

SURROUND SOUND PRODUCTION

Brothers in Arms-20th Anniversary Edition, Dire Straits

RECORD PRODUCTION/SINGLE OR TRACK

"Feel Good Inc.," Demon Days, Gorillaz w/De La Soul, Virgin Records

RECORD PRODUCTION/ALBUM

Morph the Cat, Donald Fagen, Reprise Records

Ear Candy.



Two 312 discrete mic preamps
plus our new analog to digital converter.

The A²D from API.

It's a sight for sore ears.

www.apiaudio.com
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5D doubles the mixer's I/O channels, with 96 mono and 16 stereo channels accessible via four fader layers—or add a second DSP 5D for 144 mono/24 stereo capability. The DSP 5D can reside next to the host PM5D or act as a remote stage box (with all I/O accessible on the front panel) using an optional digital cabling unit for communication up to 120 meters away over standard Cat-5 cable.

Digidesign's (www.digidesign.com) D-Show Profile is a size-conscious alternative to the D-Show flagship console of the VENUE line. Intended for small to medium installs, D-Show Profile is compatible with all existing VENUE hardware and software, including existing stage and front-of-house racks for connecting to Pro Tools HD and LE systems via a hardware option. Waves Live Bundle provides 27 popular plug-ins for Digidesign's D-Show/VENUE console, including the L2 Ultramaximizer, C4 MultiBand and MaxxBass—all optimized for D-Show/D-Show Profile consoles.

The GL3800M analog monitor desk from Allen & Heath (www.allen-heath.com) offers up to 16 monitor mixes, has built-in mic splitting and a comprehensive, dual-output engineer's wedge/IEM monitoring system. It's available in 24/32/40-channel frame sizes,

and the 16 mixes can be globally assigned as mono or stereo.

Audio-Technica's (www.audio-technica.com) re-engineered Artist Series line of live mics adds new models and upgrades classics for a complete selection of vocal, instrument and drum mics. Priced at \$299, the Audix (www.audixusa.com) VX-5 electret condenser handheld vocal mic has a supercardioid polar pattern and bass roll-off filter. Neumann expands its handheld line with the KMS 104, a cardioid condenser providing optimal vocal transmission with suppression of sounds originating behind the mic.

The 64x64 Anaconda digital snake from Aphex (www.aphex.com) can be used stand-alone or paired with the company's 1788A preamp. Features include eight ADAT I/Os (64-channel bi-directional), eight word clock outputs, word clock reference input, Ethernet connector for control and metering, and fully redundant power supply and fiber systems.

MediaNumerics (www.medianumerics.com) premiered its RockNet system. Achieving low latency was a priority in creating this real-time, audio/data-distribution network. Products include the RN.301.M1 8-channel mic preamp/analog line input/ADC and the

RN.342.M7 16/48-channel digital I/O for the Yamaha M7CL board.

EAW's (www.eaw.com) UX8800 digital processor brings the company's Guinness Focusing to existing EAW loudspeaker systems. This DSP technology can correct the problems inherent in conventional compression-driver phase plugs, horns and LF drivers, allowing horn-loaded loudspeakers to deliver performance comparable to direct-radiating studio monitors, but at the higher output levels required in live sound.

Meyer Sound's (www.meyersound.com) Constellation™ electroacoustic architecture is a complete package of equipment and services provided exclusively by Meyer and centered around the company's VRAS™ technology. Constellation gives venues the flexibility to instantly alter their acoustics to accommodate a variety of events and source material. The first installation is at Zellerbach Auditorium on the UC Berkeley campus.

COMING UP

Next up is AES Vienna, May 5 to 8, 2007, followed by AES New York City from October 5 to 8, 2007. The jury is still out on a return to S.F. in 2008, but our (admittedly hometown-biased) vote goes to the City by the Bay. ■

RUPERT NEVE DESIGNS

The Signature of Excellence

The Portico 5033 Five Band EQ

We are proud to announce an all new EQ from the design bench of Mr. Rupert Neve, based on his traditional curves, with the sweetness, precision and musicality to please even the toughest critics.



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INTRODUCING
CRYSTAL CORE
TECHNOLOGY

The Media Platform
for the 21st Century



FAIRLIGHT

FAIRLIGHT CC-1 Media Technology Platform for the 21st Century

Despite the explosive demand for larger systems, better quality and lower cost, the professional audio industry is still struggling with two-decade-old DSP technology. **UNTIL NOW.....**

Groundbreaking application of FPGA technology obsoleting DSP and Host based processing systems.

Today Fairlight announces a breakthrough – a new stream of audio and video products built around its CC-1 (Crystal Core Technology). This fresh paradigm processes data in a massive Field Programmable Gate Array (FPGA), architected into a purpose-built media processing chip with staggering power and unrivalled performance. A single CC-1 card delivers more audio processing capabilities with much lower latency than systems deploying up to **64** of the industry's most powerful floating point DSP chips. With its inherent ultra-low latency and blinding speed, this new feature rich technology platform is set to completely revolutionize the professional audio industry.

Fairlight's CC-1 is a modern, media-optimized FPGA architecture. It aggregates IP cores resulting from 20+ man-years of Fairlight R&D, drawn from over 150+ man-years of experience as a digital audio pioneer. The result is a system with fast and precise tactile response, immense processing power, and sparkling audio quality when compared to any other available system. It delivers an immediate step change in performance, and forms the development platform for an entire suite of new and futuristic creative applications.

DREAM II (Digital Recording Editing And Mixing) supporting expansion, diversity and emerging standards.

Fairlight is introducing the CC-1 card with a PC host as the revolutionary **new** processing engine behind its DREAM II Family, which includes the popular SatelliteAV, Station, Constellation-XT, HD Factory and Anthem products. With the new SX-20 and SX-48 remote I/O boxes, Fairlight offers a wide choice of affordable high quality audio convertors to compliment each DREAM II system. DREAM II products deliver up to 230 audio channels. Every channel is equipped with eight bands of parametric EQ, three stages of dynamics processing, floating insert point with return, 12 Auxiliary sends, comprehensive monitoring facilities and access to 72 user definable mix busses. In addition there is an option for an onboard Video track in Standard and or High Definition.....all this from a **single** CC-1 card.

Guaranteed Performance delivering a "NEW digital standard"

Remember your last analog system? and how ALL the controls actually worked? Manufacturers of digital systems, have for years been struggling to replicate true analog performance, instead they have managed to create a false virtue out of "flexibility" and "assignability". The frustration really begins when you suddenly run out of resources, and then "flexibility" changes to "agonizing choices over what to leave out". Time to shell out a few thousand more on yet another DSP card.

Fairlight has a new approach – **guaranteed performance**. Every channel ALWAYS has a complete set of available processing, parameters just like analog systems. Better yet, with 36-bit mixing and amazing 72-bit EQ, it actually sounds better than any other available technology.

WHY EVEN CONSIDER buying yet another expensive DSP card to squeeze more out of your old system when you can get guaranteed power with lower latency and full processing on every channel from Fairlight's new breakthrough platform. Take away the guess work. Relax in the knowledge that you will never again have to calculate your system's resources. Let the system work for you instead of the other way round.

What can be achieved with just ONE CC-1 card ?

- 230 Super Hi Resolution Audio Channels
- 8 fully parametric bands of EQ on EVERY channel
- 3 Stages of Dynamics on EVERY channel
- 72 User definable mix busses from Mono to 7.1
- 64 channel audio bridge for 3rd Party plug-ins
- Up to 220 physical I/Os per CC-1 card, Analog, Digital or MADI
- Integrated Video track in SD or HD format

Truly Open Platform

CC-1 goes even further with an integrated 192 track disk recorder and an SD/HD Video track integrated seamlessly into the recording and editing process. All tracks are on-line simultaneously for comprehensive waveform editing using the Binnacle system pioneered by Fairlight. File formats include support for OMF, BWAV, WAV, MP3, SD2, MXF, AIFF, AVI, XML, Fairlight MT and Quicktime to name a few, and with a fully integrated file transfer utility for AAF, Wiretap, Vegas Video, Open TL, AES31, PT5.0, DAR, DSPMedia, Bitmaps, Cineon and DPX Image Sequences, CC-1 is a truly open platform.

CC-1's mixing environment makes full use of the hardware power by allowing users to set up multiple busses of any format up to 7.1. These can be used for multi-stem work, for creating simultaneous reduction mixes in different formats, or both. The automation system, apart from controlling every single parameter on the DREAM console (over 70,000 of them) also uniquely allows fader levels to be offset between different mix formats.

Making sense of this complexity in the monitor speakers is simple work with an integrated monitor matrix. It allows instant choice of a multitude of monitoring sources and destination speaker sets, in any format from mono to 7.1.



CC-1 CRYSTAL CORE

Introducing the world's first FPGA-based audio acceleration platform

Over 200 channels, each with Mastering-Quality EQ and Dynamics

Automation of over 70,000 parameters including plug-ins

Less than 0.5mS latency with full processing

Lightning fast tactile response

Integrated 192 track disk recorder/editor

HD and SD video track with editing capabilities

Wide choice of I/Os in analog, digital and MADI

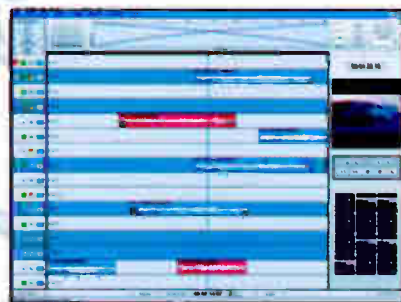
Hardware accelerated VST and Rewire support

Comprehensive Multi-format mixing capabilities

Comprehensive integrated monitoring matrix

Full support for collaborative workflow tools

Wide choice of tactile controllers



THE UPGRADE YOU'VE BEEN WAITING FOR...

DREAM II powered by CC-1: Go on - put your head above the crowd

If you are fed up with continuously upgrading your system to achieve the results you need, then move over to Fairlight because we've invented and delivered the alternative.

CC-1 delivers the step change in audio performance that you have been waiting for. With more channels, lower latency and guaranteed processing on every channel, CC-1 supersedes and out performs the entire stack of DSP cards that you have jammed in almost every available slot inside your computer frame.

One CC-1 card delivers more power than eight HD Accel™ cards. Not only that; CC-1 cards can be aggregated to form a potentially limitless processing engine. Imagine the future possibilities of that!

Utilizing 21st Century FPGA technology, CC-1 puts the power back in your hands freeing you from the limiting factors of those ubiquitous DSP and uninspired host based systems. Be better, and be more than ready for emerging standards including three dimensional audio, DXD audio formats and more.

In short, CC-1 has arrived in the world of multi-media creation delivering more power and more performance – and there's no going back!

So, if you're fed up of your current system delivering just a 'drop in the ocean' then move up to FPGA technology and discover how Fairlight's new CC-1 gives you the ocean - in a drop.

Call your local Fairlight representative NOW to see first hand what CC-1 can deliver

Ask for a demonstration and ask to register to WIN a new CC-1 engine



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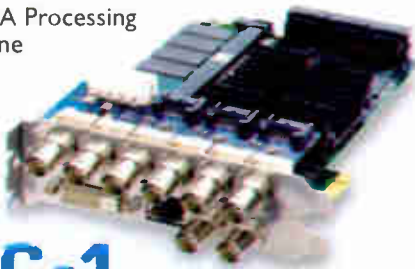
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For all other enquiries please visit www.fairlightau.com

DREAM II Engine Components

FPGA Processing Engine



CC-1

Fairlight's Revolutionary Crystal Core Engine is a PCIe card that is installed in any compliant host PC operating Windows XP. The CC-1 Engine forms the basis of a variety of powerful systems, from simple low-cost recording/editing platforms to massive large format consoles with integrated Hi Definition video. Since CC-1 runs on a standard Windows PC, the system plugs seamlessly into virtually any existing IT infrastructure. However, no other PC hosted system provides the power and dedicated performance of the CC-1 engine. CC-1's architecture allows multiple engines to be linked to form massive systems, providing a level of scalability that far exceeds any other competing system.

Sync and I/O Toolkit



SX-20

Fairlight's SX-20 is a versatile "Sync I/O Toolbox", and is a required component of any base CC-1 system. The SX-20 includes two Mic/Instrument preamps plus two additional balanced analog inputs, twelve balanced analog outputs, four digital inputs and eight digital outputs. In addition, SX-20 includes powerful simultaneous independent multi-machine 9-pin control, with Fairlight's industry leading precision and accuracy. If that isn't enough, SX-20 provides for Sync at any frame rate including HD Trilevel sync, Video Sync, Wordclock, AES and LTC. The unit also generates LTC at any standard rate. When combined with CC-1, SX-20 provides all the capabilities required for a wide variety of audio production and post production tasks.

Modular High Density Remote I/O



SX-48

Fairlight's SX-48 Signal Exchange extends the CC-1 platform with flexible and cost-effective I/O. Up to FOUR SX-48 units can be connected to a single CC-1 card via MAD1 providing up to 192 channels of discrete I/O per engine. SX-48 is designed to accommodate all standard sampling frequencies from 44.1kHz to 192 kHz. Fairlight's renowned I/O can be installed in eight channel modular blocks, allowing numerous combinations of up to six cards of analog and/or digital I/O to be mixed together in each SX-48 unit or added later if required. SX-48 locks to external Sync at any frame rate and accepts HD Trilevel sync, Video Sync, Wordclock or AES as references. Fairlight's Total Studio Connectivity Protocol (TSCP) allows intelligent management of all SX-48 I/O resources on the TSCP network.

A single CC-1 card delivers all the processing power required to deliver a complete family of fully featured large format mixing products. With 230 fully featured channels a multi format sub bus system with fold up and fold down, comprehensive monitor matrix and total automation of over 70,000 parameters, CC-1 is the power source for a complete new family of DREAM II products.

Fairlight's award winning Anthem Console



Dynamic Resolution Optimization (DRO)

As always, new technologies present new opportunities. Fairlight has used the programming flexibility of CC-1's FPGA chip to run different processes at different bit depths. This is called Dynamic Resolution Optimization (DRO).

Older DSP-based systems perform all processes end to end at a single resolution even if some processes would sound better with more resolution, or just as good with less. In Fairlight's Crystal Core system, each process is tailored exactly to its needs. With DRO, EQ processing can be performed at 72-bit floating point precision, creating the headroom needed for digital sound to finally achieve the quality missed from analog days. Mixing is performed with 36-bit floating point precision, giving a quality higher than any other system currently in the market. At the same time, metering functions warrant only 16-bit fixed point resolution, leaving more processing power available for other channels to use.

Dynamic Resolution Optimization (DRO) allows Fairlight engineers to choose the best processing for each system task. This not only ensures unsurpassed audio quality, but exponentially increases efficiency, providing greater performance at a lower cost.

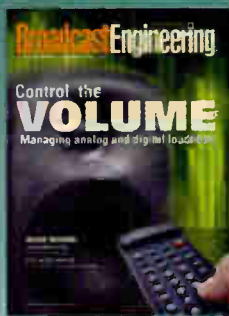
Hey, Good Lookin,' any more like you at home?



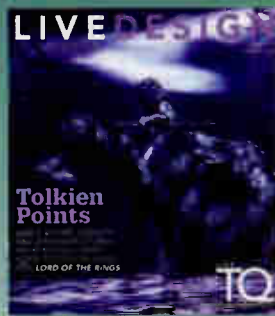
Why, yes. And thanks for asking.



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World Radio History

THE 2006 AUDIO EDUCATION GUIDE

Schools, Courses, Seminars and Internships

EAST

92ND STREET Y SCHOOL OF MUSIC

New York City, www.92y.org. Music technology lab featuring eight iMac 1.8GHz G5 workstations with Logic 7, Reason 3, Pure Data and GarageBand.

AMERICAN UNIVERSITY

Washington, D.C., www.american.edu. 4-year B.S. in audio technology; minor in audio technology, concentrating on music and audio production, recording and computer/electronic systems. Hands-on experience in a facility with 2-inch/24-track, Pro Tools HD and large mic collection. Electronic music studios.

APPALACHIAN STATE UNIVERSITY

Boone, NC, www.music.appstate.edu/recording. Hayes School of Music 4-year B.S. in music industry studies. Other concentrations prepare for careers in arts management, promotions, music merchandising/manufacturing. The 24-track facility offers digital mixing, editing workstations and peripherals. The Broyhill Music Center includes two performance halls, opera studio, MIDI studio, computer labs, rehearsal halls and practice rooms. Off-campus internships.

A.R.T.I. ORLANDO

www.audiocareer.com. 45-week Audio Engineering diploma. Students prepare for employment in the audio production industry, including music production and sequencing, sound editing for film and TV, sound effects design and mastering, film post in a THX pm3-certified mixing theater. Studios include ProControl and SSL digital. Placement assistance provided; financial aid available. An accredited member of ACCSCT.

AUDIO MAGIC RECORDING STUDIOS

Buffalo, NY, www.recordingstudio.com. 12-week certificate programs in audio basics, Pro Tools and advanced mixing techniques. Full-time commercial studio with multiple rooms and workstations. Instruction covers sonic principles, consoles, mics and effects to digital editing and advanced techniques in mixing and mastering on Pro Tools HD. Hands-on approach with private lab time.

BARTON COLLEGE

Wilson, NC, www.barton.edu. B.A. in mass communication (audio recording technology concentration) includes hands-on training in a 32-track recording studio. Low student/teacher ratio. Curriculum includes studio recording, electronic music, DAW recording/editing/mixing; production and post audio for film/video; and an internship program. Facilities include a Soundcraft Sapphyre Lc analog console with automation, outboard gear, Pentium IV computers with software from Pro Tools, Cakewalk, Nemesys, TC Electronic, etc.

BELMONT UNIVERSITY

Nashville, www.belmont.edu. The Mike Curb College of Entertainment and Music Business offers a Bachelor of Business Administration with an emphasis in music business. We own three renowned recording facilities: Ocean Way Nashville, RCA Studio B and the Center for Music Business. Eight state-of-the-art recording studios and a full range of digital and analog recording equipment.

BERKLEE COLLEGE OF MUSIC

Boston, www.berklee.edu. Four-year Bachelor of Music or professional diploma. The college offers 12 majors, more than 270 ensembles, six recital halls, 300 practice rooms, 12 professional recording studios and a Media Center.

BETHUNE-COOKMAN COLLEGE

Daytona Beach, FL, www4.cookman.edu/music/MusicTechnology/Default.htm. B.S. in music technology, 4-year degree program, Pro Tools certification. Students are admitted with the same standard as all undergraduate programs in music and take the full musicianship sequence. Students also take classes in analog and digital audio, advanced computer applications, marketing, management, recording productions and techniques.

BLOOMFIELD COLLEGE

Bloomfield, NJ, www.bloomfield.edu/cat/musicmajor.asp. 4-year B.A. in music technology. State-of-the-art Mac-based computer music lab and campus Pro Tools studio. Dept. chair professor Chris White brings years of music industry experience, having worked with such notables as Dizzy Gillespie and Nina Simone.

CAYUGA COMMUNITY COLLEGE

Auburn, NY, www.cayuga-cc.edu. 2-year A.A.S. degrees in audio production, radio/TV broadcasting and telecommunications technology with concentrations in video production, digital and interactive media, broadcast journalism and electronic publishing. 32-track studio, FM radio station, TV studio, remote truck and digital media lab. Industry internships are required. Cayuga is a unit of the State University of New York.

CENTRAL CAROLINA COMMUNITY COLLEGE

Sanford, NC, www.cccc.edu. 1-year diplomas in radio production and TV production; 2-year Associate degree in applied science in broadcast production technology. Radio production students study analog and digital audio recording, mic techniques and multitrack production. Students operate the college's FM station. Television students study linear and nonlinear editing on Avid systems, directing, producing, video photography, field production, video graphics, broadcast writing and reporting.

CITY COLLEGE OF NEW YORK

New York City, sonic.arts.cuny.cuny.edu. The Sonic Arts Center offers 4-year B.F.A. in music with a concentration in audio technology, emphasizing real-world skills with a project-based approach. Students pursue studies in music theory, performance and musicianship.

CLIVE DAVIS

DEPARTMENT OF RECORDED MUSIC

New York City, clivedavisdept.tisch.nyu.edu. Course of study leading to a B.F.A. that is designed to educate students in all aspects of contemporary recorded music, with a special focus on the art of producing music, identifying and cultivating musical talent, and developing creative material within the complex range of recorded music technologies. Student examine business and legal enterprise in a variety of courses.

THE COLLEGE OF SAINT ROSE

Albany, NY, www.strose.edu. 4-year B.S. in music, with music industry emphasis (and part-time M.A. in music technology covers technology, music business and commercial music). The technology area includes required courses in engineering: record production, Pro Tools and MIDI. Music business courses include survey, artist management and entertainment law. Commercial music offerings include songwriting, arranging and conducting. On-campus studio is equipped with Pro Tools analog 24-track and a MIDI lab with 15 Mac-based DAWs.

THE COMMUNITY COLLEGE OF BALTIMORE COUNTY

Baltimore, MD, www.ccbcmd.edu. 30-credit certificate in music production and audio recording technology, 2-year program.

COUNTY COLLEGE OF MORRIS

Randolph, NJ, www.ccm.edu. 2-year A.S. degree in music recording or electronic music. Two recording studios feature Soundcraft Ghost consoles, Alesis ADATs, Pro Tools MIXPlus 24 TDM systems, and a host of mics and outboard gear. Electronic music lab boasts 15 workstations running Pro Tools LE and Logic Pro 7.

DUQUESNE UNIVERSITY

Pittsburgh, www.music.duq.edu. The Mary Pappert School of Music offers 4-year B.M. degrees in sound recording technology/technology performance/technology composition a Master of Music Technology; and summer recording seminars. Campus facilities include two 24-track automated digital studios, mastering lab, digital music tech lab and workstation lab.

EASTERN SUFFOLK BOCES

Bellport, NY, www.esbores.org. 2-year program. Multiple workstations covering various digital platforms, including Pro Tools, Cubase and Tascam. Industry-standard equipment gives an overview of multitrack recording and sound design. College introductory courses taught at high school level.

FANSHAW COLLEGE

London, Ontario, www.musicindustryarts.com. Music Industry Arts offers a thorough 2-year education providing myriad career options, with 24/7 access to two state-of-the-art recording studios with Pro Tools and traditional 2-inch machines. Our studios and 10-station MIDI facility are equipped with dual-processor G5s and the latest software.

FINGER LAKES COMMUNITY COLLEGE

Canandaigua, NY, www.fingerlakes.edu. 2-year A.S. music recording technology degree. Recording facility with two recording rooms and a spacious control room. Control room features a Mackie D8B console and 24 tracks of Tascam DA-88s. Editing and mastering are done via MOTU 2408 using Samplitude Studio.

CONTENTS

EAST	50
CENTRAL	58
WEST	62

When using this directory, please note that only North American programs have been included. All of the information presented here was supplied by the schools. Specific programs may change, so contact the school/program for up-to-date information.

FIREDOG STUDIOS MUSIC TECH CENTER

Spotswood, NJ, www.firedogstudios.com. Three-part audio training program provides basic know-how and hands-on experience about recording, mixing, mic placement and more. We also offer Pro Tools 101 courses and mix the instructor-led classroom experience with live sessions in a working facility.

FITS & STARTS PRODUCTIONS

Eatontown, NJ, www.fitsandstarts.com. The multichannel audio seminars tour each year to 30 cities in five regions, and features industry experts Mike Sokol and Hector La Torre. Colleges, private recording schools and studios should call to host the seminar. A certificate of achievement for completing the seminar is offered.

FIVE TOWNS COLLEGE

Dix Hills, NY, www.fivetowns.edu. Bachelor of Music with concentrations in performance, composition/songwriting, musical theater, recording technology and music business. 16/32/64/72-channel SSL 9000 J audio recording studios and MIDI labs. The Dix Hills Center for the Performing Arts has been described as "acoustically perfect."

FULL SAIL REAL WORLD EDUCATION

Winter Park, FL, www.fullsail.com. Associate and B.S. programs in computer animation, digital media, entertainment business, film, game design/development, recording arts and show production/touring. Hands-on training in a state-of-the-art multimedia complex with multiple pro recording studios. The Recording Arts facilities feature one-on-one lab environments with industry-standard digital and analog consoles and more than 90 Pro Tools stations.

FUTURE MEDIA CONCEPTS

New York City, www.FMctraining.com. Complete range of manufacturer-authorized training in digital media, including Pro Tools Operator and Pro Tools Expert certifications, nonlinear editing, sound design, Web design and programming, video streaming, DVD authoring, 3-D animation, compositing and desktop publishing.

GEORGIA STATE UNIVERSITY

Atlanta, www.music.gsu.edu. 4-year Bachelor of Music degree in music technology and Pro Tools training program. Six recording and post-production studios.

GREEN STREET ARTS CENTER

Middletown, CT, www.greenstreetartscenter.org. Classes in sound recording with Pro Tools, which meet once a week for a 3-hour hands-on lecture/lab. During the first 10-week course, students learn the basics in a Pro Tools HD studio by recording small musical projects. The second course involves larger projects with more advanced recording techniques.

GUILFORD TECHNICAL COMMUNITY COLLEGE

High Point, NC, www.gtcc.edu/programs/et/faq.html. 2-year Associate of Science in entertainment technology offers fields of study in recording engineering, concert lighting/live sound production, artist management and live performance. Three recording studios, two Pro Tools music labs, a large concert staging auditorium, an outdoor amphitheater and a smaller indoor auditorium/staging area.

HAMPTON UNIVERSITY MUSIC DEPARTMENT

Hampton, VA, www.hamptonu.edu/academics/schools/libarts/music. 4-year B.S. in music with a music engineering technology emphasis, including multitrack audio production, stereo recording and psychoacoustics, electronic music, DAWs, music theory, music performance, electrical engineering, computer science and music business.

HARRIS INSTITUTE FOR THE ARTS

Toronto, Ontario, www.harrisinstitute.com. 1-year diploma programs in recording arts management and producing/engineering. The 16,000-square-foot facility includes Pro Tools in the audio post suite, Logic Audio in the MIDI/multitrack suite and 24-track digital multitrack in the music recording control room.

HOWARD UNIVERSITY

Washington, D.C., www.howard.edu. The Department of Radio, TV & Film offers 4-year B.A. degrees in audio production, television production, film production, telecommunications management and a 2-year M.F.A. in film. The department has six Pro Tools-equipped audio studios, including state-of-the-art post-production facility.

HUMBER COLLEGE

Toronto, Ontario, www.humber.ca. Bachelor of Applied Music (contemporary music). Performance Music degree with an optional major in production in years three and four. State-of-the-art 5.1 music studio with 1,000-square-foot studio.

INSTITUTE OF AUDIO RESEARCH

New York City, www.audioschool.com. 9-month diploma program in audio recording features digital audio production, analog/digital recording and mixing, signal processing technologies, post, MIDI, music business and DAW operations. 18,000-square-foot facility. Pro studio internships and graduate-placement assistance. Licensed by NYS Education Department, approved for veterans training, accredited by ACCSCT. Financial aid.

IN YOUR EAR

Richmond, VA, www.lobe.com/computermusiccourse.html. Program on advanced use of computers in music production. Concentrates on basics of acoustics and mic use, digital interfaces, outboard gear and computer equipment, including software configuration.

ITHACA COLLEGE SCHOOL OF MUSIC

Ithaca, NY, www.ithaca.edu/music. 4-year program (B.M. in sound recording technology) features 24-track SSL/Pro Tools HD recording studios, Yamaha 02R/Pro Tools production studio and three electroacoustic music studios. Training musicians to be engineers, the program includes music theory, history, performance, liberal arts and coursework in recording/editing, electroacoustic music, repair and calibration, and recording workshops. All recording majors are hired as work-study engineers in the School of Music for four years.

JACKSONVILLE UNIVERSITY

Jacksonville, FL, arts.ju.edu/music/index.htm. B.S. in Music Business.

LEBANON VALLEY COLLEGE

Anrville, PA, www.lvc.edu/music. 4-year liberal arts college. Studies include music theory, history, performance, studio production and recording industry operations. NASM-accredited. Two 24-track recording studios, computer labs and Pro Tools production/editing/mastering rooms.

MCGILL UNIVERSITY

Montreal, Quebec, www.music.mcgill.ca/sr/build/. The Master of Music program in sound recording has provided Tonmeister education since 1979, combining practical and theoretical training in studio techniques, mic selection, digital sound processing and technical ear training. The Ph.D. program focuses on research related to the evaluation and improvement of sound recording practices and technology.

MERCY COLLEGE

White Plains, NY, www.mercy.edu/cda. 4-year Mercy College Music Industry and Technology program (B.S.) and partner Music Conservatory of Westchester. Four computer labs, three recording studios and a theater. Demonstration tape or audition required.

METALWORKS INSTITUTE

Mississauga, Ontario, www.metalworksinstitute.com. 12-month diploma programs in audio production and engineering, and entertainment business. Digidesign Pro school. Extension of Metalworks Studios. State-of-the-art campus facilities.

MIAMI-DADE COMMUNITY COLLEGE

Miami, www.mdc.edu. The School of Film and Video offers A.S. degrees in radio, television, broadcast programming and film production; a certificate in television production; and an A.A. degree in mass communication. The program stresses hands-on equipment, and students have access to high-end cameras, editing suites and video graphics animation facilities.

MIDDLE TENNESSEE STATE UNIVERSITY

Murfreesboro, www.mtsu.edu/~record. B.S. with concentrations in production and technology, and music business; M.F.A. in recording arts and technology. Five studios with SSL, Sony and Studer consoles; Pro Tools; RADAR and SADIE DAWs; 5.1-channel mixing; MIDI and digital audio labs; mastering, post-production and listening laboratories. AES and SMPTE chapters.

MIDLANDS AUDIO INSTITUTE

Columbia, SC, midlandsaudiainstitute.com. Classes include audio engineering, music business and studio recording. All classes are taught by full-time working professionals.

MUSITECHNIC EDUCATIONAL SERVICES

Montreal, Quebec, www.musitechnic.com. A thorough exploration of the technical and artistic facets of current hardware and software. Musitechnic offers a spacious, comfortable and professional environment. Respected industry professionals teach the program.

NASHVILLE STATE COMMUNITY COLLEGE

www.nsc.edu. 1-year technical certificates, 2-year A.A.S. degrees. Studio recording/mixing/mastering with offerings such as music publishing, songwriting and maintenance. Facilities include a new 32-track studio and mix room and 12 Pro Tools/MIDI workstations, with limited class size.

NASSAU COMMUNITY COLLEGE

Garden City, NY, www.ncc.edu. Three-semester program provides a broad perspective of the music industry and acquaints students with musical structures (intellectually and aurally). Technical skills and internship training acquired in an off-campus recording studio.

NEW ENGLAND INSTITUTE OF ART

Brookline, MA, www.neia.artinstitutes.edu. A.S., Associate in audio production, B.S. in audio and media technology. Through rigorous study of theoretical concepts, industry practices and hands-on production techniques, students develop the technical skills and aesthetic sensibilities needed to become professional audio engineers, technicians, producers and business people.

NEW ENGLAND SCHOOL OF COMMUNICATIONS

Bangor, MA, www.nescom.edu. Pro Tools certification and B.A. degrees in communications, with concentrations in audio engineering, television, multimedia, marketing and radio. Students work in a world-class studio facility that includes seven control rooms. There are 13 dedicated Pro Tools rooms and a computer training lab for Pro Tools and MIDI.

NORTHEASTERN UNIVERSITY

Boston, www.music.neu.edu. Students work professionally for 18 months, alternating with semesters in school. All degree programs with co-op take five years. B.S. programs include music industry, music technology and a dual-major in multimedia studies/music technology.



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N.Y. INSTITUTE FOR FORENSIC AUDIO

Colonia, NJ, www.owinvestigations.com. Certificates in video and audio authenticity and voice identification. Lab features Avid Forensic workstation, which enables hands-on experience for all participants. Evidence procedures, legal questions and courtroom testimony related to the above specialties will be discussed.

NYC COLLEGE OF TECHNOLOGY

Brooklyn, NY, www.citytech.cuny.edu/academics/deptsites/enttech. Sound for live entertainment, with a 4-year B.T. in entertainment technology and certificates in sound, lighting, scenic construction and show control. We feature low tuition and a world-class faculty.

NYU STEINHARDT

New York City, www.nyu.edu/education/music/mtech. 2-year, 4-year and Master's degrees in music technology, emphasizing the integration of musical and technical skills. Wide-ranging internship program.

OCEAN COUNTY VOCATIONAL TECHNICAL SCHOOL

Lakehurst, NJ, www.ocvts.org. Half-year certificate program (Audio Recording for Electronic Media Career) is offered to high school and post-secondary students. 450 hours per year, with emphasis on hands-on recording by students. Three control rooms overlooking main studio, audio computer lab, separate mixing suite and three DAW suites.

OMEGA RECORDING STUDIOS

Rockville, MD, www.omegastudios.com. Five comprehensive programs: recording engineering, electronic music synthesizers and MIDI, sound reinforcement, audio production techniques (Pro Tools Operator certification) and music business. Avid-authorized education center. Nationally accredited by ACCSCT, approved by the Maryland Higher Education Commission and approved for veterans' educational benefits.

ONTARIO INSTITUTE OF AUDIO RECORDING TECHNOLOGY

London, Ontario, www.oiaat.ca. 1-year, college-level diploma. A full-time faculty and a 5:1 student/instructor ratio guide select students to creatively acquire industry-valued skills. Students learn in six studios of pro analog and digital gear.

PARSONS CENTER FOR AUDIO STUDIES

Wellesley, MA, www.paudio.com. Courses for audio professionals include Golden Ears, Critical Listening for Audio Professionals, Principles of Audio for Professionals, Principles of Pro Tools, Pro Tools for Pros: Intermediate/Advanced, Growing Your Personal/Project Studio, Signal Processing I & II, Acoustics for Audio Professionals, etc.

PEABODY INSTITUTE

Baltimore, MD, www.peabody.jhu.edu. 5-year bachelor's degree in recording arts, 2-year master's degree in audio recording and acoustics. Fully automated digital facilities.

PENN STATE UNIVERSITY

University Park, PA, www.psu.edu. B.F.A. in technical theater (sound design), B.A. in integrative arts. Theaters (all with automation systems), recital hall, project recording studio, MIDI/mixdown suite, two computer labs with audio facilities. Full-time faculty in sound design and electroacoustic music, and a graduate-level program in acoustics.

PRO TOOLS TRAINING CENTER

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www.protoolstraining.com. Pro Tools certificate program is 25 hours, the Digidesign Operator certificate for music or post is 75-plus hours and Digidesign Expert Certificate for music or post-production is 100-plus course hours. Accelerated audio and multimedia training for individuals and corporations. Courses delivered at high-end studios nationwide. Staff comprises pro engineers with decades of experience and hundreds of Gold/Platinum albums and 12 Grammy Awards.

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**QUEENSBOROUGH
COMMUNITY COLLEGE**

Brooklyn, NY, www.qcc.cuny.edu. Music electronic technology degree.

RADFORD UNIVERSITY

Radford, VA, www.radford.edu. 4-year B.M. in music and technology, 2-year M.A. in computer music. Housed in the Center for Music Technology, facilities include MIDI/audio studio, A/V surround sound studio and 13-station lab. Focus on composition, performance, mixing, software development and production techniques.

**RECORDING ARTS CANADA,
TORONTO/QUEBEC**

www.recordingarts.com. RAC has a one-student-per-workstation ratio. Digital sound and music facilities include more than 40 studios, workstations and labs. Digital media studios feature the latest in computer and

software technologies. Our "Dolby-certified Surround Mixing" theaters and Foley studio have hosted acclaimed film clients.

RECORDING ENGINEERS INSTITUTE

Islandia, NY, www.audiotraining.com. Certificate offered for graduates of 8-month, 170-hour program. Classes limited to five students during the hands-on portion. Experience on 24-track digital equipment, including 5.1 mixing course with Mac G4 computers. Qualifying graduates secure their first job at the school as members of the Recording Engineers Association.

**SAE INSTITUTE OF TECHNOLOGY
NEW YORK CITY/NASHVILLE/NORTH MIAMI
BEACH/LOS ANGELES**

www.sae.edu. 900-hour diploma program in audio technology, featuring industry-standard equipment and innovative teaching techniques from accomplished professionals. Career development assistance. More than 40 locations worldwide.

SAVANNAH COLLEGE OF ART AND DESIGN

Savannah, GA, www.scad.edu/academic/majors/snds. B.F.A. in sound design, M.A. in sound design, M.F.A. in sound design. Students learn the practice of sound design using original films, animations and videogames. Digidesign-certified training location. Extensive field recording equipment for use in the development of sound effects libraries and to provide location sound for film shoots.

SELECT SOUND STUDIOS

Kenmore, NY, www.selectsound.com. Six New York state-accredited recording technologies programs, each is 12 weeks and three credits. Four production rooms let students work in 24-track analog studios, Pro Tools TDM studios, a MIDI suite and a mastering suite. Topics include the history of recording, physics of sound, studio acoustics, mic techniques, tape recorders, mixing consoles, and Pro Tools native and TDM systems.

**THE SHEFFIELD INSTITUTE
FOR THE RECORDING ARTS**

Phoenix, MD, www.sheffieldav.com. 6-month full-time, 1-year part-time certificates. Quality instruction and hands-on training on the latest equipment. Instructors have extensive real-world experience. Graduates are prepared to enter a variety of fields, including studio recording, live recording, sound reinforcement engineering, audio for video, remixing, nonlinear digital audio editor, equipment sales and more.

SHENANDOAH UNIVERSITY

Winchester, VA, www.su.edu. B.M. in commercial music. Shenandoah University is located in a state-of-the-art facility featuring an SSL 4000 G+ console with automation. Students record more than 300 concerts, student and faculty recitals, and internal and external projects every year. Two MIDI/editing suites.

SIGMA SOUNDZ

Holland, PA, www.SigmaSoundZ.com. Former chief engineer and president of Sigma Sound and SPARS, Michael Tarsia has designed a 16-course recording program where the focus is on the art. Pro Tools is the platform the students will be taught on. Deconstructing and recreating a mix is the final exam.

**STARFIELDS PRODUCTIONS
RECORDING STUDIOS**

New York City, www.starfieldsproductions.com. 10-week primer with concentration on recording. Workshop II focuses on use of Pro Tools and overall DAW integration with current audio and MIDI gear, as well as use of classic analog outboard gear.

SUNY, FREDONIA

www.fredonia.edu/som/srt. 4-year B.S. in Music with an emphasis on sound recording technology. Modeled after European Tonmeister training, competence in playing a musical instrument and in sciences must be demonstrated through scheduled audition. Five studios, SSL console, 24-track analog and digital recording, MIDI/sampling labs. Students receive a minimum of 650 hours in-studio experience. Accredited by NASM.

SUNY, ONEONTA

www.oneonta.edu/academics/music. B.A. program prepares students for work in the music/entertainment industry. The curriculum includes entertainment industry business affairs, intellectual property law, music products, music theory, performance and history/literature. The minor in audio production focuses in the technical and artistic components of audio recording and offers Pro Tools 101 certificate.

SUNY, OSWEGO

www.oswego.edu/music. B.A. program prepares students for work in the recording industry through classroom instruction, hands-on experience with modern digital recording equipment and internship opportunities at recording studios and music production facilities. Accredited by NASM.

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Miami, www.mssurrounded.com. Grammy-winning engineer provides one-on-one or small-group training to select individuals. Custom course(s) per individual basis. Topics include basic and advanced engineering, mixing, DAWs, critical listening, production techniques, surround sound.

TEMPLE UNIVERSITY

Philadelphia, www.temple.edu/btmm. B.A., M.A. In the Recording Industry study, courses are offered in music production and business, including local, national and international internship opportunities. The flexible curriculum allows students to explore their own path while having access to all of the resources of a large, urban university. Seven studios include both vintage analog and digital technologies.

TOP HAT PRODUCTIONS

Lake Worth, FL, www.tophatproductions.net. One-day workshop is taught by seasoned radio, TV and voice-over pros from an award-winning audio production company. Learn script interpretation, diction and inflection, creating your demo, studio etiquette, finding work, marketing, launching your career.

TORONTO FILM SCHOOL

Toronto, Ontario, www.torontofilmschool.com. 15-month, full-time sound technology program: music production, post-production audio, live sound reinforcement. Taught in state-of-the-art facilities, with SSL, Soundtracs and Aneq consoles.

TREBAS INSTITUTE

Toronto, Ontario, www.trebas.com. 3-year B.A. in sound technology, 1-year diploma programs. Authorized training center for Cubase and Macromedia. Established in 1979 to train students in music business, audio, record production, film/TV production, post-production, interactive multimedia and computer animation. Outstanding instructors. High-tech studios and labs. Lifetime national job-search assistance.

TROD NOSSEL

PRODUCTIONS & RECORDING STUDIOS

Wallingford, CT, www.trodnossel.com. Modern Recording Techniques 1 (MRT1) is a weekly class on the basics of multitrack recording, with seven weeks of theory and five weeks of hands-on training. MRT2 is a 15-week hands-on extension of MRT1.

TROY UNIVERSITY

Troy, AL, www.troy.edu. B.A./B.S. in music with specialized degree tracks. A post-secondary Master of Science with a concentration in music industry is under development with implementation in the fall of 2007. Areas of concentration include writing and production, music business and a flexible general music industry track. Digidesign-sponsored institution, with production/teaching facilities including Studio A, Studio B, digital audio lab and a music technology lab.

UNITY GAIN RECORDING INSTITUTE

Fort Myers, FL, www.unitygain.com. The Audio Recording Comprehensive program and Advanced Techniques in Audio Recording are two 48-week programs that provide more than 250 hours of hands-on recording. Class size is limited; two state-of-the-art recording studios. Students record 20 musical acts on analog and digital formats.

UNIVERSITY OF HARTFORD, THE HARTT SCHOOL

West Hartford, CT, www.hartford.edu/hartt. B.M. in music production and technology. A strong academic background and music audition are required. Training includes record engineering and production, electronic music, acoustics, electronics, music management, music theory, ear training and liberal arts. Facilities include several studios, computer lab and disk-based remote recording system.



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illustration by Elias Perez

World Radio History

UNIVERSITY OF HARTFORD, WARD COLLEGE

West Hartford, CT, uhaweb.hartford.edu/FULLER. 4-year B.S. in audio engineering technology. Covers applied audio electronics, audio studio engineering, acoustics and computer programming. Electives allow students to take additional coursework.

UNIVERSITY OF MAINE, AUGUSTA

www.uma.maine.edu. UMA has the only music program in Maine with a state-of-the-art recording studio. Internships from B.M. in jazz and contemporary music (audio concentration).

UNIVERSITY OF MARYLAND, BALTIMORE

www.umbcrecordingstudios.org. 4-year B.A. in music with an emphasis in recording. Focuses on audio engineering, including acoustics, mic techniques, digital signal processing, mastering, plug-in applications, Pro Tools and surround sound recording. Three-studio facility with Pro Tools HD systems, Genelec and Event monitoring.

UNIVERSITY OF MASSACHUSETTS LOWELL

www.uml.edu/College/arts. B.M. and M.M. degrees in sound recording technology. Minor programs for computer science and electrical engineering majors. Supported by eight studios and control rooms, including critical-listening and surround recording studio, high-end multitrack room with API Vision console, MIDI/synthesis studio, DAW/surround room, 8-track control room, video post-production suite, maintenance/repair laboratory, entry-level room.

UNIVERSITY OF MEMPHIS

music.memphis.edu. B.M. with concentrations in sound recording technology and music business. Fully accredited by NASM. Contemporary on-campus production facilities include a comprehensive multitrack recording studio outfitted with 7.1 high-resolution recording and mixing technologies, electronic music labs and a multichannel high-resolution mixing suite. Students work in digital art, writing and publishing studios.

UNIVERSITY OF MIAMI, FROST SCHOOL OF MUSIC

Coral Gables, FL. www.music.miami.edu. The Music Engineering (B.M.) program accepts undergraduate musicians who desire careers in music recording, audio engineering, audio equipment hardware and software design, sound reinforcement and broadcasting. M.S.E.E. graduate students engage in research in audio DSP programming, psychoacoustics and synthesis.

UNIVERSITY OF NEW HAVEN

West Haven, CT, www.newhaven.edu. Bachelor's degree in music and sound recording, music industry programs. The sound recording courses include multitrack recording, digital audio and computers in the studio. The music industry courses cover record companies, contracts, recording studio management, copyright law and music publishing.

UNIVERSITY OF NORTH CAROLINA, ASHEVILLE

www.unca.edu/music. Bachelor's program. Recording facilities include two multitrack studios with a variety of consoles, microphones, signal processors, Pro Tools. The electronic music laboratory houses analog and digital synthesizers, samplers, etc.

UNIVERSITY OF SOUTH CAROLINA, COLUMBIA

www.music.sc.edu/recording. Curriculum includes more than 10 classes in sound recording (pop and classical recording, mixing techniques, workstation editing, digital audio technology and audio-for-video) and music technology (synthesis, signal processing, sequencing and computer music). Facilities include a large recording studio, an 18-station computer music lab and two electronic music/MIDI studios.

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VALENCIA COMMUNITY COLLEGE

Orlando, www.valenciacc.edu. 2-year audio engineering degree. Program develops recording skills through ear training for quality of sound, principles of psychoacoustics and basic studio techniques. Digidesign Pro Tools 101 is covered as part of the regular curriculum.

YALE SCHOOL OF DRAMA

New Haven, CT, www.yale.edu/drama/admissions/sdesign.html. 3-year M.F.A., 1-year certificate, 2-year engineering internship. Sound Design program teaches the theory and practice of sound design, including script interpretation, compositional elements of design, fundamentals of sound and music technology, advanced problem-solving, sound delivery systems and a design master class.

YORK UNIVERSITY

Toronto, Ontario, www.yorku.ca. B.A., B.F.A., M.A., Ph.D. comprehensive music program with digital audio and computer composition streams. Courses include sonic architecture, composing for film, notation, alternate tunings, MIDI, digital and electronic media, etc.

CENTRAL

ALEXANDER MAGAZINE

Warren, MI, www.alexandermagazine.com. Online certification program study with lessons, reference materials, audio demonstrations and interactive quizzes. Free CD-ROM for high-speed study (U.S.-only). Study for Recording Institute of Detroit and other recording programs. Recording Institute of Detroit completions for production courses; RID Theory certification on basic audio, mixing and music business.

AUDIO ENGINEERING INSTITUTE

San Antonio, TX, www.audio-eng.com. 10-week basic and advanced engineering classes. Study is part hands-on/part lecture. Basic class covers theory, mics, consoles, recorders, live recording and mixing. Advanced class covers signal processors, hard disk recording, MIDI, synths and samplers, drum machines and sequencers, audio-for-video, real-time analysis and equipment maintenance.

BALL STATE UNIVERSITY

Muncie, IN, www.bsui.edu/musictech. 4-year Bachelor of Music, minor options in applied physics, computer science and digital media. Program focuses on theoretical and historical aspects of sound and music, computer music, recording and composition.

BROWN MACKIE COLLEGE

Cincinnati, www.socaec.com. 2-year associate's degree in audio/video production. All-digital A/V production techniques and hands-on training. Digital music recording studio with Mac-based Pro Tools and Alesis HD24. Location sound techniques and sound for video and film.

BUTLER UNIVERSITY

Indianapolis, www.butler.edu/mediaarts. B.A. in recording industry studies. Three on-campus studios and control rooms feature Pro Tools HD/LE, Waves Platinum plug-ins, 16 mBox systems, MIDI keyboards, mics, outboard gear, ControlJ24, and Audient ACS 8024, Soundcraft Ghost and a Mackie 24X8 consoles. Active MEISA chapter and 770 Vinyl, a student-run record label.

CASE WESTERN RESERVE UNIVERSITY

Cleveland, music.case.edu. B.A. in audio recording and a 5-year double-major with electrical engineering. State-of-the-art facilities, hands-on-studio time.

CLEVELAND INSTITUTE OF MUSIC

www.cim.edu. B.M. in audio recording or double-major with instrument or composition major in five years. Courses cover classical and popular music studio techniques, mic use, surround sound, digital sound processing, audio-for-video, acoustics and studio maintenance. Faculty features multiple-Grammy-winners Jack Renner and Michael Bishop, Dr. Peter D'Antonio, Bruce Egge and Alan Bise.

COLLIN COUNTY COMMUNITY COLLEGE

Plano, TX, www.ccccd.edu. 2-year A.A.S. in commercial music, 1-year certificate in audio engineering. Studio features Pro Tools MIXPlus, ControlJ24, Genelec 1030A monitors, a wide array of mics and six Mac G4s with Digi 001s. The MIDI/synth studio has 16 Mac G4 workstations.

COLUMBIA COLLEGE CHICAGO

www.colum.edu. 4-year B.A. in audio arts and acoustics. Courses in electronics, acoustics, math and audio systems theory, with electives in music, arts management, film/video and interactive multimedia. Three audio studios, digital audio and sound-for-picture suites, and labs for sound contracting and acoustics.

CUYAHOGA COMMUNITY COLLEGE

Cleveland, www.tri-c.edu/rat. A.A.S. in recording arts and technology, certificate in live sound reinforcement, certified Pro Tools training center. Students train under professional producer/instructors and record regional music groups, cable TV programs, in-house label artists and manage regional stage at 5,000-seat Live Nation venue. Courses include concert production, tour management, concert technical production and sound for worship. Semester-length student-designed capstone recording project and internships.

DALLAS SOUND LAB

Living, TX, www.dallassoundlab.com. Diplomas in audio engineering and studio techniques. Courses provide extensive hands-on training on SSL, API, Neve, Focusrite, Yamaha and Mackie consoles. Lab sessions are held in the school's 12,000-square-foot multistudio facility.

DB RECORDING & SOUND DESIGN

Cincinnati, www.dbsounddesign.com. Individual novice to advanced Pro Tools training, with elements of MIDI and recording techniques. Instruction is offered in our studio, dB Recording & Sound Design.

DEL MAR COLLEGE/RADIO & TELEVISION

Corpus Christi, TX, www.delmar.edu/comm/rtr/RTV-home1.html. Radio and Television, 2-year A.A. degree. Three-camera television studio with permanent interview and news sets. Control room includes switcher, character generator and audio board. Students learn linear editing; advanced students do nonlinear projects. Two audio sound rooms, one set up to produce commercials.

DEPAUL UNIVERSITY

Chicago, depaul.edu. B.S. in music with elective studies in electrical engineering degree. DePaul SRT students take the full musicianship sequence and applied music, large ensemble, conducting and music electives. SRT students take classes in analog and digital microelectronics, computer science and calculus.

EASTERN MICHIGAN UNIVERSITY, YPSILANTI

www.emich.edu. 4-year B.S. in electronic media and film, and broadcasting. Program emphasizes production, history, theory and criticism.

ELMHURST COLLEGE

Elmhurst, IL, www.elmhurst.edu. Bachelor's degree. In addition to classwork in music and business of music, students get hands-on experience through internships, industry speakers and course tours. State-of-the-art 24-track digital studio, courses range from music theory to MIDI, practice and recital facilities.

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GRAND VALLEY STATE UNIVERSITY

Allendale, MI, www.gvsu.edu. Electrical engineering with music minor program.

HOUSTON COMMUNITY COLLEGE

nwc.hccs.edu/av. A.A.S. and certificates in audio engineering and film production, certificates in MIDI production. Hands-on experience with eight fully equipped studios. Studio V: SSL 4048 G+. Studio IV: Pro Tools, Control24. Studios IIIA and IIIB: Alesis X2 consoles, ADATs and synths. Studio II: video post and scoring. Studio I: 13 Mac G4s with Pro Tools. Studio VVI: 30 Final Cut Pro and Avid editing suites. Studio VIII: 3,000-square-foot soundstage.

INDIANA UNIVERSITY, SCHOOL OF MUSIC

Bloomington, www.music.indiana.edu/som/audio. A.S. or B.S. students record performances of the IU School of Music and complete more than 200 hours of project time in multitrack studio. Four performance hall recording studios, two DAW suites, two maintenance labs and a computing instruction classroom.

INSTITUTE OF PRODUCTION & RECORDING

Minneapolis, www.iprschool.com. 6-quarter A.A.S. degrees in audio production/engineering and entertainment business; Digidesign Pro School Operator and Expert certifications in Pro Tools, Logic certification. A faculty with more than 150 Gold and Platinum records. More than 80 Pro Tools workstations, 15 Digidesign ICONs, multiple SSL consoles, 10 studios.

INTERNATIONAL COLLEGE OF BROADCASTING

Dayton, OH, www.icbcollege.com. Associate degrees in communication arts and video production; diploma programs in audio engineering and broadcasting. Enrollment invitations based on prospective students touring the facility and demonstrating commitment and desire to be part of the broadcasting and recording fields. Small class sizes.

KANSAS CITY

KANSAS COMMUNITY COLLEGE

www.kckcc.edu/music. Associate degree. Classes cover computing skills, MIDI, synthesis, audio recording, audio editing/sound design, sound reinforcement, digital video production and Web design. Classes limited to 12 students. Accredited by North Central Association. Amek Media 51, Pro Tools HD2/LE, Alesis HD24XR, 5.1 Genelec studio, Soundcraft Ghost/MH3 and an 8.2 sound reinforcement system.

LABETTE COMMUNITY COLLEGE

Parsons, KS, www.labette.edu. 2-year A.A.S. program. Hands-on experience learning through recording sessions, classroom lectures and research assignments. MIDI production and digital audio recording using Digital Performer and Pro Tools. Freshmen use the Mackie 32x8 and 24x8 mixing consoles to record to ADAT and to the SDR24. Sophomores use the Tascam D8B to record to Pro Tools and Digital Performer. Internships available.

LAKELAND COMMUNITY COLLEGE

Kirtland, OH, www.lakelandcc.edu. Degrees and 2-year certificates in audio engineering/production, video and broadcast, radio engineering, interactive media technology, animation/cartoon arts; B.A. in communication with Notre Dame College. Hands-on education taught by industry pros. Facilities include digital/analog studio/soundstages. Consoles by Otari, Sony, Mackie, SSL. Mac/PC media production labs.

MADISON MEDIA INSTITUTE

Madison, WI, www.madisonmedia.com. A.A. degrees in recording/music technology and multimedia technology. State-of-the-art classrooms, computer labs and studio space. Low student-to-teacher ratios. Classes taught by industry professionals. Hands-on and classroom experience. Accredited. Placement service.

MCNALLY SMITH MUSIC SCHOOL

Saint Paul, MN, www.mcnallysmith.edu. 2-year A.A.S., 1-year diploma programs and 4-year bachelor's degrees through a direct-transfer agreement with Augsburg College. Extensive Pro Tools training and 10 studios, including three 5.1 rooms and Trident, Sony and SSL consoles.

MILLIKIN UNIVERSITY

Decatur, IL, www.millikin.edu/music.

MINNEAPOLIS COMMUNITY & TECHNICAL COLLEGE

www.minneapolis.edu. 2-year A.S. in sound arts. Program focused on the nature and control of sound with analog and digital tools. The craft of engineering plays a large part in the course, but the program focuses on a broader application of skills and liberal arts curriculum.

MINNESOTA STATE UNIVERSITY MOORHEAD

www.mnstate.edu/music. 4-year B.M. in music industry, M.M. in new media. The program features a MIDI lab, recording studio, digital audio studio, film/video scoring studio; Dragon Tracks annual CD project; and MEISA student organization.

MOUNT ROYAL COLLEGE

Calgary, Alberta; www.mtroyal.ca. 2-year diploma in broadcasting. Program teaches working as a team to inform, create, promote and entertain through radio and television. Students report, write and anchor news and sports programs; create, write and produce commercials; and record, edit and direct programs for both media.

NORTH CENTRAL UNIVERSITY

Minneapolis, www.northcentral.edu. 4-year B.A./B.S., 2-year A.A., 1-year certificate programs. Students experience sound engineering and recording production at McPherson Recording Studios on the campus. The Brad Yost-designed facility houses state-of-the-art equipment and has been employed by professional Christian artists to record and produce.

NORTHEAST COMMUNITY COLLEGE

Norfolk, NE, www.northeastaudio.org. 2-year A.A.S. audio/recording technology. Program combines thorough academics and hands-on training in live and studio environments. Facilities include two control rooms, recording studio, concert stage and isolation rooms.

NORTHERN MICHIGAN UNIVERSITY, MARQUETTE

www.nmu.edu. 4-year B.S. degree program (options in media production and new technology, electronic journalism and media studies). Professionally equipped studios include Pro Tools, Final Cut Pro and Trinity software.

NATIONAL SYSTEMS CONTRACTORS ASSOCIATION

Cedar Rapids, IA, www.nasca.org. 4-year online and classroom apprenticeship program for electronic systems technicians; 3 levels of certification for those who install and integrate multiple systems. Regional and online review courses offered.

OVERLIN CONSERVATORY OF MUSIC

Oberlin, OH, www.timara.oberlin.edu. 4-year degree. TIMARA Department has excellent facilities for computer music, performance technology and new media. Seven studios, including a recording studio, two computer music studios, a digital media room with a Media 100 system and a computer music lab with multiple Mac-based workstation/samplers.

OHIO NORTHERN UNIVERSITY

www.onu.edu/a+s/comm_arts. 4-year B.S. in broadcasting and electronic media. Students use the facilities of WONB, 94.9 FM and ONU Cable 3. Special courses offered in audio and video editing using Cool Edit Pro, Final Cut Pro and Avid.

OHIO UNIVERSITY, ATHENS

www.ohio.edu. B.S. in communications. The audio production sequence offers three tracks in audio production: music recording, media production or audio post-production. Recording complex includes an Amek BIG 26x24 console, Tascam MX-2424, Pro Tools HD with Control24, and wide assortment of mics and processing gear. 16-station Mac G4 digital media lab and Sonic Solutions DVD-authoring system.

OKLAHOMA STATE UNIVERSITY, STILLWATER

music.okstate.edu. Courses in music technology and recording techniques focus on the fundamentals of music technology, sound recording and audio post. 24-track project studio is built around a Tascam MX-2424 and a Mac G5 Digi 002 running Pro Tools. The Seretean Center for the Performing Arts also includes two performance halls, a computer lab, teaching studios and practice rooms.

PARKLAND COLLEGE

Champaign, IL, www.parkland.edu. Learn recording essentials through Parkland College's recording studio classes at Pogo Studio. Instructor/producer/engineer/musician Mark Rubel gives skilled guidance and overview in a real-world, well-equipped environment. Pogo Studio features digital and analog recording and a wealth of instruments.

PRECURSOR PRODUCTIONS

Winnipeg, Manitoba, www.precursorproductions.com. Certificate courses in digital music production, advanced digital music production, 5.1 surround production, video art/VJ production. Our team specializes in selecting the hardware and software that you will need to make your music a reality. We will set up your virtual studio and provide all of the training that you need to begin producing your own music.

PRO TOOLS TRAINING CENTER DALLAS/HOUSTON/SAN ANTONIO

www.protoolstraining.com. The Pro Tools certificate program is 25 hours, Digidesign Operator certificate for music or post is 75-plus hours, Digidesign Expert certificate for music or post is 100-plus hours. Accelerated audio and multimedia training for individuals and corporations. Courses are delivered at high-end studio facilities nationwide. Financial aid available.

RASICCI INTERNATIONAL

North Canton, OH, rasicci@yahoo.com. The Audio Technician certification program emphasizes business and sound engineering. Coursework includes audio production, business law, management and technical courses in acoustics. The program also includes in-depth study of analog and digital audio production techniques in the state-of-the-art recording studios on campus.

RECORDING INSTITUTE OF DETROIT

Eastpointe, MI, www.recordinginstitute.com. 39-week recording engineer certificate, 26-week music producer certificate, 8-week associate recording engineer/producer certificate. Three major studios, dedicated student control room and student workstations. Small classes. See Alexander Magazine entry for online training.

RECORDING WORKSHOP

Chillicothe, OH, www.recordingworkshop.com. Certificate programs in audio recording and music production. Approved for college credit toward bachelor's degree in commercial music at Capital University. Two months of intensive, full-time training in music tracking, mixing and production. Eight studios and convenient student housing.

RIDGEWATER COLLEGE

Hutchinson, MN, www.ridgewater.mnscu.edu. 2-year A.A.S. and diploma programs in audio technology cover studio recording, live sound, system design and installation. Students achieve a strong electronics and computer-applications background. Students will work with Pro Tools HD, Rankus-Heinz EASE and Ears, SIA Smart Pro, BSS Soundweb, B&K acoustical test equipment, etc.

ROSE STATE COLLEGE

Midwest City, OK, www.rosa.edu/faculty/cwhite/. Associate degrees in liberal studies with a music recording option. Classes include recording, computers and music, pop music theory, American music industry and lyric writing. Four Mac-based labs for hands-on time.

SINCAGLIAN SCHOOL OF THE ARTS

Chicago, www.sincaglianschool.com. 2-year audio engineering certificate.

SOUND ENDEAVORS

Columbus, OH, www.soundendeavors.com. Specialized private instruction includes music composition, aural training with applications in sound synthesis, MIDI and Mac-based computer music. Apprenticeships and internships available.

SOUTH PLAINS COLLEGE

Levelland, TX, www.southplainscollege.edu/creativearts/soundtechnology. 2-year A.A.S. in sound technology. Two 24-track studios with Sony, Mackie digital consoles, Mackie HDR24/96 digital recorders. One 24/16-track digital/analog studio with Sony MXP-3036 console, MCI 2-inch analog, Mackie SDR24/96 digital. 15-station Pro Tools lab, 12-station MOTU Performer lab, two Digital Performer DAWs, MIDI lab. Small class sizes.

SOUTHERN ILLINOIS UNIVERSITY CARBONDALE

rtv.siu.edu. B.A. with specializations in audio production, radio, television/video production, broadcast news, electronic media marketing and management. Two labs with 29 Mac stations running Pro Tools LE, Digital Performer, Reason, Final Cut; 2 Pro Tools HD systems with Control24. WSIU-TV television station, WSIU-FM radio station (NPR affiliate), WIDB Internet radio station and Digital Dog Records (student-run record label). Internship programs.

SYNERGETIC AUDIO CONCEPTS

Greenville, IN, www.synaudcon.com. Variety of seminars, each taught using a multimedia approach. The fundamental principles are also taught in a very practical way, which allows you to use them immediately within the workplace. The seminars are approved for continuing education units.

TEXAS STATE UNIVERSITY, SAN MARCOS

www.txstate.edu/music/srt. 4-year B.M. in sound recording technology. Applicants should have significant musical abilities, well-developed aural skills and the ability to complete calculus and other technical courses. The curriculum emphasizes recording, music, digital media, math/science and an internship. TSU owns and operates the Fire Station, a multipurpose recording facility, where students participate in commercial recording sessions.

UNIVERSITY OF CENTRAL MISSOURI, WARRENSBURG

www.cmsu.edu. B.M. in music technology emphasizes audio engineering and musicianship, with hands-on learning with multitrack recording/editing studios, Pro Tools HD2/3, sound reinforcement equipment, MIDI/synthesis studios and a 12-station computer lab. Internships required. Class sizes between 15 and 20 students.

UNIVERSITY OF CINCINNATI

www.uc.edu. B.F.A. and M.F.A. coursework includes sound technology and production, theater aesthetics, critical listening, music, digital audio, recording, reinforcement and sound design. We offer a diverse season of shows, including large musicals, operas, dance and dramas. Facilities include three well-equipped theaters, a sound design studio and extensive reinforcement equipment.

UNIVERSITY OF THE INCARNATE WORD

San Antonio, TX, www.uw.edu/music/musicdegrees.html. 4-year B.A. in music with an emphasis in music industry studies program. Students take music theory, ear training, business, accounting and music industry studies, as well as arranging, MIDI and digital audio on a Mac G5 running Digital Performer.

UNIVERSITY OF MICHIGAN, ANN ARBOR

www.musc.umich.edu. Four undergraduate degrees let students study a music core curriculum while specializing in separate areas in music technology, ranging from music performance along with technology to the emphasis on electrical and computer engineering. The M.A. degree is a multi-disciplinary program integrating engineering, music and art. An electronic music studio and computer/synthesizer lab; the college of engineering has a full recording studio.

UNIVERSITY OF MISSOURI, KANSAS CITY


www.umkc.edu. 3-year M.F.A. in theater sound. Students create sound scores for the theater through design, technical skills, history, production and entrepreneurship.

UNIVERSITY OF NEBRASKA, LINCOLN

www.unl.edu. 4-year bachelor's of journalism. The College of Journalism and Mass Communications houses the broadcasting department with extensive audio and video production facilities and the university's FM radio station.

UNIVERSITY OF TEXAS, AUSTIN

rtf.utexas.edu. Undergraduate classes include production and post-production, and strictly audio production in radio production classes. M.F.A. program has one required audio-for-picture class, and thesis films are mixed by staff mixer in in-house mix theater. Editing stations with Pro Tools HD and LE systems; second small mix theater.



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> Matt Kirkwold
Class of 1994

> Justin Bonhiver
Class of 2003

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After Justin signed to Sony/Epic with his band Quietdrive the next step was World Record Productions. "Matt and James provided the perfect foundation for our album," he recalls, "they knew just what to take out and what to emphasize."

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James adds, "instructors like Chopper Black gave us the tools we needed to make our love of music into a career."

Justin agrees, "McNally Smith College has given me the extra edge in such a competitive industry."

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UNIVERSITY OF TEXAS, SAN ANTONIO

music.utsa.edu/technology. Music technology certificate program is a 16-credit block of courses in music production, recording technology, synthesis and multimedia.

UNIVERSITY OF WISCONSIN, OSHKOSH

www.uwosh.edu. 4-year B.M. with emphasis in recording technology. Students are trained in a digital tape/hard disk/analog studio featuring a Sony 3000 Series console with automation, lock-to-video, full Pro Tools system with Control24, mastering DAWs and a connected MIDI lab. Auditions are required. Final requirement is a full-semester internship.

VINCENNES UNIVERSITY

Vincennes, IN, www.vinu.edu. 2-year associate's degrees in broadcasting and music recording. Students use Cool Edit Pro, Final Cut Pro, two low-power radio stations that also broadcast on the Net, 50kw contemporary music radio stations and a public TV station with student-run newscast and Vincennes University sports programming.

WAYNE STATE UNIVERSITY

Detroit, www.music.wayne.edu. Recording techniques and concepts for music majors, including sound design creation for video and performance. A surround recording/mixing studio with Pro Tools HD, Neumann and DPA microphones. An electronic music lab with five Pro Tools workstations. A 165-seat recital hall, two music computer labs, 60 rehearsal spaces with pianos and larger spaces for ensembles.

WEBSTER UNIVERSITY

St. Louis, www.webster.edu. 4-year B.A. audio production program. Students work in music recording, film sound, audio-for-video, radio, electronic sound synthesis, theatrical sound design, sound reinforcement, audio for computers, equipment maintenance and audio facility management.

YOUNGSTOWN STATE UNIVERSITY

Youngstown, OH, www.fpa.yzu.edu/music. Bachelor of Music with emphasis in music recording. Recording classes include music recording workshop, digital editing, advanced microphone placement, digital sound design, recording intern and senior project. Faculty is currently working in the industry.

WEST

ACADEMY OF PRODUCTION & RECORDING ARTS

Calgary, Alberta, www.thebeachaudio.com. The certificate courses enable students to learn all elements of audio recording, engineering and production. APRA is located within Alberta's premier recording facility, The Beach Advanced Audio.

ALTA CENTER FOR COMMUNICATION ARTS

Phoenix. 10-week digital audio recording diploma program. Curriculum is created for independent musicians, artists, producers and engineers. Offers a multimedia production program, including digital graphics, video production, animation and Website development.

AMERICAN INTERCONTINENTAL UNIVERSITY

Los Angeles, www.aiula.com. B.F.A. in media production with concentrations in audio and sound recording; computer animation and special effects; editing and post-production; and general media. Starting with a history of popular music, the program allows students to create their own music using MIDI and to record, mix and master live music. Other topics of study include techniques for recording on location and audio post for video.

ART INSTITUTE OF SEATTLE

www.artinstitutes.edu/seattle. 6-quarter A.A.A. in audio production. Program includes studio production, post-production, streaming media, radio production. Required internships, placement assistance upon completion. Hands-on experience: five studios, four DAWs, two 25-seat computer labs.

ART INSTITUTE OF VANCOUVER

Burnaby, BC, www.aivan.artinstitutes.edu. 1-year independent recording arts certificate, 2-year professional recording arts diploma. Students train for careers in music and post-production for film, video, TV and new media. The campus covers more than 55,000 square feet and boasts five recording studios, a mix-to-picture surround studio and automated music production facility.

ASPEN MUSIC FESTIVAL AND SCHOOL

Aspen, CO, www.aspenmusicfestival.com. The Edgar Stanton Audio Recording Institute is an intensive, 4-week, full-time seminar/workshop. Provides a background in the basics of audio production and prepares students for a career as a recording engineer. A wide range of recording and guest lecturers. The session is limited to 10 students.

AUDIO INSTITUTE OF AMERICA

San Francisco, www.audioinstitute.com. Diploma in recording engineering. Home-study course for professional careers and home recording studios. AIA has students in 100 countries around the world. This licensed school specializes in the art of digital and analog recording techniques.

AUDIOME

San Francisco, www.audiome.com. Pro Tools training and certification for both music and post. Master instructors, world-class facilities, small class sizes. In addition to DigiDesign's official curriculum, AudioMe offers ICON D-Control and D-Command training program.



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BANFF CENTRE

Banff, Alberta, www.BanffCentre.ca. Work-study program that provides a bi-weekly stipend with no tuition fee. The audio program runs alongside internationally renowned music programs with prominent faculty and musicians. Facilities include recital hall with adjoining control room, digital multitrack recording studio, Pro Tools post-production suite, Sonic Solutions editing suite, Pyramix digital audio workstation and a multichannel research lab.

CALIFORNIA STATE UNIVERSITY, CHICO

www.csuchico.edu/mus/ra. 4-year B.A. in music industry and technology with an option in recording arts.

CALIFORNIA STATE UNIVERSITY, DOMINGUEZ HILLS (CARSON)

www.csudh.edu/musicdepartment. B.A. and certificate programs. Analog and digital studio, and synthesizer studio. Mackie and Panasonic digital 5.1 mixing consoles, 48 tracks of DA-98 and ADAT multitrack recording, Pro Tools and Sonic Solutions DAWs, and high-res mastering equipment.

CASPER COLLEGE

Casper, WY, www.caspercollege.edu. 2-year A.A. degrees in music performance, music education, multimedia and theater tech. Non-degree students welcomed. Sound Reinforcement I, II and III levels of independent study. Analog, hard disk and Pro Tools LE recording. Aligned with NASM.

CITRUS COLLEGE

Glendora, CA, www.citrusstudios.org. 1-year vocational certificate in recording technology. Two studios with Neve VR and Euphonix CS2000 consoles, Tascam digital, Studer A827 analog and Pro Tools HD recorders. Auditorium for live recordings and film scores, a smaller analog studio and a lab with 25 Pro Tools workstations. The curriculum has courses in engineering, acoustics, live sound, critical listening, digital audio, MIDI and music business.

CITY COLLEGE OF SAN FRANCISCO

www.ccsf.edu. Sound recording/sound design certificates. Program covers analog and digital multitrack techniques, basic tracks, overdubbing, editing, mixing and mastering, mic placement, the console, signal flow, gain structure, music mixing theory and aesthetics, equalization, compression and reverb.

COGSWELL POLYTECHNICAL COLLEGE

Sunnyvale, CA, www.cogswell.edu. 4-year digital audio technology program. Students receive instruction in recording, audio editing, musicianship, and the business of audio and project management. The final three trimesters of study concentrate on audio production tailored to students' specific needs.

COLLEGE OF SAN MATEO

San Mateo, CA, www.gocsm.net. 2-year A.A. program. Core classes: Electronic Music I and II, Sound Creation: Sampling and Synthesis, Audio for Visual Media. Three studios and a state-of-the-art theater. Digital Performer, Peak, ARP 2600V and Max/MSP. Mac G5, MOTU 828 audio interface, ADAT and DAT recorders, mics, various MIDI synthesizers, sound modules and drum machines.

COLUMBIA ACADEMY

Vancouver, BC, www.columbia-academy.com. Students in the 1-year program develop pro skills in engineering, music production, post, digital editing and mixing, tracking and recording, with hands-on experience in broadcast production, audio post and music recording studios. In the music studios, students regularly work with live talent. In post-production, independent filmmakers provide students with feature-length movies, documentaries and short films.

COMMUNITY COLLEGE OF SOUTHERN NEVADA, CHEYENNE

www.ccsn.edu. Certificate in music business and technology covering audio recording, the business of music, computer skills and communication abilities. Pro Tools, Otari 24-track analog, 24 tracks of ADAT and more.

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Tempe, AZ, www.audiorecordingschool.com. 10 certifications. Limited to 12 students, Master Recording Program II secures and requires an internship for graduation. Our 40,000-square-foot facility includes eight control rooms, five studios, two Pro Tools labs, two digital labs, two mix labs and a 6,000-square-foot live sound classroom. Gear includes 26 Pro Tools rigs, SSL, Neve, Studer, Manley, Otari, Universal Audio and more. Financial aid is available.

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Paso Robles, CA, www.cuesta.edu. Cuesta College Recording Studio has been a full-service professional studio since fall 2001. Recording technology and studio procedures are taught in the 1,500-square-foot facility. A fine array of new and vintage gear, as well as current digital recording equipment.

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GLENDALE COMMUNITY COLLEGE

Glendale, AZ, www.gc.maricopa.edu. 2-year associate degree, 2-year certificate program in audio production technologies. Classes cover principles of sound recording with emphasis on acoustics, signal flow, mic selection and recording equipment, sound reinforcement, DAWs, music business, electronic music, music theory, aural perception and internships. Facilities include a state-of-the-art studio and lab with 25 individual Pro Tools stations.

GLOBE INSTITUTE OF RECORDING AND PRODUCTION

San Francisco, www.GlobeRecording.com. Audio Producer associates, Psychoacoustics and Sound Healing associates, Audio Recording and Production certificate, Music Business certificate, Audio for Media certificate, Digital Composition certificate, Disc Jockey certificate, Digital Audio Workstations certificate, Psychoacoustics and Sound Healing certificate. Hands-on intensive recording classes on major equipment. Five studios with Pro Tools, Reason, Live. World-renowned 3-D visual system as a tool for explaining and showing how to create a great mix.

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Pittsburg, CA, www.losmedanos.edu. 2-year A.A., 2-year recording arts certificates. Faculty honored with multiple Grammy Awards and nominations. Two fully equipped 24-track studios, with Studer and Alesis ADATs, Otari MX-70 and MTR-90 multitracks, and Pro Tools. Fully accredited.

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MESA COMMUNITY COLLEGE

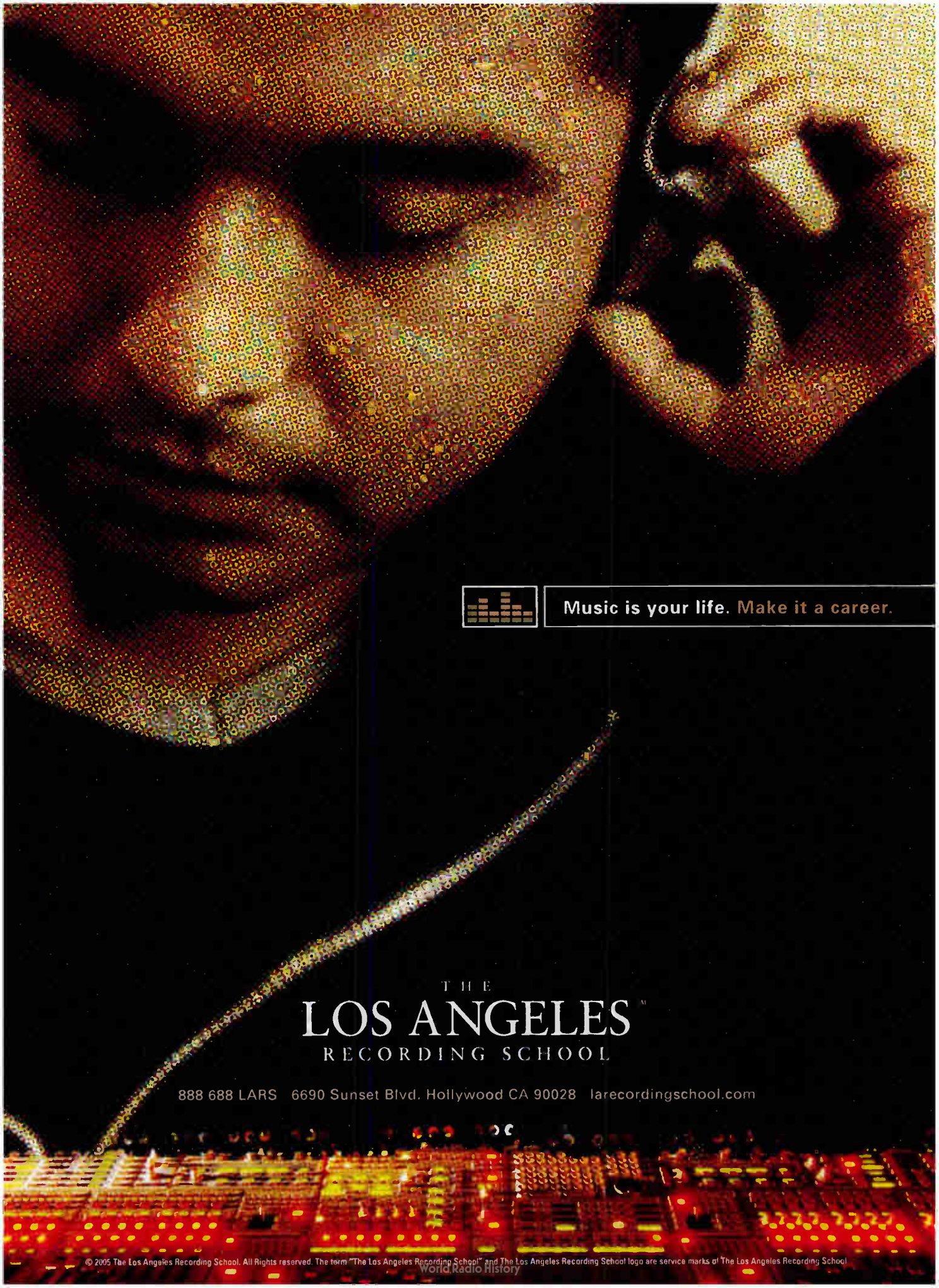
Mesa, AZ, www.mc.maricopa.edu. 2-year A.A.S. in audio production technology, 1-year certificate of completion in audio production technology. Classes in studio recording, live sound reinforcement, DAWs, electronic music (MIDI and digital audio), music business, music theory and more. Two recording studios: one equipped with a Solid State Logic console and the other with a Trident console. AKG and Neumann microphones, and high-end outboard processing. With a huge two-story studio proper, we accommodate orchestras, choirs, big band jazz and pop music bands.

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MIRACOSTA COLLEGE

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Vancouver, BC, www.pacificav.com. 1-year diploma programs in audio engineering/production, film/music business, game design and film/digital arts. World-class commercial recording studio. Film students graduate with a pro portfolio and studio experience. Game design students graduate with a completed game and a game engine license.

PYRAMIND

San Francisco, www.pyramind.com. 8-month certificate programs: digital producer, post-production and electronic music producer. Hands-on training interacting with industry professionals in the recording studio and classroom. Students learn current software and hardware skills and techniques for media and music production.

ROCK 'N' ROLL RANCH STUDIOS

Las Vegas, www.rocknrollranchstudios.com. 20-week course covers basic to advanced recording techniques and skills.

SACRAMENTO CITY COLLEGE

Sacramento, www.scc.losrios.edu. 2-year program encompassing live sound reinforcement, studio audio engineering, and post-production editing for picture and for sound and independent projects. Associate degrees or certificate programs.

SAN DIEGO COMMUNITY COLLEGE

San Diego, CA, www.sdccd.net. 2-year A.A. in electronic music. Students receive a well-rounded music education while focusing on Pro Tools in a Mac-based lab. Graduates are prepared for entry-level positions in recording studios, radio and TV stations, multimedia facilities including Web-based production, as live sound engineers, etc.

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Santa Barbara, CA, www.sbccc.ca.us.

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Santa Monica, CA, academy.smc.edu. Certificates and A.A. degrees. The interactive media program is a comprehensive course in the design and implementation of Websites, interactive entertainment and other media. The program emphasizes high-quality design driven by real-world business, entertainment and technical requirements.

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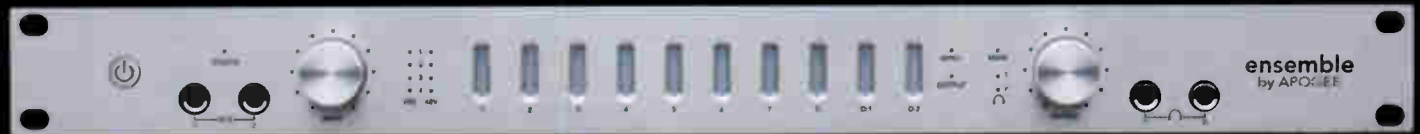
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www.du.edu/lamont. 4-year concentration in audio production within the jazz and commercial music program. The school is housed in the Newman Center for the Performing Arts, comprising state-of-the-art classrooms, concert halls and a Pro Tools HD-based studio. Students work in the electronic music studio and on the Yamaha PM5D and Sony Oxford digital consoles.

UNIVERSITY OF OREGON, EUGENE

darkwing.uoregon.edu/~fmo. The curriculum balances the development of artistic and creative skills with the mastery of the discipline's technical aspects. Courses emphasize music composition, performance and real-time interactive media environments. Focus is on creation of experimental types of musical content.

UNIVERSITY OF THE PACIFIC

Stockton, CA, www.pacific.edu/conservatory/music_conservatory.asp. 4-year bachelor degrees in music composition and music management. Introductory and advanced training in the use of music technology for composers and music-management professionals.

UNIVERSITY OF SOUTHERN CALIFORNIA

Los Angeles, www.usc.edu/schools/music/programs/industry. B.S. degree. The technology track emphasizes recording, MIDI and other music technologies. Computer lab with 15 workstations, featuring Pro Tools, Logic, Reason, Finale and Digital Performer. Our main studio has Pro Tools HD, ProControl 40-fader worksurface, and a large selection of microphones and outboard equipment.

VANCOUVER FILM SCHOOL

Vancouver, BC, www.vfs.com. Digidesign Operator certificate. Audio engineering for visual media. Students learn the culture of the industry by designing sound for film, games and animation, and specialize in mixing, dialog editing, recording or music production. All students graduate with original demo reels.

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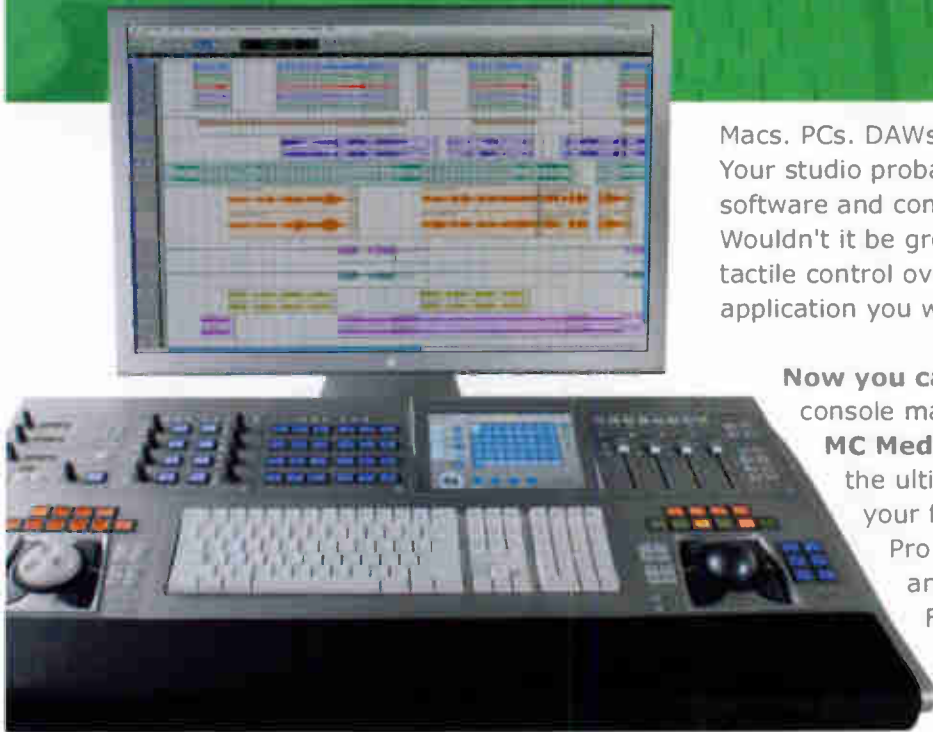
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You Can Take It With You

Mobile Audio Explodes Sans Standardization

I've always wondered just what went into creating mobile audio and how to get into the development community. Mobile audio these days is very similar to computer audio nearly 20 years ago. There are hundreds of different kinds of devices, each providing different audio capabilities—from beeps to MP3s. Considering that ringtones take up about 10 percent of the world's music-publishing market, according to recent reports, and that there are more than 30 million iPods and that nearly every videogame publisher has a mobile department, this is an area worth exploring. People are taking music with them in ways that the original Walkman couldn't have portended.

And why shouldn't they? Quality is improving and you can't beat the convenience. But let's get real: With this unprecedented freedom comes a market scrambling for standardization. The *Highlander* phrase applies now just as much as it did with VHS and Beta: "There can be only one." The closest thing to the "one" at the moment is the ubiquitous MP3 (though iTunes, the world's largest digital music store, uses AAC and its copy-protected variants), but under the hood of most cell phones resides a widely varying set of playback mechanisms requiring a lot of patience to navigate. When you consider that there are more than 15 ringtone formats alone, we're talking *a lot* of patience.

Don't panic—getting into ringtones isn't too difficult if you combine knowledge of MIDI and creating stereo digital files (and 5.1, with the Samsung SCH-B570 cell phone) with a middleware tool like Ringtone Creator Pro from unwiredtec or mobileBAE from Beatnik. Considering the size of the ringtone market, this is a pretty low barrier to entry, and if you become an expert at converting music into the best possible sound over such tiny speaker systems, then the biggies at major record companies might just take you up on converting part of their enormous back catalog into ringtones.

While ringtones have captured the imagination of the national consumer media, they are only part of the mobile audio picture. Game development and manipulation of audio interactively on phones is a more complex task. And the market is only going to get bigger. To help answer some questions on this front, we visited with Phil Sorger, president of Sandcastle Studios (Carlsbad, Calif.), one of the country's biggest mobile game developers.

Sandcastle Studios develops mobile games for a wide range of phones and handheld devices appearing on North and South America's largest carriers, including Verizon, Sprint, Cingular, T-Mobile and Vivo. Publishing and technology partners include MLB.com, Electronic Arts, Blaze, Qualcomm and Sony Pictures Digital.

"For mobile audio," Sorger says, "Sandcastle starts



with assets provided by the publisher or commissioned to external composers and sound designers, and then converts those assets as needed to the target platform. For Qualcomm chipset devices, Sandcastle uses the BREW SDK and CMX Studio to prepare sounds for the appropriate chipset. For Java-based phones, we use device manufacturer's tools—like those available from Sony Ericsson and Nokia—to convert and create game-ready files. Since most devices still support General MIDI, Sandcastle applies MIDI composition and sequencing tools to maximize the emotional impact and still work within each device's audio constraints."

But not every project requires pushing the limits of a device's audio capabilities. *Madden 2006* for EA Mobile blended voice-overs from John Madden and Al Michaels with grunts, groans and tackle sounds, as well as a MIDI menu score to create a rich multimedia experience. At the same time, CBS SportsLine Fantasy Companion has no sound at all.

FORMATS, PLEASE

Either way, sound or no sound, the need for standardization is accelerating. Kids on Sprint want to play with kids on Verizon. And music publishers would obviously like to control the quality of ringtone downloads across all formats to keep the buyers coming back. So just who is handling formats for the numerous phone types? You can't just send a WAV file to a phone and have it play back. You need to send several dozen different kinds of WAV files using more than just Pro Tools or Cubase, as Sorger has demonstrated with the use of BREW and CMX Studio.

To help tackle the format issue, the Interactive Audio Special Interest Group (www.iasig.org) has formed a Mobile Audio Working Group, with representation from companies such as Philips, Dolby and QSound. To discuss the IA-SIG's effort, we talked to Brad Fuller, Steve

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Horowitz and Jim Rippie of MAWG. The organization has two goals: to discuss methods of interactive composition on mobile devices and to publish recommendations and guidelines for production techniques.

But MAWG isn't a standards group, Fuller cautions. It's more of a recommendations body. The group plans to release a document soon, stating problems with mobile technology and recommended solutions. For instance, looping standards for MIDI don't exist, and MAWG members have established desired criteria for a looping standard.

"There are many parallels to early computer audio," says Horowitz. "Just like back

in the '80s, it's common to have a processor that specializes in digital signal processing to support sufficient audio features. Now and in the recent past, we're pretty accustomed to having plenty of horsepower on the CPU to direct to audio features. And in gaming, even the processor budgets dedicated to audio processing have relaxed a bit in recent years." Mobile terminals are still in a conspicuous "do more with less" mode, and this is made even more interesting by the aggressive power-consumption techniques employed by handset OEMs and component manufacturers.

There's another element of "early com-

puter audio" that's often overlooked: You hear your carefully crafted audio on *miserably* underspecified speakers, frequently in mono. Even worse, because handset designs change frequently, manufacturers sometimes swap a more capable speaker for a cheaper one, either for cost savings or because they've completely switched suppliers. These switches sometimes push all audio on the device through a brute-force compression to guarantee loudness.

Still, development continues and quality will only get better, as evidenced by some of the high-end phones now on the market. According to Horowitz, "Each carrier has different high-end phones like the LG8000. T-Mobile and Cingular both carry those, but every six months this changes. The way the carriers make money is air time and the additional services, but the churn rate on phones is six months to one-and-a-half years, so they won't make money on the phone."

At the same time, Fuller cautions not to place your bets on ringtones. "I think ringtone work will eventually go away for audio developers," he says. "Most people are going to want the latest pop tune, and phones will be more capable of playing MP3s and the like. Many studios did very well porting ringtones to MIDI, but this is going to fade.

"[Mobile audio] is definitely tough. There are a lot of musicians that know MIDI and know how to use General MIDI. But there is a problem with mobile GM: It often isn't a complete set in many mobile phones. There are subsets of GM that you need to know, like guitar, for instance. Many phones have just one guitar instrument rather than the other GM guitars, so your composition has to take that into account.

"Nokia has several phones that contain a subset of general MIDI," he continues. "So if you want guitar, you need to write for the single guitar to account for the subsets. You can't necessarily write a rock tune with distortion guitar that has a lot of bends in it because some of those bends are subsets, as well, and the range of the bends differ from subset to subset."

If you want to get into mobile audio the easy way, wait until streamed and compressed audio becomes commonplace in cell phones and other embedded systems. (Yes, even GPS requires audio.) But for now, there are solutions for the large number of formats. As Fuller puts it, "They're formats. They shouldn't stand in your way." ■

Alexander Brandon is the audio director for Midway Home Entertainment in San Diego, Calif.

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Dialog Replacement 101

Never Underestimate the Value of Good Dubbing

By Blair Jackson

So far in our periodic in-depth series about the film sound chain, we've looked at production sound mixing (April 2004), sound effects recording (July 2005) and Foley recording (September 2005). This month, we examine the world of ADR—automated dialog replacement, also known as looping or dubbing (or post-synchronization in Britain). As most of you know, this is the critical procedure in which dialog is recorded in a studio for any number of reasons: to replace existing production sound that is not usable either for technical considerations (usually due to a noisy location) or editorial ones (lines of dialog have been changed); to add a voice-over to a film (often planned from the outset, but occasionally added at the last moment to help clarify

MIXER BACK STORIES

Like so many people in film sound, Universal Studios Sound's Jeff Gomillion was born into the business, so to speak. His father, Ted Gomillion, was a production sound mixer in the '60s, a re-recording mixer in the '70s and ran his own (now defunct) post facility in Hollywood: the Gomillion Theater, which opened in 1981 and was regarded as one of the most technologically advanced independent stages in Hollywood. "My dad hoped I'd go into the business, so he put me to work," Jeff Gomillion says from the control room of ADR 4 in the Hitchcock Building on the Universal lot. "At first, I resisted a little bit. He wanted me to go to SC film school, but I spent so much time at his facility and got into the union at 18 as a projectionist, and shortly after that in the sound local [union]. I started off doing re-recording and I actually did ADR on those shows, as well; it was a small facility. I'd do the ADR and the Foley, and I mixed the effects and Foley on the final dub. I'd sit next to the dialog mixer and I learned a lot about what a dialog mixer needs to do to make ADR work. Most mixers come into the busi-

ness and do ADR for a long time or Foley for a long time and then they go to re-recording, but I did it the other way." Gomillion's credits include dozens of features—*As Good As It Gets*, *The Pink Panther*, *The Ring Two*, *The Chronicles of Riddick*, *The Cat in the Hat*, *The Scorpion King*, *The Fast and the Furious*, *Memento*, *Bram Stoker's Dracula*—and regular TV work, including *Desperate Housewives* and *24*.

Film sound was also in Charleen Richards-Steeves' blood: "My grandparents owned a couple of little non-union studios," she says from her ADR room on the Fox

lot. "My grandfather—Dale Knight—started doing production mixing at RKO. My cousin and my uncle also did production mixing, so I started working for them. I used to go out in the summers and help around there, but mostly I did their books, because at the time, women were not allowed in the union. Then the guy who was doing transfers disappeared, so I learned how to do that, in addition to typing up the bills and doing the books. After a while, it got real busy around town and [the studio] became a signatory with the union, and by then, they were letting women in the union—I was probably 23 or 24." She soon gravitated to film sound jobs, beginning with Foley work and eventually settling in at ADR. Among her more than 150 credits (including 20 just in 2004 and 2005) are *Munich*, *Fantastic Four*, *War of the Worlds*, *The Incredibles*, *Collateral*, *Shrek 2*, *The Last Samurai*, *Seabiscuit*, *Minority Report*, *Pearl Harbor*, *JFK*, *L.A. Confidential* and *Fight Club*.

A guy with a name like Doc Kane *should* be a crusty 75-year-old who got his start with Orson Welles in the late '40s. But actually, Kane has only been mixing ADR since the mid-'80s—still plenty of time to become a beloved and nearly legendary figure. An L.A. native, he first became interested in sound through music. "I played drums in a band in high school and college, and at one point, we borrowed all our dads' tape recorders and overdubbed ourselves to sound like eight guys," he says from the Disney lot, where he's worked for the past 17 years. "I was not a very good drummer; I was actually better on the engineering side.

"But what affected me most is when I was in high school, we used to get out early on Fridays and go hang around down at Paramount—Paul Hagggar was the head of the sound department and he would let us sit on the scoring stage. This is around 1972," Kane continues. "When I got out of high school, I got a job working on a sound effects library. I didn't know what film sound was until I worked for a guy named Richard Einfeld, who taught me about production sound using a Nagra and boom mics. We did a lot of police training films: I was the location mixer and did the lights—wearing all the hats.



On the ADR soundstage at Fox in Los Angeles

a hazy plot); to add group voices not covered by production sound; to record dialog for an animated production; or to dub the film into another language. It is an exacting craft that requires great teamwork between the ADR team—usually a supervisor, who helps determine which lines need to be re-recorded, an ADR "mixer," who actually runs the session, and some sort of tech assistant/recorder—and the actors.

We spoke with three of the best ADR mixers in Hollywood to get a sense of the scope of their job and how changes in technology are affecting what they do.

They were looking for sound people at another studio called Sound Services [SSI] and I learned how to record voice-over and cut commercials on quarter-inch. From there, I went to work for [director] Hal Ashby, who was putting together a sound-transfer and video-transfer company—he was one of the first directors to cut on video with the Betamax. Then I went to Warner Hollywood [Goldwyn], and from there over to Disney.” As you’d expect, Kane’s resume is peppered with scads of animated films—including *Aladdin*, *Pocahontas*, *A Bug’s Life*, *Monsters Inc.*, *The Incredibles*, *Chicken Little* and *Cars*—but among his nearly 200 credits are scores of films of every variety, such as *National Treasure*, *Ladder 49*, *The Village*, *Panic Room*, *Meet the Parents*, *Rush Hour*, *Good Will Hunting* and *Magnolia*.

THE BIG PICTURE

Clearly, one of the thrills of working in ADR is the incredible variety of projects. “There’s no ‘typical’ film,” Kane says. “Sometimes it can be two days, sometimes it can be three weeks or a month. And it’s not constant. Sometimes we work on something for two days, and then don’t see them again for another few days. Sometimes we work all week or a day here, and then two weeks later it’s two days. It’s never the same. Every film is different. Every day is different. That’s what’s fun about it.”

“When I first started doing this, a show would come in and it would be all cut and you’d work on it maybe a week and get everything done,” adds Richards-Steeves. “But these days, it’s more likely that the ADR is being done by several different people—now you’re just doing parts of it because schedules are weird and actors are all over the place, and now you have ISDN, so you might have an actor in New York or London and the director in L.A. So I’ll do some and Doc [Kane] will do some, Tommy [O’Connell] will do some. It’s gotten quite complicated. Working on several different things at once now is typical.”

“It depends on the director and the kind of film it is [whether there is a lot of ADR],” Gomillion says, “but in general, I’d

say there’s less than there used to be. In the old days, they would loop hundreds of lines. Now on a feature, the typical amount might be just 30 or 40 lines on a sit-and-talky kind of movie.” One reason for that is production sound recording has become more reliable in recent years with the widespread adoption of RF microphones used in addition to traditional booms, as well as allowing more characters in a scene to be heard clearly regardless of the location.

IT ALL STARTS WITH THE MIC

The actual work of recording ADR has not changed *that* much through the years. It still involves recording actors in a studio, usually (but not always) working to picture. But within that job description, there is much variety and many layers of nuance. There is the delicate art of trying to match new dialog to existing production tracks, with all their ambience, differing sonic perspectives, etc. Mic selection and placement and understanding how the dialog fits in the scene are still perhaps the most critical components of the job.

“There are a lot of variables when it comes to mic choice,” Gomillion offers. “You want to know what they used on the set [to record the production track]. That helps get you in the ballpark. Is it the Sennheiser MKH Series and Neumanns? Or neither? Even though they use certain mics, when you get in a controlled environment with a lot of sound deadening [like an ADR studio], you might not be able to use the same mics because the coloration is different. I would say the Neumann KMR 81 and TLM have, for lack of a better word, the apparent coloration on them that makes them sound production-like. But lavs are very different, so it helps to know specifically what they used, and then we’ll go out and rent those



Universal Studios Sound’s Jeff Gomillion started in re-recording before ADR work.

or try to match them.”

“I used to use the Neumann U86s,” Richards-Steeves says, “but everything started to change when they went to digital recorders [instead of Nagra] on the set; those big, warm mics don’t work so well when you’re trying to match. Currently, I mostly use a Neumann KMR 81 and a Neumann 87, and a few different lav mics.”

Kane notes, “It usually comes down to a Sennheiser or a Schoeps [shotgun]. And now with radio mics, which have gotten better, the way we shoot ADR is we find out what the production mixer used and then if he shot on a [Zaxcom] Deva [digital recorder], he probably shot four channels, but we probably don’t need that because the other two channels are often background mics. So when we get it from the picture editors, it’s usually a combination of the lav and the boom, so we find out what they used on production and then we’ll shoot a lav and a boom to Pro Tools.”

“When the shot changes, I change,” Kane continues. “If there’s a mic angle change and you can hear it, if we’re listening to the actor and the actor sounds a little close-miked, we’ll move the actor in or move the mic in. And if in the next shot you hear a little more ambience, we’ll have the actor move back so we can match all the mic angles.”

However, Richards-Steeves adds, “Sometimes dealing with tracks from these 4- and 8-track recorders [used by production sound mixers] makes it more complicated because they’re miking so

many things, and unfortunately when we get the stuff, they've smashed things down and you're getting more than one of the mics. It's very different than when it was film and the editors would prepare a work track and you knew everything was at zero level. Now you wonder, 'Is this what the actual production sounds like?' because a lot of times it isn't. Sometimes they take it into the editing room and they do little mini-mixes and they EQ, so you're not really sure anymore what it sounded like [on

the set] and what you're supposed to match."

IN THE EDITING ROOM

In the past few years, Pro Tools has become the de facto standard for recording and editing ADR. "Pro Tools has really revolutionized everything," Gomillion says. "It not only makes the editor's job easier, it makes *my* job easier because it's often difficult for a client to imagine how a line's going to work. But with Pro Tools, it makes presentation, as far as synching a line, very easy—right on the spot. In the old days, we'd have to take the single stripe down and go to the bench for 15 or 20 minutes. You do that now and the actor's out the door! [Laughs] Now it just takes a few seconds and they can even do some other things with plug-ins and whatnot to give a better sense of how it will sound.

"I have an [Eventide] H3000 Harmonizer and I use the Sampler feature to capture a piece of background [from the production tracks], and then I'll loop it



Doc Kane has been mixing ADR since the mid-'80s.

behind [the newly recorded dialog] in Pro Tools on a separate track to help sell that the lines match across," he continues. "Plus, if an actor is having trouble matching a line, it's so easy to instantly play it back for them right there rather than having to cycle through the system and take another 30 or 40 seconds each time, like we had to do with tape. It speeds it up, they get a fresh read and we go right into record."

Richards-Steeves adds, "You can try a lot of things you couldn't try before, and



From left: Charleen Richards-Steeves with her engineer, Derek Casari, and recordist Dave Lucarelli



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you can adjust and move and do things like put a pause in or clip the end of a word so much more easily. The downside of that is that sometimes it can actually slow things down, because if you get a director who's constantly asking to do things, you're not just flowing along and letting the actor keep doing his thing."

THE HUMAN FACTOR

This brings us to a delicate part of the job: working with actors. Now, no one is expecting ADR mixers to actually direct actors' performances, but the fact is, they must be

sensitive to their mood swings, make them as comfortable as they can and, above all, make sure that the recordings are as clean and present as possible.

"I think it would be good if all actors had to take a post-production history course because they don't realize how good they have it now," Gomillion says with a chuckle. "Even as recently as the early '90s, if we had to loop only two or three lines in a scene, we would end up looping the whole scene. Now, with Pro Tools and being able to match things so that our playbacks and our presentation can sell the director and the actor that it's going

to work, things move so much faster.

"Still, on our end, the most important thing you can do for an actor is to make them comfortable," Gomillion continues. "And [at Universal] we have an outstanding craft service. You come into our ADR stages and they are like living rooms. A lot of actors come in and they don't really like [doing ADR]. I'm behind the glass and my input is mostly technical: 'Is the sound quality good for you?' 'Can you be perhaps a little louder?' Usually, the sound supervisor will concentrate on the sync, and the director—or it might even be a picture editor or, in the case of a TV show, an associate producer-type—is really concerned about the performance, and my job is the sound quality. We cross over into each other's worlds a little bit and help each other. It's definitely a team."

"You have to know when to say something and when not to," adds Richards-Steeves, "because the most important thing is trying to make everything calm and peaceful and not have so much gab from the booth, unless you have to. The most important thing is to keep things moving transparently."

What if an actor really can't get a line down? "You have to be patient," Kane says, "and if they're really frustrated, we sample the line and put it in their ear and do a hear-it, say-it thing: We put the line in their headphone, we run the tapes wild and then we might do a series of 20 of them and then, if need be, we piece it together. We use an Eventide sampler for that, and now with Pro Tools, obviously you can use that, too."

Some ADR mixers will deliver their files to the stage flat—with no EQ—so that the dialog editors and re-recording mixers can do what they need to do in cutting and, if necessary, treating the tracks. "Once it's on the stage," Richards-Steeves says, "they can EQ it or put reverb on it or effects or 'worldize' it. They can do all those cool things that dubbing mixers have as their little tricks. At that point, we're done with it." Kane, however, says he's constantly making small adjustments, trying to match the production sound's EQ to the newly recorded ADR.

And, usually, the ADR mixers don't know how the dialog they've gone to such pains to record will sound in the finished film. "I'm surprised all the time!" enthuses Kane. "I'm constantly amazed by it. The mixers on the stage have gotten so good they can take some pretty bad stuff and make it sound good, and they can take what we give them and make it sound like just about *anything*." ■

Blair Jackson is Mix's senior editor.

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Wireless Wonders

TOP-OF-THE-LINE HANDHELD SYSTEMS FOR LIVE SOUND

by Matt Gallagher

Despite anxiety over the wireless frequency crunch that's slated for February 2009—the date that the FCC has chosen for analog transmission to cease—the demand for wireless systems keeps growing, particularly in live sound applications.

Wireless system manufacturers continue to meet the challenge of developing more efficient and user-friendly systems, even as available frequencies become increasingly scarce. We surveyed manufacturers' current top-of-the-line handheld units for live sound and found a wide array of systems and features, priced for any application.

AKG's (www.akgusa.com) WMS 4000 system operates in the 650 to 790MHz UHF range and is priced from \$1,474. The WMS 4000 can access up to 1,200 channels (depending on conditions) for using more than 50 systems at once. The HT 4000 handheld comes in a choice of three dynamic and three condenser capsules. It features jog wheel control and a backlit display, showing battery life, frequency, channel/preset groups, gain setting and mute. The optional CU 4000 charging station comes with two "Smart Batteries." The transmitter operates for 15 hours on two AA alkaline batteries or 12 hours on two AA rechargeables. The half-rack SR 4000 receiver has front-mount antennae and a backlit LCD indicating audio input, RF level, mute, frequency, group or user ID, and diversity switching, along with battery life and setup parameters. The receiver has balanced XLR and unbalanced ¼-inch outs and a data port for computer monitoring/control. An optional network hub interfaces with Harman Pro's HiQNet system. The SR 4000 accommodates two diversity antennae; also available are a master antenna pair (directional and omni, with/without booster), an antenna splitter and multi-coupler.



Audix RAD-360 system offers 193 channels between 638 and 806 MHz.

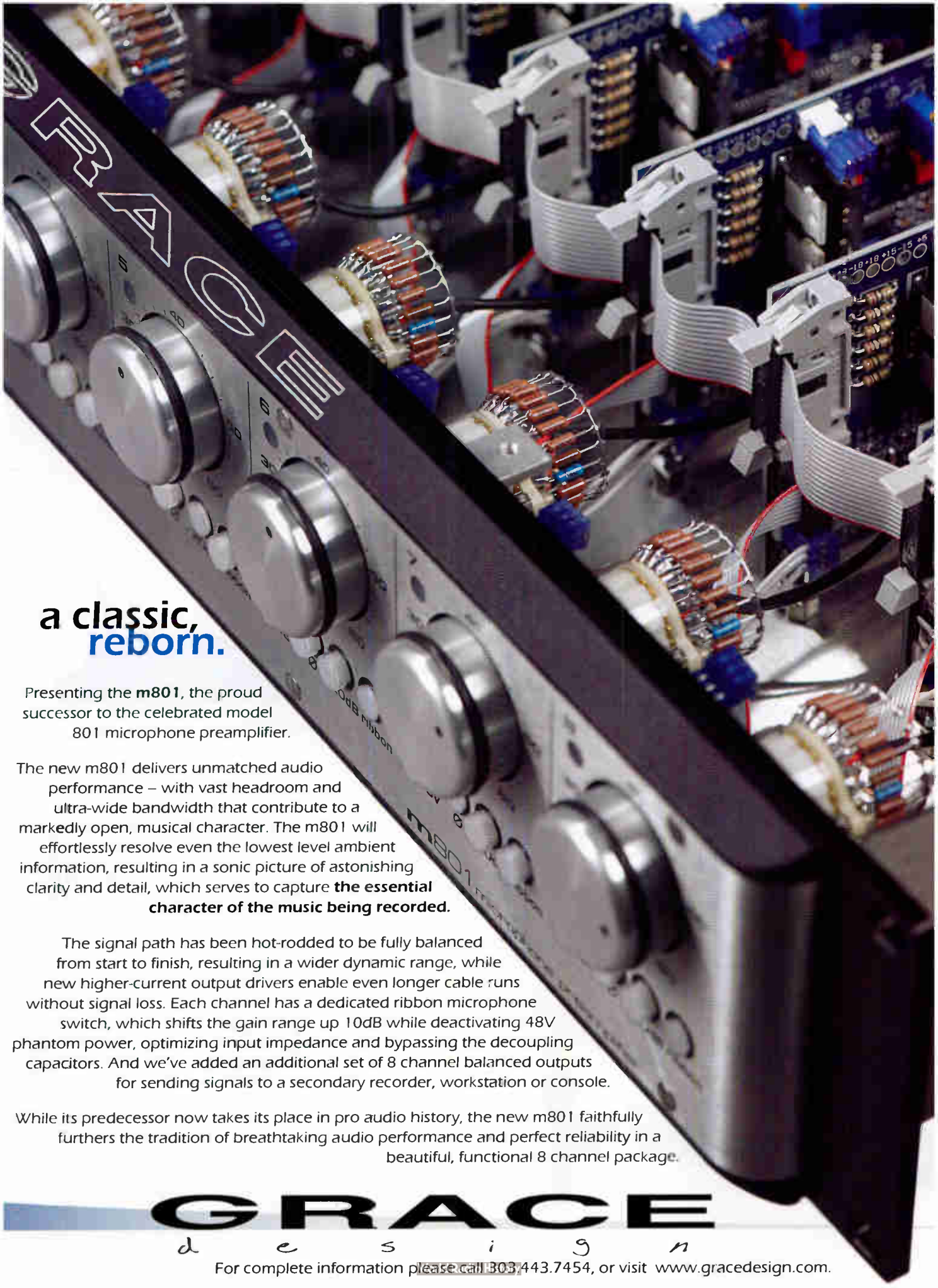
Audio-Technica's (www.audio-technica.com) Artist Elite 5000 Series AEW-5255 (\$3,999) includes two AEW-T5400 cardioid condenser handheld transmitters and one AEW-R5200 dual receiver with XLR output, ¼-inch TRS balanced jack and a headphone output. Another ¼-inch jack lets the user mute the system via a footswitch. The system offers 200 channels per band, available at 541.5 to 566.375 MHz, and 655.5 to 680.375 MHz. The system has two front-mounted UHF half-wave antennae and an IntelliScan feature, which automatically finds and sets the best available frequencies on all linked receivers. Its dual-compressor circuitry processes high and low frequencies separately. The receiver's on-board Ethernet interface allows monitoring and controlling system parameters with AEW Control Interface software. All transmitters have a metallic chassis, programmable features, soft-touch controls and output power switchable between 10 and 35 mW. The transmitter operates up to eight hours on two AA alkaline batteries.

Priced from \$689 to \$1,169, the Audix (www.audixusa.com) RAD-360 system offers 193 channels between 638 and 806 MHz. The half-rack RAD-360R true-diversity receiver has an optional amplified antenna distribution system, allowing up to four systems to run off a single pair of antennae. Up to 16 systems can operate simultaneously. Available with four Audix OM Series mic capsules, the



Audio-Technica Artist Elite 5000 Series comprises two cardioid condenser handheld transmitters and a dual receiver.

Available with four Audix OM Series mic capsules, the



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Azden enters the live sound market with its 511HTH.

RAD-360 handheld has a gain-setting control with 10/20/30dB pad to prevent overload distortion. A menu-driven LCD shows frequency selected, audio signal strength, A/B antenna indicator, mute, RF, battery indicator, audio levels and lock/unlock status. The system also offers soft-key controls for gain setting and frequency selection, noise-squelch circuitry, Surface Acoustic Wave (S.A.W.) filters and tone-key squelch. The transmitter operates up to 12 hours on two 1.5-volt AA batteries.

Avlex Corporation's (www.avlex.com) ACT-707 Series UHF 100 true-diversity, frequency-agile wireless systems, priced from \$820 to \$3,580, operate between 620 and 692 MHz with a choice of three handheld transmitters. Sixteen systems per frequency band can operate simultaneously, and the ACT-707DE receiver is available in 1, 2 or 4-channel models. Outputs are balanced XLR and unbalanced 1/4-inch. Power supply is internal 90 to 264 VAC switching type. The color LCD shows the user's name, group/channel, frequency, transmitter battery status, squelch level, RF/AF metering and PC address. An Automatic Channel-Targeting function selects the channel setting and automatically locks the receiver/transmitter to the same frequency. The system operates up to 20 hours on two AA batteries.

Azden's (www.azdencorp.com) true-diversity 511HTH (\$735) UHF handheld system comprises the 511DRH half-rack receiver and the 51HT handheld, unidirectional dynamic microphone/transmitter.



Lectrosonics Venue's Soundcheck mode finds possible dropouts.

The receiver has an internal antenna and operates between 793.875 and 805.875 MHz, with true-diversity operation over 63 user-selectable UHF frequencies. The system can operate for up to eight hours on two AA alkaline batteries.

The Opus 800 Series system from Beyerdynamic (www.beyerdynamic.com) operates in four frequency ranges (740 to 764 MHz, 774 to 798 MHz, 798 to 822 MHz and 850 to 874 MHz), offering 961 preprogrammed frequencies per channel and an integrated spectrum analyzer for manual frequency selection. It includes the rackmount Opus 800 MF receiver (\$719), NE 800 C receiver (\$419) and Opus 800 software (\$599). The receiver has a rear-mounted antenna, and its color LCD indicates frequency, group and channel, squelch, battery status, user's name, and RF and AF level. Sixteen systems are simultaneously operable, and four handheld transmitters are available: the SDM 860 (\$369), SDM 860 M (\$599), SDM 869 (\$369) and SEM 881 (\$419). Opus 800 software allows for real-time control of a maximum of 64 channels or 64 NE 800 receiver modules. The system also offers a memory function for system settings and signal history. The transmitters can run on two 1.5V AA alkaline batteries for up to 20 hours.

The new REV system (prices start at \$1,890) from Electro-Voice (www.electro-voice.com) features detachable half-wave antennae and operates with synthesized PLL-agile UHF REV-S single and REV-D dual receivers over four frequency bands—614 to 638 MHz, 650 to 674 MHz, 674 to 698 MHz and 722 to 746 MHz. Factory-set channel groups allow 16 systems to operate simultaneously in one frequency band. More than 950 possible channels are programmable in 25kHz steps across a 24MHz operating bandwidth. The receiver's LCD shows group, channel, diversity, label and setup. Advanced ClearScan automatic group and channel selection provide quick setup. REV offers four capsule options and two handheld body styles. REV-Link PC software

enables remote monitoring, control and programming over a CAN bus connection through an E-V UCC-1 converter or E-V Netmax N8000.

Lectrosonics' (www.lectrosonics.com) Venue (\$2,395 per complete channel) UT handheld transmitter and Venue modular receiver operate in UHF frequencies between 537 and 800 MHz in 25.5MHz blocks, with 256 frequencies per block; up to 70 channels are simultaneously operable. The Venue modular receiver can house up to six channels of either standard or tracking-filtered receiver modules in one rackspace, and it includes rear-mount antenna connections with DC power for RF amplifiers. The receiver shows transmitter battery level, audio level, signal strength, diversity mode and antenna phase (in switched mode). A Soundcheck mode helps determine potential dropout locations. The system's native Digital Hybrid Wireless mode provides compander-



Beyerdynamic Opus 800 Series includes receivers and software.

free audio with compatible transmitters, and compatibility modes allow use with older analog transmitters. The UT handheld transmitter (\$1,745) has a Vari-Mic preamp with 3-band tone control. Available condenser capsules include cardioid, supercardioid and omni patterns. The system runs on alkaline 9V batteries for four hours, and can be monitored/controlled with supplied PC software, and networked via USB and RS-232. The SNA600 folding dipole and ALP600 LPDA directional antennae are optional.

Nady Systems' (www.nady.com) newest flagship product is the \$739 UWS-1. Featuring true-diversity circuitry, it's available in three frequency bands in the 760 to 864MHz range. The PLL-controlled system has 1,000 user-selectable channels per band. The receiver uses dual rear-mount, right-angle antennae with 9VDC phantom power for optional remote-powered antennae. IF filtering allows operating multiple UWS-1K systems in the same location. Its backlit LCD indicates the selected channel/frequency, SQL level, receiver RF level, A/B diversity

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status, transmitter battery level and audio LED bar graph. The UH-1K handheld has an internal antenna system and a Nady DM-10D neodymium capsule. It operates for up to 10 hours on two AA batteries.

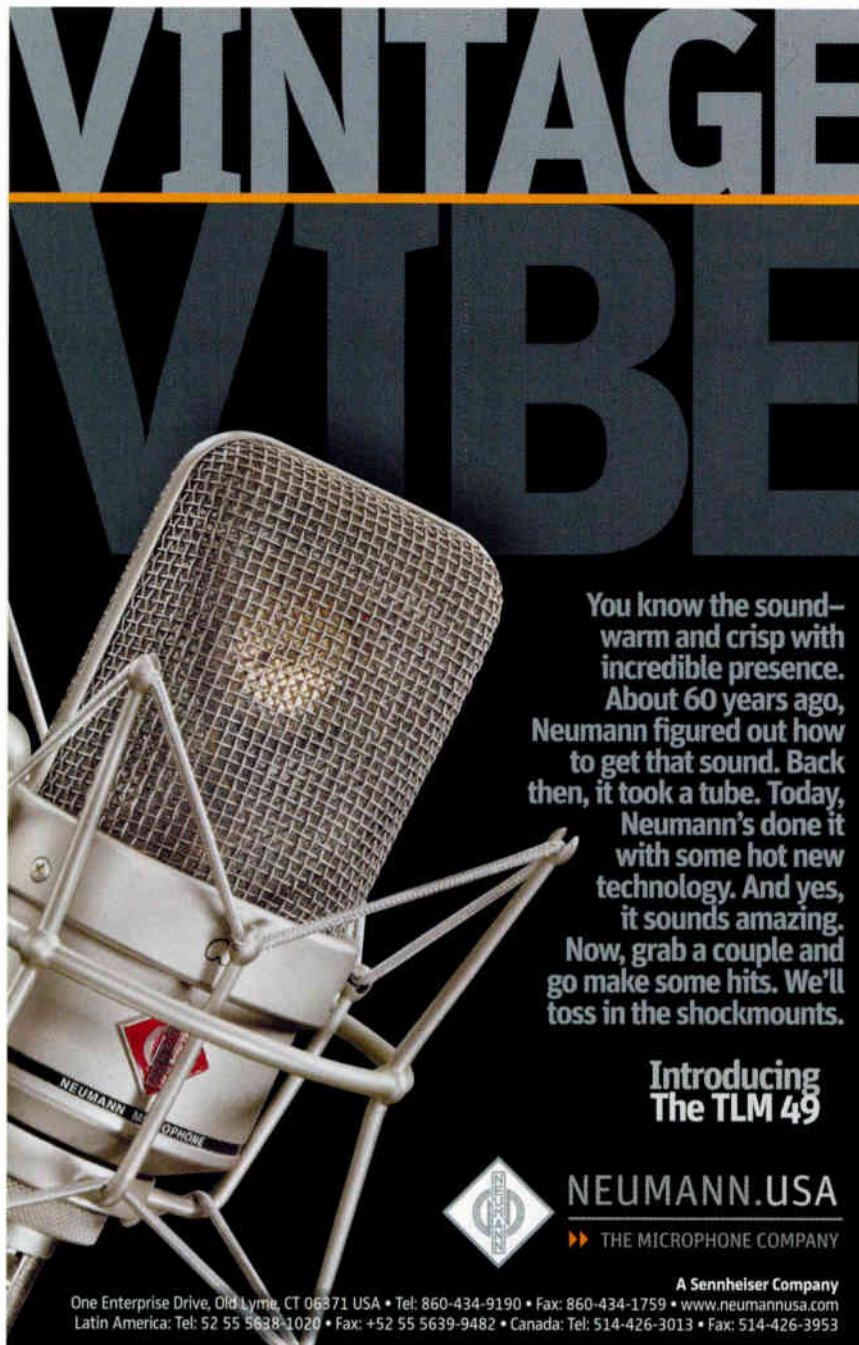
Sabine's (www.sabine.com) true-diversity SWM7000 Series (\$1,299.99 single-channel, \$2,099.99 dual-channel) operates in the 2.4 to 2.483GHz ISM band, which grants access to the same 70 preprogrammed channels simultaneously. Sabine's Smart Spectrum system combines spread-spectrum filtering with a variation of FM technology for a more interference-resistant system with more simultaneous channels. Each system

includes FBX Feedback Exterminator, parametric filters, Mic SuperModeling, a compressor/limiter and adaptive de-esser. The rackmount SW2-NDR receiver has two rear-mounted coaxial dipole antennae. SW70 Series handhelds use Audix OM3 or OM5 dynamic capsules or a Voice Technologies condenser. Accessories include rackmount antenna distribution for up to six receivers and a low-profile extension antenna for unobtrusive wall-mounting. Transmitter functions can be controlled from the receiver, the included Windows remote-control software, from Crestron or AMX touchscreens or any serial-based controllers. Sabine rechargeable

batteries offer nine hours per charge, or the transmitter can operate for 15 hours on two AA alkaline cells.

The UHF Synth Series Six from Samson Technologies (www.samsontech.com) uses two independent, synthesized receivers (\$2,199.99) in one rackspace and works with a variety of popular handheld mics, offering 101 channels in two frequency spectrums—782.125 to 793.875 MHz and 794.125 to 807.875 MHz. A spectrum-analyzer feature scans for the clearest available frequencies, and up to 96 systems can operate simultaneously at 1mW power or up to 22 systems at 10mW power. The receiver has balanced XLR and unbalanced 1/4-inch outs, and its backlit LCD shows channel and frequency selection, mute, tone, squelch, receiver ID and more. Its power supply senses voltages automatically. Transmitters (\$609.99) are powered by AA batteries. The system can be controlled remotely with a PC using Samson's WSM (Wireless System Manager) software.

Sennheiser (www.sennheiserusa.com) followed up its SKM 5000 with the SKM 5200-UHF (\$2,115). The new transmitter features 7,200 frequencies, a menu-driven user interface in a backlit LCD, three selectable low-cut filters and mic sensitivity adjustable in 1dB steps. The transmitter's LCD indicates battery-charge status, which is also transmitted to suitable receivers. The SKM 5200 offers a fixed channel bank and a variable bank. The fixed bank can be ordered with 20 preset frequencies to allow the transmitter to be integrated quickly into existing RF environments. Users can program up to 20 UHF frequencies in 5kHz steps into the variable bank. The system is compatible with five condensers and one dynamic handheld—as well as Neumann's KK 105 and KK 104 capsules—with omnidirectional, cardioid, wide-cardioid or supercardioid



VINTAGE

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The Nady UH-1K handheld offers an internal antenna system and Nady DM-10D neodymium capsule.

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pickup patterns. Its HiDyn Plusnoise reduction system keeps RF noise to a minimum. The SKM 5200 offers more than eight hours of operation using the rechargeable battery pack or standard alkaline batteries.

Prices for Shure's (www.shure.com) UHF-R system begin at \$3,043 for a single-channel system with an SM58-equipped transmitter. The system offers 2,400 selectable frequencies and allows up to 40 preset-compatible systems to be operated per band. Up to 108 systems are operable simultaneously using multiple bands. Shure's Advanced Track Tuning Filtering technology shifts onboard RF filtering within selected frequencies to maximize compatibility and isolation from interference. The UR2 handheld transmitters are offered with SM58, SM86, SM87, Beta 58, Beta 87A and Beta 87C capsules, and feature automatic frequency selection with group scan, infrared automatic transmitter sync and menu-driven system operation. UHF-R receivers have Flash memory capable of storing six 60-channel custom-frequency groups. They're also compatible with AMX and Crestron touchscreens and facilitate USB and Ethernet network control and monitoring. Accessories include an antenna/power distribution system, passive antenna splitter

kit and active or passive directional wide-band antennae. UHF-R systems ship with Wireless Workbench software, providing PC management of system parameters, plus a real-time view of the complete, networked environment.

Sony's (www.sony.com/professional) Legacy 800 Series includes the single-rack-space MB-8N tuner base (\$2,750), WRU-8N UHF synthesized tuner unit (\$1,000 each), WRT-8B UHF bodypack transmitter (\$1,850) and WRT-847 transmitter (\$1,000), which works with five capsules priced from \$445 to \$550 each. The transmitter operates on two AA alkaline batteries for eight hours of operation. Its LCD shows channel number, frequency, audio input status, RF level output/status, attenuator level, remaining battery power and more. Audio outputs are XLR. This system has a 116dB dynamic range and 20 to 20k Hz response, and can be controlled from any Ethernet-equipped PC via included software. WRU-8N tuners include LED AF/RF level and transmitter battery alarm indicators, as well as an LCD for viewing channel, frequency and group settings. Up to four WRU-8Ns can be installed in one MB-8N base, and up to four MB-8Ns can be linked for a total of 16 channels, without requiring an antenna divider.

TOA Electronics (www.toaelectronics.com) recently expanded its lineup with the 5000 Series system, which operates in the 692 to 722MHz band. Up to 16 systems can be operated at once. The WM-5220 (\$292) handheld condenser is powered by a single AA battery for 10 hours of operation. Receiver models include the WT-5800 (\$628) true-diversity 64-channel wireless tuner, WT-5805 (\$482) space-diversity 64-channel wireless tuner and the portable WT-5810 (\$384) space-diversity 16-channel wireless tuner. All 5000 Series receivers feature a frequency-scanning function and transmitter battery-status indicator.

Zaxcom's (www.zaxcom.com) digital wireless system (\$1,850) includes its handheld digital wireless microphone. The system operates between 536 and 850 MHz in 25MHz frequency blocks. It can run for approximately four hours powered by two AA lithium ion batteries. The handheld microphone system is encrypted and completely digital (no companding), with digital modulation and audio quality equivalent to a hardwired microphone. The company's handheld can be used with any standard wireless screw-on Shure capsule. ■

Matt Gallagher is an assistant editor at Mix.

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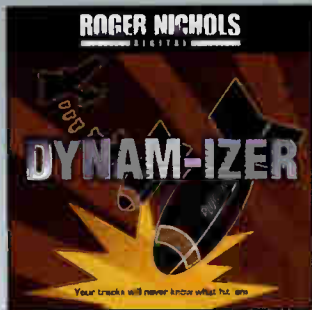
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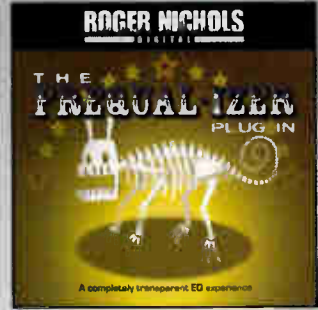
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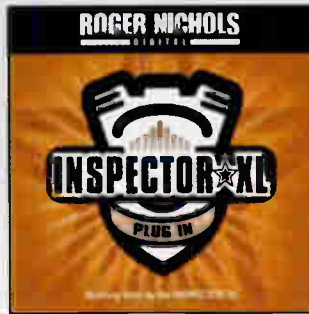
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Gnarls Barkley

Photos and Text by Steve Jennings

A collaboration with Danger Mouse and Cee-Lo Green (a solo artist and former member of Goodie Mob), Gnarls Barkley is finding huge commercial success with their radio-friendly "Crazy." The act is currently out on a club and festival tour, and *Mix* caught up with the audio crew, front-of-house engineer Stephen Curtin and monitor engineer Tim Engwall, at their San Francisco stop in mid-September.

This is Curtin and Engwall's first tour mixing on a Digidesign VENUE console. "The highlight of the desk is the effort Digidesign put into it after the preamp," says

Curtin. "Most other digital desks concentrate on the preamp and then just throw together some algorithms for everything that is post-preamp, such as the compressors, gates, etc." Engwall added that he "mixed a couple of festivals in Europe this past summer on [the VENUE], and really liked it. With good-sounding mic pre's, comps and gates; onboard effects; and user-friendly controls, it's hard not to dig this desk."

Green sings through a Sennheiser SKM5000 wireless with a 5000 capsule, but will soon be switching to the SKM5200 with a KSM 105 capsule; bandmembers are on Shure PSM700 in-ear monitors. Green's vocal goes through an Avalon 737 preamp/compressor. Onstage, Green uses a pair d&b M2 wedges with d&b A1 amps. Other d&b gear includes C7 subs/tops for sidefills (powered by P1200 amps).

"I'm always excited to be working with new gear—it keeps me on my toes," Curtin says. "I am very excited to be working with Danger Mouse and Cee-Lo. They are two of the hottest songwriters/producers/performers out there. Mixing the 13-piece band is always a challenge, yet fun."

"Because the music is so diverse," Engwall says, "mixing this band is definitely fun. I also enjoy working with Cee-Lo and Danger Mouse, both talented, cutting-edge artists. They encourage me to be creative and rockin' with the mix onstage."



Tim Engwall (left), Stephen Curtin

FixIt

Monitor engineer Raphael Alkins is currently out with Ricky Martin. He and guitar tech Tim Wright were instrumental in finding a wireless beltpack system for the band's guitarists.

We use acoustic guitars with onboard batteries driving the pickups on a number of Ricky's songs. When these feed wireless systems using companders, the guitar's sound ends up getting compressed to the point where it's not very musical. The Lectrosonics [IS400] doesn't use a compander, so the guitar sounds perfectly natural—big and full, with a rich, musical tone. Wireless systems tend to be heavily dependent upon a straight line of sight for optimum performance, and while we make every effort to maintain this, our guitarists move all over the place, so that's not always possible. Even when they're beyond the arc, we've had great reception with the IS400. The guitarists wear as many as three beltpacks—for a wireless mic, in-ear monitor and the IS400 for their instrument. Having three wireless systems in such close proximity can create some real headaches, but not once has the Lectrosonics gear created any difficulties.



PHOTO: STEVE JENNINGS

inside

- 88 **Live Mix News:**
Tours, Events, Installations
- 92 **All Access:** Shakira
- 94 **Tour Profile:** AFI

News



With Clair Bros. handling the hardware for John Mellencamp's current tour, WorxAudio Technologies' TL.2185S sub-bass system is filling out the bottom end. FOH engineer John Robbins spec'd a rig comprising four TL.2185S subs powered by Crown Macro-Tech 3600VZ power amps in bridged mono to each speaker.

Joining the current Journey/Def Leppard bill is a Digidesign VENUE for FOH (Kevin Olson) and monitors (Brian Evans)...New EtherSound networking technology licensees: Peavey MediaMatrix, Architectural Acoustics and Crest Audio...The Maxine Theater, a new 580-seat performing arts center in Valley Center, CA, installed a new system that includes an Allen & Heath ML5000 Series board; EAW AX Series loudspeakers, SB Series subs, and MX8750 and DX8 digital processors; and Shure SLX UHF wireless mic systems...LTS (Vancouver, BC) added an Adamson Y-Axis rig to its installation inventory...Jands Production Services (Sydney) has upgraded its monitor systems, including the purchase of 12 Clair Bros. Audio custom Dolby Lake Processors. The units feature proprietary software and custom CBA presets not available in the standard Dolby Lake Processors. Additionally, 48 new Crown MA3600 amplifiers and an extra 32 Clair Bros. 12AM monitor wedges were also added. The new monitor racks debuted in September on a national concert tour by Australian electro-rock band Rogue Traders.



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Perfect for concert sound, JBL's industry leading VerTec line arrays can be a bit impractical for smaller rooms. Meeting the need for VerTec quality in a smaller, more portable format, JBL designed the VRX932LA Constant Curvature Line Array for sound rental companies, installers and discerning musicians looking for the ultimate, flexible, no-compromise sound system. Using VerTec's lightweight drivers mounted along JBL's unique Constant Curvature waveguide, the VRX delivers extraordinary power and flexibility, making it the perfect line array for the rooms you actually play. For a small club, simply mount a single cabinet on a tripod, or pair it with the VRX918S subwoofer cabinet, for wider coverage and bandwidth. For a ballroom or small hall, fly up to six cabinets with JBL's patent pending suspension system. Regardless of the configuration, the VRX delivers cohesive, articulate, stunningly clear JBL sound. Hear the VRX at your Authorized JBL Professional Dealer or learn more at jblpro.com.

VRX900

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PHOTO: C. TAYLOR CROthers 2006



On the Road

Taj Mahal

Bluesman Taj Mahal is currently out touring with drummer Kester Smith and bassist Bill Rich; handling all system requirements is FOH engineer Rich Vink, who relies mostly on house gear, but carries a few choice mics and a smattering of outboard.

How much does your mixing change because you're relying on house systems?

The rate of change keeps me limber. Touring is a balance of known and unknown quantities. The band has been working together for some 30 years in various configurations and they bring a compelling "true north" to the proceedings. I'm familiar with most of the gear and venues—trips to Cuba and some off-brand digital desks aside. With all the different rental gear we see, I have a great day with a line array rig, where the tom-toms don't sound like cardboard.

What is your mic setup?

For Taj's vocal, the Neumann 105 fits like a glove right from the get-go. All the "slither and croak" in Taj's voice comes through crystal-clear and being able to work two feet off the mic is liberating for a singer who's playing guitar at the same time.

Are you working with a monitor engineer?

No. The low-maintenance/subtle approach this band thrives on can be a bit elusive to a systems guy coming in out of the cold, so the band prefers when I can do [everything] from FOH. When the channel EQ or insert—compression, in my case—affects the send going to the monitors, I may split the input signal at FOH so I can have separate channel strips for things like kick drum or lead vocal.

When you're not on the road, where can we find you?

Outdoors, on or around water, or working on my own musical outlet, Bluegill, with my esteemed colleague, J. Bradley.

Now Playing

Unearth

FOH Engineer/Console: Barry Hite/house-provided
 Monitor Engineer/Console: house-provided/house-provided
 P.A./Amps: house-provided, prefer L-Acoustics V-DOSC, JBL VerTec
 Outboard Gear: Drawmer gates, dbx 160X/166, Yamaha SPX-900, Eventide H3000S, TC Electronic D-Two
 Microphones: Shure SM91, SM52, SM57, KSM 32, SM58; Sennheiser Evolution 602, 900
 Additional Crew: tour manager/lighting designer Iano Dovi, stage manager Gregory "Griz" Middleton, backline tech Chris Golas

James Gang

Sound Company: Power Plus (San Diego, Calif.)
 FOH Engineer/Console: Sandy Blythe/Soundcraft Series 5
 Monitor Engineer/Console: Billy Triplett/Soundcraft Series 5
 Monitors: WorxAudio Max 1.5M, Max 3.5All, 2.5M, Max 5
 Outboard Gear: TC Electronic EQ Station, M5000, D-Two; BSS Audio DPR-404, DPR-504; dbx 160SL; Yamaha SPX-990; Eventide H3000 Harmonizer; Klark Teknik DN360; Drawmer 1968; Whirlwind split snake
 Microphones: Heil Sound PR-40, PR-30, PR-20, Handy Mic Pro; Shure Beta 98, SM81; AKG C451B; Countryman Type-85 DI; Klark Teknik LBB-100DI
 Additional Crew: guitar tech Mark Reis, keyboard/



bass tech Dennis Fitzmartin, drum tech John Gregar, tour manager Smokey Wendell

End of Shakespeare Season

When the curtain dropped for the season on *As You Like It*, the fourth production this past summer at Cal Shakes (Orinda, Calif.), sound engineer David Flashner had a chance to reflect on audio improvements made at the 500-seat outdoor venue.

"I'm in my third season now," Flashner says, "and I'm happiest about upgrading our wireless package. We had two heavy-mic shows this year, including a traveling band in *As You Like It*, so we now have seven mics in a Shure ULX system. Plus, John and Helen Meyer [of Meyer Sound] have loaned us a package, including two UPA-1Ps, six UPM-1Ps and four MM4s scattered above the stage for effects."

Every cue is routed through a program called Cricket controlling the I/Os, setting delays and working EQ. He uses the Mackie CFX20 for fader moves, but his wish list is topped by a small-footprint digital console. This year, he beta-tested the Clear-Com CellCom system, with three drops and two antennas. "We're always trying to improve the quality of the productions," Flashner says. "Jonathan Moscone, our artistic director, has always brought fresh, inventive designers. I'm just trying to match his passion through sound. This organization has been going strong for 30 years, and it's sounding better than ever. Now that [the season] is over, I need to find some work!"

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The Toby Keith Big Throw Down II tour audio crew, L-R: Ryan Reynosa, Monitor tech; Russell Fischer, System Engineer; Dirk Durham, FOH engineer; Earl Neal, Monitor Engineer; John Brawner, System Tech.

DRIVERACK
4800
LOUDSPEAKER MANAGEMENT SYSTEM

“When the audience hears Toby Keith, that’s all they hear.” *Dirk Durham, FOH Engineer*

“I knew the DriveRack® 4800 was going to be great the first time I tested it. None of us – including our monitor engineer Earl Neal, or Dave Shadoan, President of Sound Image – could spot the processed signal: it was beautifully transparent.

I can get anywhere on the front panel with just two button pushes. Everything can be visually represented on the 4800’s color front panel display or via System Architect™ software on a laptop or wireless tablet PC – which is very important when you’re surrounded by 20,000 screaming fans.

I’ve been with Toby as we’ve gone from small clubs to huge arenas...it’s been a great ride, and the ride is getting better with dbx on board. The new DriveRack 4800 is just one incredible box. ”

Dirk Durham

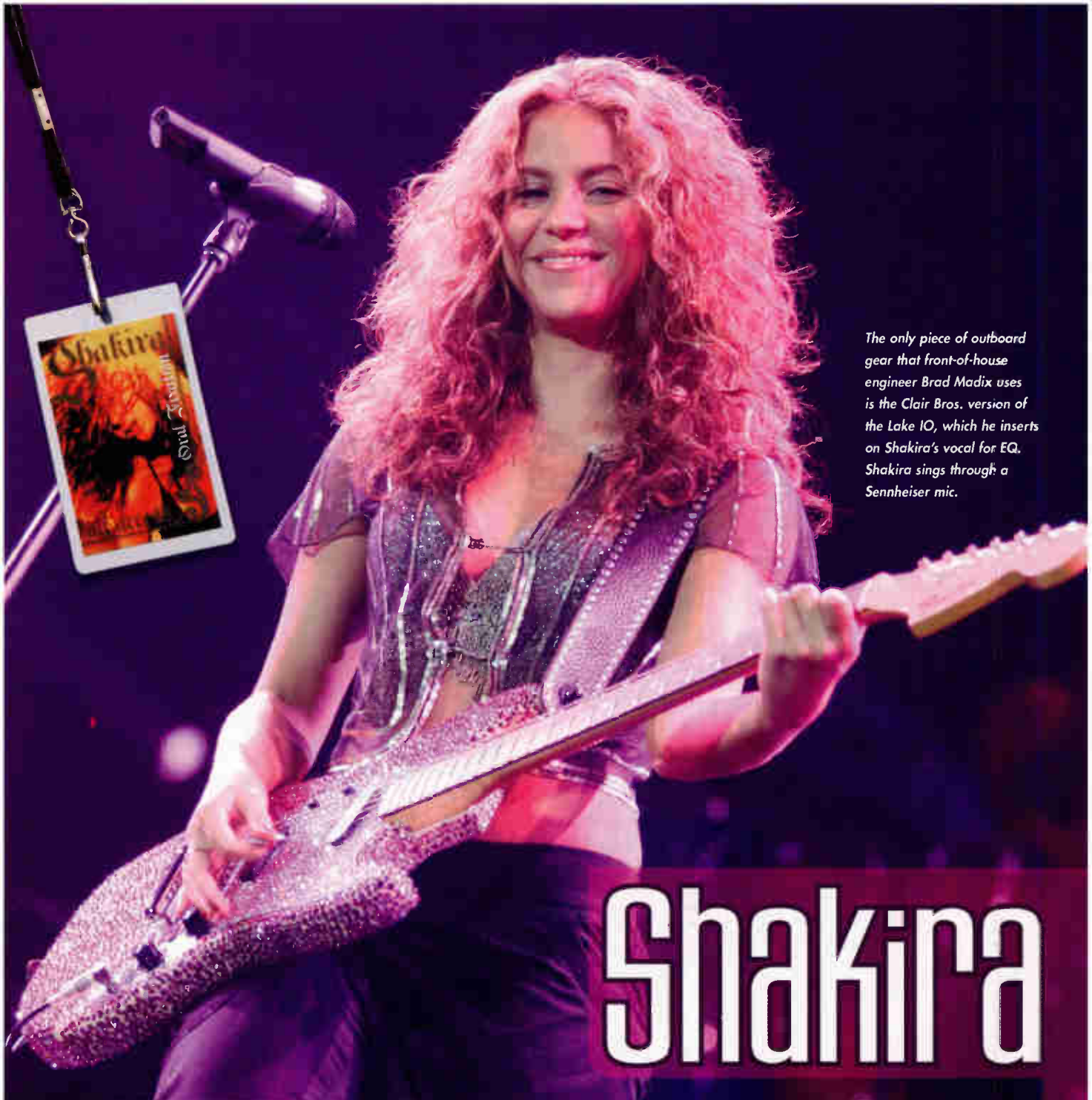


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The only piece of outboard gear that front-of-house engineer Brad Madix uses is the Clair Bros. version of the Lake 10, which he inserts on Shakira's vocal for EQ. Shakira sings through a Sennheiser mic.

Shakira



Shakira's band comprises guitars/musical director Tim Mitchell, Ben Peeler (guitar/Koto player), bassist Jon Button, drummer Brendan Buckley, keyboardist Albert Menendez, percussionist Archie Pena and backup vocalist/guitarist Olgui Chirino.

The current Shakira U.S. tour hosts dueling Digidesign VENUE boards—one at front of house and one at monitors. Fortunately, FOH engineer Brad Madix is comfortable behind a digital desk, while monitor engineer Vish Wadi takes the digital leap; on the previous Shakira tour, Wadi used a Midas H3000. Both are mostly relying on onboard effects rather than truckin' racks of outboard goodies. *Mix* caught up with the tour in mid-August at San Jose, Calif.'s HP Pavilion.

PHOTOS AND TEXT BY STEVE JENNINGS



Drum/percussion tech Luke Lowes



Archie Pena's percussion mics include Audio-Technica ATM 35s (conga/bangos), ATM 25s (timbale/ajembe), AE 3000 (tambuzo), and ATM 4050s and AKG 414 (overheads/gong).



Bass/guitar tech Freddy Pinero Jr. (above) with Jon Button's Yamaha upright SVB-200. The pickup is a Piezo positioned directly below the bridge.

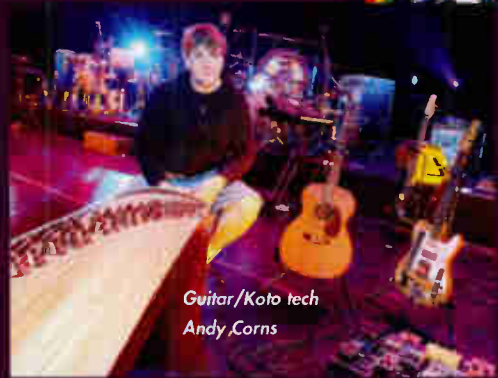


According to keyboard tech Bill St. Amour, keyboardist Albert Menendez uses a Korg Triton, a Roland VK-7 used without a Leslie cabinet—its sound is output from the unit's main audio outs—a Wurlitzer 200B and a new addition to the tour, a Roland Fantom X7. A Kurzweil PC-2x is mounted in an upright piano shell.

The last time Mix caught up with Madix, he was mixing Fort Minor on a Yamaha PM5D. "I'm a big fan of mixing in the digital environment," Madix says. "Being able to call up any input or output and have it placed directly in front of me on the work surface allows me to manipulate small facets of the mix while staying focused on the overall mix. It also lets me make small changes while keeping up with the hundreds of cues we have written into the [Shakira] show. As for the VENUE, it's great to have access to the same plug-ins that were used to mix the record."

There are approximately 70 lines from the stage, in addition to 14 effects return channels and six channels of playback (CD, iPod, DAT) at FOH. "It's a handful," Madix concedes, "but since it all resides on one console, getting from one channel to the next is a snap. During a show, there are numerous changes to individual inputs [EQ, fader rides, mutes], but I spend most of my time with the VCAs in front of me. When a musician switches from one instrument to another, that ride is made on the input, which may or may not be on the top layer. I can still control the level with the VCA and I don't have to move an inch. If an update to the EQ is necessary, I can call that input up with a click of the mouse and make the changes while keeping my hand on whatever VCA I might need to be riding at that point."

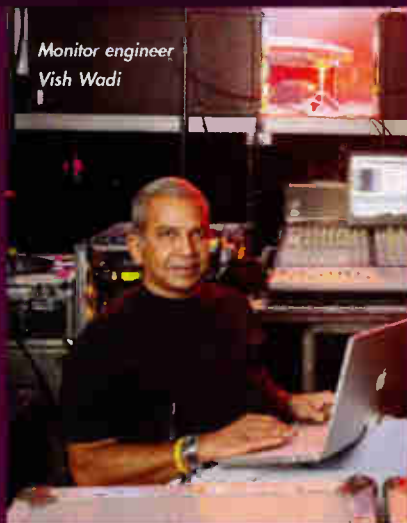
The tour is carrying a Clair Bros. i4 line array system, augmented with i4b bass bins in the air and MD Systems' T2 subs on the floor. "We have a main left and right column, 14 deep," Madix says, "as well as offstage columns eight deep, which are reverse stereo image to throw some stereo information up into the side seating. Our front-fills are small, wedge-shaped cabinets called P2s used in mono to fill in the middle and close in on the sides. We are also carrying eight S4s as delay, which we use high in the back of the larger arenas."



Guitar/Koto tech Andy Corns

This is monitor engineer Vish Wadi's second tour with Shakira; previously, he used a Midas H3000. His VENUE board is configured for 96 input channels, effects returns and 24 mix buses, 77 inputs (including talkbacks) and three stereo effects channels; his rack comprises five DigiRack 7-band parametric EQs, six Fairchild 660 comps, nine DigiRack mono comps, four Impact comps, five DigiRack stereo comps, four ReVibe verbs and three D-Vibe verbs.

"The band and Shakira are using Future Sonics Ear Monitors," Wadi says. "Shakira and five of the bandmembers who move around are on Sennheiser G2 Series ear monitors. Brendan [Buckley, drummer] and Albert [Menendez, keyboardist] are on Stewart hardware in-ears. Shakira uses a modified Sennheiser 3000 Series wireless mic with a ME3005E capsule, which is modified for her."



Monitor engineer Vish Wadi

AFI



PHOTOS: STEVE BENNINGS

Maintaining Rock's Analog Warmth Through a Digital Signal

By Sarah Benzuly

Pete Keppler has been living a life of yin and yang—balancing studio engineer with road warrior. As a young boy in Northampton, Mass., Keppler had been intrigued with sound and the inner workings of audio gear, taking apart his mom's stereo and trying to figure out how to make it sound better, which led to opening up a recording shop with a friend and eventually landing mixing gigs in top-notch New York City recording facilities.

"But from early on, I found myself doing live sound mixing for a lot of the bands I recorded, and I really grew to love live performance," Keppler remembers. In addition to AFI, Keppler has toured as a front-of-house engineer for the past several years with David Bowie and Nine Inch Nails.

Keppler maintains a 32-input Pro Tools



Front-of-house engineer Pete Keppler is equally at home in front of the board in a studio or a live mixing gig.

HD portable rig at home in New York City; his familiarity with Pro Tools came in handy for his recent mixing gig: this year's AFI tour, where he is working on Digidesign's VENUE live sound environ-

ment. "Nine Inch Nails was the first time I worked on VENUE," Keppler says at FOH, where he spoke with *Mix* hours before the early September sold-out San Francisco show at the Bill Graham Civic



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As he continues to innovate with Rupert Neve Designs Portico Range, Mr. Neve is creating new modules to add the sweetness and musicality of analogue recording into the digital reality of today's music industry. Ask Rupert any questions you have regarding the past, present or future of analogue audio design.

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Auditorium. "And with Nine Inch Nails, I'd used the HDx option on the console and multitracked every night's performance direct to Pro Tools. The setup for that is so easy—three cables! When [AFI] asked me to do this tour, I said, 'Yes, but I really want to take out this console.' They talked about doing recording at the stage and having [monitor engineer Mike "Porkchop" Souder] look after all of that, as well as everything else he has to look after. And I said, 'If you want to take me and take the



Monitor engineer Mike "Porkchop" Souder mans a DiGiCo D5 Live digital console for the all-in-ears band.

console, I can do the recording.' I can't say enough good things about the VENUE. It took a couple of days to really get the feel of it—it feels a bit different from a lot of other consoles—but it sounds amazing. I wouldn't want to use anything else."

Kepler is using the majority of the board's installed effect plug-ins, which helps in keeping a small FOH footprint, as the only outboard gear to be seen is the Rat Sound loudspeaker-management system and a CD player/recorder. "The stuff that is built into the VENUE itself—the dynamics and equalization—works really well for almost anything," Kepler says. "The console is configured right now with eight onboard graphics, which I use to do final tailoring on the outputs; usually, I'll use it to make up the difference in the hall between an empty room at soundcheck and a full house at showtime."

"Another great thing about the VENUE is the ability to use plug-ins. I'm using ReVibe, which is Digidesign's latest reverb generator, on drums and vocals, and I splash it around on instruments from time to time. And then as far as the delays go, I'm using EchoFarm for almost everything because it's got different models of all

these great old tape delays. I find—mostly through working in the studio—that I don't like delays that sound really clean; I like them to have a little bit of grit, a little bit of distortion. I still love analog consoles for live mixing because they can add a bit of that, too, but because of the amount of song-to-song changes in AFI's show, it's not practical.

"I'm using Digidesign's Pitch program to do a pseudo-[Eventide] H3000," Kepler continues. "Then I've got two different doublers. One's just a single voice delay with a little bit of pitch modulation. The other one is Eventide Quadra-vox, which I barely understand, but it sounds cool. I'm using McDSP's Channel G and their multiband compressor, the MC-2000, for guitars and vocals and sub-group compression."

Also taking advantage of the compactness and onboard effects offered in a digital console is Souder, who is manning a DiGiCo D5 Live. He previously worked on a Yamaha PM5D with Jimmy Eat World, but found the snapshots on the D5 more suitable to AFI's needs. "I switched from the 5D to the [DiGiCo] D1—the smaller version—but I found that I don't have enough faders to catch cues, so I moved to the D5. It's essential to have digital with these guys—there's a lot of stuff going on, so I find I have to run scenes to catch the cues. Otherwise, it's just too much chasing around. I don't think I could run it in analog: I would miss something eventually. I only run scenes for the new songs, so it's probably around nine scenes. But I always end up going back to my main scene for everything else."

Kepler also finds that the band's on-stage dynamics are more "controllable" with a digital board: "It changes so much from a soundcheck to a show," he says. "When they're onstage for the actual show, there's so much more energy coming from them and the audience that their performance really changes. I do spend some time scrambling, making sure that things are where they're supposed to be when they play the first song or two. I have to keep my eyes on the stage a lot, too. They're all over the place!"

Adding to this "eyes on the stage" mix

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requirement is the fact that lead vocalist Davey Havok twirls his Audix OM7 mic around, as well as cups it. "I would normally hand almost anybody a [Shure] 58 or Beta 58 to start with and see what it sounded like, unless they had something else they were particularly happy with," Keppler says. "But he'll wrap his hands around the mic and leave very little space to sing into. He knows, he apologized in advance. The first day I mixed the band, one of the first things he said to me was, 'I cup the mic. I'm really sorry, I just do it. I know it messes with your world and makes it sound worse, but it's an old habit.' So before I came onboard, Ronnie Kimball [the previous FOH engineer] had found that this mic [the OM7] responded the best and had the least amount of frequency response change and still had a fair amount of gain before feedback. And Audix has been really cool with us. As you can see, most everything on the stage is white; so are the mics. Audix graciously allowed us to powder-coat the mics and then they took them back from us and did their silk-screening of their brand and model number and clear-coated them, and they look great. We use OM5s for the other vocals because, to me, the OM5 sounds very close to a 58."

With Havok running around so much onstage, it seems odd to choose a wired OM5, but because the vocal mic "takes flight quite often," a wired mic is much more economical when it comes to replacing them.

Everything else onstage is wired, with the exception of the wireless guitars. Adam Carson's kit takes a non-Beta 91 and a Sennheiser 602 ("a wonderful, inexpensive, great-sounding mic for bass drum and floor tom," Keppler says), 57 on snare, Beta 57 on bottom snare, 451 on hat and KSM32s on overheads. Jade Puget's dirty guitars take a 57, 421 and KSM32. "And there's also [Shure Beta] 98s on the clean guitar amp," Keppler adds. "The 98s are great because they can clip onto the body of the amp and focus on the area of the cone that I want. Those have been working really well. On the dirty guitar amp, I pick and choose which mic seems to work on which song. I'm pretty old-school and this is also from the studio: If there's a different mic that will work and sound better, instead of grabbing an EQ, I'd rather change the mic. I like to do as little processing as possible, EQ-wise. I tune the [Rat Sound-provided JBL VerTec] P.A. with my voice and a standard 58, not a Beta, because I know the sound of my

voice and the sound of that mic, and it seems to translate really well. I find that a lot of my strips are close to flat, especially in guitar land. There is a bass mic [Shure 98 for bassist Hunter], but I just take the SansAmp [PSA-100] and use that as a direct input. The 98s are an odd choice for a bass mic, but I think it was selected more because it's not obtrusive and won't get knocked over."

Despite the plethora of mics onstage, stage volume is kept to a relative minimum, as the entire band is on in-ears. "I was the one who introduced the band to in-ears," Souder relates. "I tried to bring them in without wedges to keep it as quiet as possible." As for specific mixes, "Everybody's pretty standard," the monitor engineer continues. "The guitar is pretty much the central block for everybody. Tonally, the drummer does not want any mids. As for levels, some bands fluctuate, but they just like their mix to be where they want it so they can perform well. I can't compress anything too much because they don't really know if they're being over-dynamic. I try to make things as natural as possible, but I have to ride gain, ride channels so they can hear themselves."

Keppler is also happy with the wedgeless stage: "With the P.A. turned off, you can stand at front of house and have a conversation at normal volume while they're playing. So my mix is maybe at 102, 103 dB and it's nice. It means I can keep my hearing a little longer." [Laughs] This is pretty incredible, considering the roar from the teenaged crowd when the band plays the first few chords from such radio hits as "Love Like Winter" and "Miss Murder" from their latest studio effort, *December Underground*.

Fortunately for both engineers, the band feels free to express their needs regarding the mix, making their job that much more seamless. But more importantly, Keppler and Souder say that the relationship between FOH and monitor is key to creating a great sound onstage. "One of the most important aspects of front-of-house mixing is your monitor engineer," Keppler enthuses. "And I don't think people understand—the general public at least—what a monitor engineer does. But without him, especially with an all-in-ears band, it doesn't matter what I do. If the band can't hear themselves properly, they can't play properly, and no amount of mixing can fix a poor performance." ■

Sarah Benzuly is Mix's managing editor.

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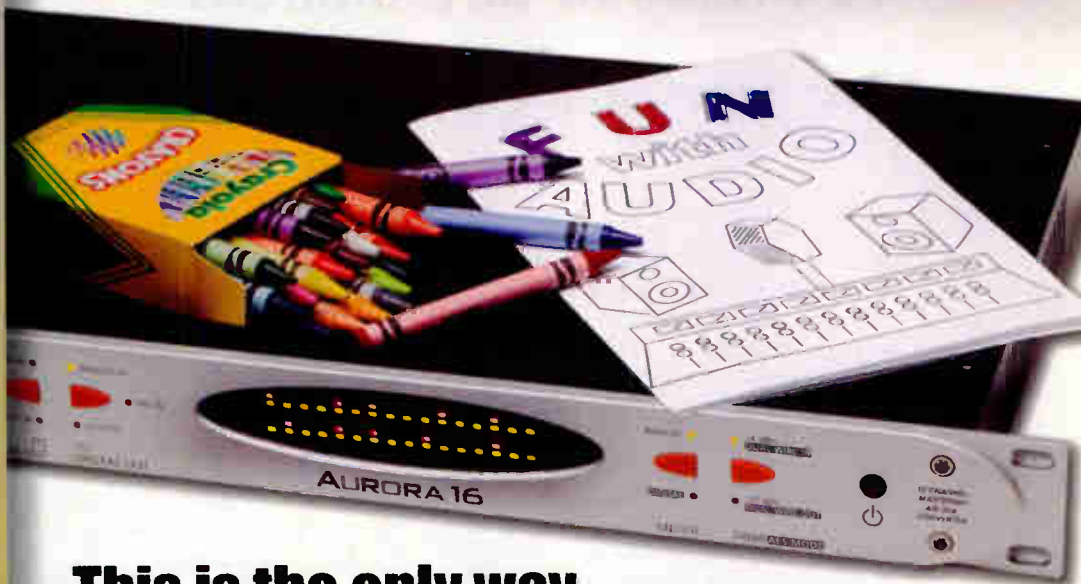
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To Preserve or Enhance?

That Is the Upgrade Question

Once upon a time, repair requests were “simple” and most customers were happy if the item in question passed audio. Ever since digital audio put analog gear under the microscope, questions about upgrades became just a bit harder to answer. No op amp is going to sound like a discrete Neve module. Op amps can and should be transparent. The past 40-plus years of IC evolution have left some room for improvement, although design engineers have managed to squeeze remarkable results from the tools of the day.

Op amps are not one-size-fits-all, but you can only learn by doing, even if a mistake is part of the equation. But knowing what’s on the other side of the connector is helpful when you’re doing an installation. It’s taken years to acquire the discipline to preserve flaws that enhance sonic character—guitar amps being the most obvious. ICs that are wrapped around any flavor of gain-reduction circuit should be “colorless.” Vintage op amp flaws that get in the way of transparency can easily be treated. The minor battles are won at dynamic range extremes: just before headroom runs out and all the way down to the noise floor.

Awareness of, and striving for, 0dB full scale (kissing digital zeroes) has done a disservice to certain analog circuits. Pushing amplifiers toward clipping was not what the designers intended (unless you wanted a fuzz box). For example, it’s not possible to overload the API 2520 (discrete op amp) if its 3-output transformer (xfmr) windings are wired in series (most are).

The 2520 is slow by modern standards—2 volts per microsecond—but you’d never know it. The transformer’s 1:3 windings ratio provides more than 8 dB of headroom, and that increases the slew rate. You can apply this approach to any amplifier by taking advantage

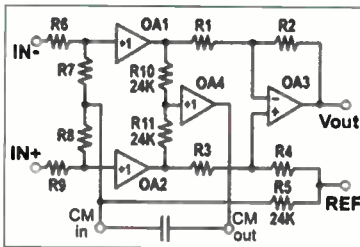
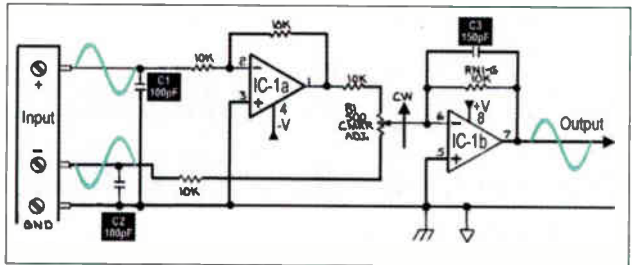
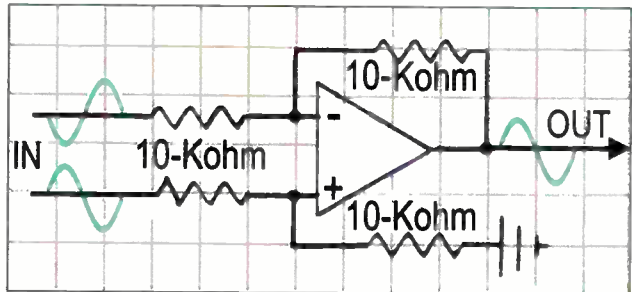


Figure 1: Balanced input circuit variations, from top: simple (dbx 166), cascade (UREI 1178) and instrumentation. This circuit is incorporated into the InGenius IC design and requires minimal support components.

of 24-bit headroom, dropping the level 6 dB under the guise of maximizing resolution.

ON THE BENCH

I recently treated two stereo compressor/limiters, a UREI 1178 and a dbx 166. The 1178 preserves a portion of its 1176 heritage—the FET gain-reduction circuit—but to shoehorn two channels into a two-rackspace package, IC op amps replaced the discrete transistors. So much has been said about how the discrete circuitry and unique transformers contribute to the full-on 1176 experience, but for the optimist, here is a chance to hear the FET processing—solo.

The dbx 166 was an entry-level VCA processor with no-frills circuitry. The customer had several and wondered if an upgrade of ICs and/or passive components could improve the transparency. (There are less than a handful of ICs in the signal path.)

BALANCED INPUT

The UREI 1178 and the dbx 166 have transformerless inputs, a type of “line receiver”

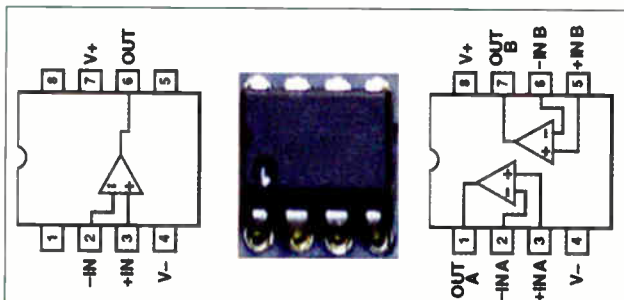


Figure 2: 8-pin Dual In-line Package (DIP). Op amp pinouts: single at left, dual at right and at center.



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Alan Says



We just wrapped up *Pirates of the Caribbean: Dead Man's Chest*, and there are Royer R-122V tube ribbons all over the score. I used three R-122Vs on the decca tree, and also extensively on the woodwinds.

There's something going on in the mids with Royer's tube ribbon mics that's hard to explain; there's a reach and depth and lushness that sounds magical to me.

For some remote island cues that needed a cannibal vibe, Vinnie Colaiuta, Abe Laboriel Jr., and JR Robinson played drum kits simultaneously on the Sony scoring stage. I captured each kit as a mono setup - panned left-center-right - using a single R-122V over each kit. It sounded amazing.

Alan Meyerson

(Scoring Engineer & Mixer - Hans Zimmer, James Newton Howard)

See photographs of Alan's 'Pirates' sessions at royerlabs.com - Session Photos

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configuration also known as a differential amplifier because it subtracts one signal line from the other. "Balanced" signal transmission implies that there are two signals (pin 2 and pin 3 of an XLR; tip and ring of a ¼-inch connector), where one signal is of opposite polarity to the other on a twisted-pair cable. Sometimes, only one pin is modulated. In that case, the source/output impedance (of the previous device) should be the same for both of the signal lines so that noise will be equally radiated into the twisted pair.

Assuming the above, noise polarity is identical on both wires and subtraction literally removes the noise from the equation. The ability of the differential amplifier to amplify the signal and ignore the noise is known as the Common Mode Rejection Ratio (CMRR). Good CMRR is more about design and implementation than actual IC choices. You can see three of the common designs in Fig. 1. All *but* the last silver-faced version of the 1176 used an input transformer. Transformers are the most effective way to reject noise that is induced into the cabling, but they require more space, weight and cost.

The goal here is to heighten awareness of input circuit variations—they do affect CMRR—and of the fact that the variations exist partly due to a product's place in the audio timeline. Better designs contrast with the need to streamline production and minimize component costs.

THE COUNTDOWN

How an op amp affects the audio signal depends on its demands. The post-processing makeup gain and output amps are separate, application-specific circuits. To best determine which op amps to choose, we need to determine the packaging options (Fig. 2).

To determine circuit performance, I apply a 1kHz square wave to the input and then poke a 'scope probe to the output of each amplifier. Figure 3 shows how the raw square wave should look on an oscilloscope; use a "x10" probe and calibrate according to the instructions. Note how the vertical component is nearly invisible on the upper trace (the raw oscillator output), as compared to the lower trace after traveling through a slow op amp at max output.

If you don't have a 'scope, capturing the wave on your workstation at the max sample rate will at least shed light on the one hazard in this game—oscillation outside the range of human hearing—although it won't be enough to determine performance.

Always monitor the oscillator's output to make sure that the signal is not loaded down by cabling and input circuitry. The capacitive loading effect will be similar

to the lower trace of Fig. 3 and may be caused by capacitors such as C1 and C2 (across the 1178's input). Their purpose is to filter unwanted, out-of-the-audio-band interference, but they may also slow down the square wave enough to make it hard to see the effect of different op amps.

You may want to de-solder and lift one leg of each cap, as well as C3 (in the feedback loop of UREI's IC-1b), during IC testing, and then replace and see what happens. The wave should be square, with neither rounded edges nor spikes. Square waves are also good for checking capacitors.

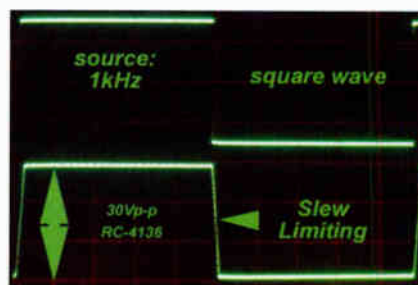


Figure 3: A 1kHz square wave is a quick and easy way to determine amplifier performance.

Once you've determined the quality of the input amplifiers, the next test point is the amplifier following the gain-reduction circuit. An optical limiter may slow down the vertical portion of the square wave due to the attenuator network's high impedance—it becomes very sensitive to capacitance. However, with 6 dB of gain reduction, the wave's response will improve. All transformer-coupled audio gear required a 600-ohm load, and without a transformer as destination, a load or termination resistor is required. SCSI, video and S/PDIF also require termination.

When upgrading a dbx 166's VCAs, the original parts required trimming to minimize distortion—a big difference. The new parts deliver the same low distortion at 1 kHz—about 0.05 percent—without adjustment and with plenty of room for improvement.

SUMMARY

Are you still waiting for op amp recommendations? For dual op amps, I generally start with the Analog Devices OP275 and the Burr-Brown OPA2604. These parts are similar in terms of slew rate (22V/μS), but have much different current consumption. There are plenty of tweakheads looking for greater performance and recommending even better op amps. To them, I say, "Go for it!" ■

Eddie spent the summer teaching a class in guerrilla recording. Visit www.guerrilla.remote.com for sounds and video.

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Tools of the Trade



BLUE SKY SAT 12, SUB 15

In addition to being quite the mouthfuls, the SAT 12 three-way, 500-watt, tri-amplified mid-field monitor and the SUB 15 Universal 1,000W subwoofer are the latest products out of the box from Blue Sky International (www.abluesky.com). The SAT 12 features a 12-inch high-excursion hemispherical woofer; a 4-inch hemispherical, midrange driver; and a 1-inch dual-concentric diaphragm tweeter. The three drivers are powered by two 200W amplifiers and a 100W amplifier, respectively. To integrate with the SUB 15 Universal and Blue Sky's BMC (Bass Management Controller), an 80Hz highpass network with phase-correction filter is included. The SUB is a sealed box using a 1-inch forward-firing driver, and offers a switchable low-frequency response characteristic. The rear panel carries dual inputs: one for bass-managed operation and the other for use without the SUB. Rear panel controls also feature switching for "full-space" or "half-space" operation, along with individual HF, MF and LF level trims, two switchable input attenuators and a variable gain control. Prices: \$7,500 (2.1) and \$15,795 (5.1).

AUDIOSKIN CABLE ORGANIZER

Are your stray cables getting under your skin? One solution is to put them inside the new AudioSkin (www.audioskin.net, \$16.99)

cable organizer, which takes your recalcitrant cables and zippers them into a flexible plastic tube. The organizer comes in 5-foot lengths that can

be used head-to-tail to create the desired overall length. Each set comes with a handy doo-dad (that's a technical term) that lets you quickly zip your cables inside the "skin." If you want to get one or more out, then just grip and rip it out of the organizer.

CHARTER OAK M900

Charter Oak's first small-diaphragm microphone, the M900 (www.charteroakacoustics.com; \$569, single, \$1,099, matched pair) features a two-step sensitivity switch (-10 dB and -20 dB) and a two-position bass roll-off (15 Hz/75 Hz). The mic ships with cardioid, hypercardioid and omni capsules that can be quickly swapped for the desired polar pattern. As an interesting extra service, the company's Adapt service lets users create their own desired mic characteristics: Within 30 days of purchase, customers can ship the microphone back to the company for desired modifications based on studio environment and professional taste.

DIGIDESIGN MBOX 2 PRO

Digidesign's Mbox 2 Pro (www.digidesign.com, \$799) offers many key

new features, including support for 24-bit/96kHz, MIDI time stamping, word clock I/O (BNC), studio monitor outputs with volume control and a built-in phono preamp input. The FireWire bus-powered unit also comes in a Factory configuration (\$899), which includes an additional five Digidesign and Bomb Factory plug-ins (worth more than \$1,000) and an iLok USB Smart Key.

DRUMWERX PUNK ROCK DRUMS

Feelin' lucky? You should with this in-your-face group of drum samples from Beta Monkey Music (www.betamonkeymusic.com, \$29.99). The 662 license-free loops are sonically matched, making it easy to match any one sound to any other on the disc. The samples range from 100 to 280 bpm, and are available in 16- or 24-bit WAV (44.1 kHz) and Apple Loops, with REX2 format support soon to be released.

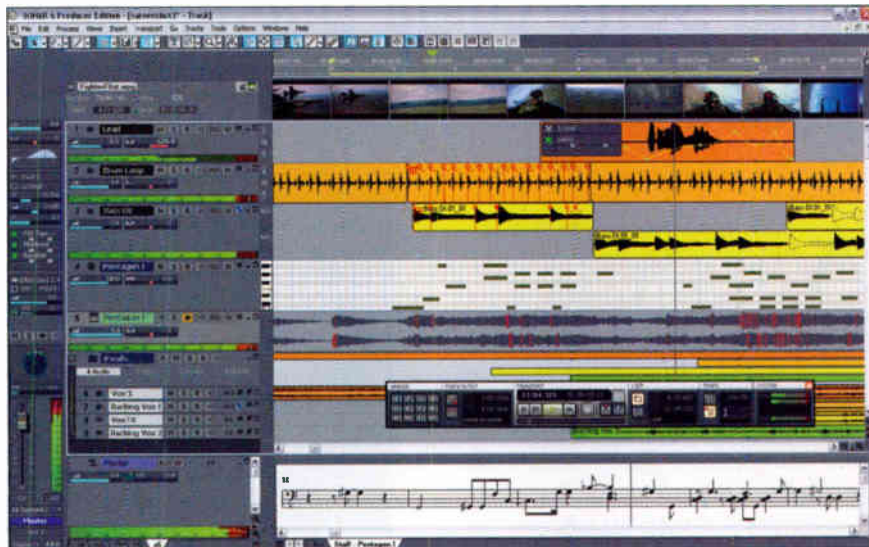
PROMINY LPC GUITAR LIBRARIES

Prominy's (www.prominy.com) LPC guitar libraries can let the "air" out of your guitar-god dreams and make you the real deal. The collection comes in either clean or distorted versions, and ships with 60 GB of 44.1kHz 16-bit samples on six DVD-ROMs. The set supports Native Instruments Kontakt and Tascam GigaStudio 3 2 players, allowing the user to arrange the guitar parts from a MIDI keyboard. The guitars are sampled with a wide variety of styles, trills, slides, harmonics and more, making the finished product sound very realistic. You've got to see the video demo on the Website to get the full impact of how spot-on this thing is. Prices: \$599 (clean and distorted) and \$349 (clean *or* distorted).



CAKEWALK SONAR 6

Cakewalk's (www.cakewalk.com) SONAR, the ever- and quickly evolving DAW, has morphed again into Version 6, featuring completely redesigned Track and Console views, workflow innovations and the VC-64 Vintage Channel, promising to sound like a "big desk" analog channel strip. Other features include Active Controller Technology (ACT) that dynamically remaps effect, mix and instrument parameters to hardware controllers; AudioSnap, a nondestructive audio timing/manipulation toolset; automation and clip editing enhancements; crash recovery safeguards; and automatic file versioning, making it easy to back up projects with a time/date stamp. Prices: \$619, Producer's Edition, and \$369, Studio Edition.



variable from 50 to 400 Hz, the MF band is continuously variable from 330 to 2.5k Hz, and the HMF range is continuously variable from 2 to 16 kHz. The mid-bands offer fully variable "Q" control between 0.7 and 5.

also features a 25-pin D-sub input (Pro Tools/Tascam format) and an internal power supply.

CAD TRION 8000

The Trion 8000 from CAD (www.cadmics.com, \$599) is a multipattern, large dual-diaphragm (1.12-inch) tube condenser mic. The 8000 is switchable between omni, cardioid and figure-8; features Class-A electronics; offers a transformer-coupled output; and features a rugged metal housing and construction. Able to get up close and personal with SPL, the mic will take up to 133dB SPL and has 21 dBA of self-noise. It comes supplied with a shock-mount, heavy-duty aluminum carrying case, 25-foot 6-pin connector cable and power supply.



RUPERT NEVE PORTICO 5033 EQ/LINE DRIVER

From the mind of Rupert Neve (www.rupertnevedesigns.com) comes the Portico 5033 5-band EQ and line driver. The unit features custom input and output transformers, ± 12 dB input level adjustment and five filter bypasses, and is available in either horizontal or vertical formats. The outer bands are high (2.5 to 25k Hz) and low (30 to 300 Hz) shelving filters, while the LMF band is continuously

SM PRO AUDIO PM-8 PASSIVE SUMMING MIXER

Designed for the DAW user who wants to put that final analog touch on the mix, this new, surprisingly affordable passive summer from SM Pro Audio (www.smproaudio.com, \$569) will mix down eight audio channels into two stereo output pairs. The dual-rackspace box offers eight combo TRS/XLR inputs, eight mute switches, eight rotary panners and two stereo mix volume controls. The box



Solid State Logic Duende DSP Processor

Channel Strip and Bus Compression for Your DAW

As home and project studios continue to multiply, it's fitting that SSL is now parting its signature sound into the DAW world. Served up on a custom DSP platform, Duende is an extremely powerful rackmounted hardware and software solution that connects to a computer with a single FireWire cable to deliver console-grade channel strip EQ and dynamics, and the legendary SSL Stereo Bus Compressor to most popular VST, Audio Units and RTAS workstation environments. (At the time of this review, only a Mac OS version of the install disc was shipping; Windows support should be ready by the time you read this.)

SUPERANALOGUE PLUG-INS

Duende functions like SSL's C200 digital production console, whose algorithms are based on the XL 9000 K SuperAnalogue console. Though the C200's algorithms are tried and proven, SSL specially tweaked them so that Duende would sound even more authentic.

A quartet of 333MHz, 40-bit, floating-point SHARC DSPs—which are individually more powerful than those in the C200—crunch numbers inside the 1U box. Despite its rugged mass, Duende's hardware lacks an internal power supply. The unit is capable of being bus-powered via the 6-pin IEEE-1394/FireWire 400 connectors (1x primary and 1x loop-through) on the rear panel; SSL also supplies a universal wall wart adapter with interchangeable adapters for use in countries that employ different voltage levels.

Duende has a total of 32 virtual processor "slots" available simultaneously at sample rates of 44.1 or 48 kHz (this halves to 16 slots at 88.2 and 96 kHz), each capable of running either channel strips or bus compressors. Because mono instances occupy one slot and stereo two, Duende can only truly function as a 32-channel mixer if you don't run bus compressors and your session is 48 kHz or less. When you install Duende's plug-ins on a Mac, a DSP usage panel is installed into Apple Menu > System Preferences.

THE ENGLISH CHANNEL

The channel strip's 4-band parametric EQ is based on the XL 9000 K's switchable G and E Series EQ circuitry. The "normal" G-



curve shelving EQ has those distinctively aggressive-sounding SSL mids (200 to 2k Hz low/mid; 600 to 7k Hz high/mid) featuring adjustable Q of 0.5 to 2.5 and ± 20 dB of gain—plus, there's over/undershoot on the highs and lows. The LF section operates over a range of 40 to 600 Hz and is capable of up to 16.5 dB of cut or boost. The HF section covers 1.5 to 22 kHz and is capable of ± 20 dB gain. Both bands can be set to shelving or peaking curves by pressing the Bell button. Engaging the E button removes the over/undershoot effect and provides a slightly gentler slope, with the bandwidth of the HMF and LMF sections remaining constant at all gains.

By default, EQ precedes the filter and dynamics section, but you can easily rearrange these. Pressing the Input button sends the 12dB/octave lowpass filter (20 to 500 Hz) and 18dB/octave highpass filter (3 to 22k Hz) pre-EQ. Each filter, as well as the EQ section, can be independently bypassed or dynamics sidechained, or you can pop the filters into the sidechain together with EQ for simple de-essing and other frequency-controller dynamics processing. If only the filters are assigned to the sidechain, then the EQ comes before them in the signal path. As you make routing adjustments, a block diagram at the bottom of the plug-in window shows you what's going where.

The dynamics section features a compressor/limiter and expander/gate that work independently, but they can operate simultaneously. Like its hardware counterpart, this section can be placed pre- or post-EQ (but always appears post-filters), and makeup gain is automatically applied to maintain steady output levels. Thankfully, the Version 1.2 update added 20 dB of

channel input gain/attenuation with polarity reverse and metering. A similar gain knob and level meter are provided on output, as is an S/C Listen button that routes the sidechain directly to the output for monitoring.

AT THE ARMREST

I installed the plug-ins' V. 1.2 update and upgraded the Duende firmware to V. 1.14 on my Mac dual 1.8GHz with 4GB RAM, Mac OS 10.4.4 and Pro Tools HD3 Accel hardware with a 192 I/O interface. Mono and stereo versions of both the EQ and Dynamics Channel Strip and Bus Compressor plug-ins are placed into their three respective plug-in-format folders. Although VST and Audio Units versions were natively coded by SSL, Pro Tools users gain support via an invisible RTAS wrapping process licensed by FXpansion. I ran Duende as an RTAS plug-in under Pro Tools HD 7.1 and as an Audio Units plug-in under Apple Logic Pro 7.2.

With Duende sharing the FireWire 400 bus with my audio drives, I achieved full 32-slot processing without a single hiccup or click. However, once I tossed my Focusrite Liquid Mix into the fray, performance became unstable and about half as efficient. Users with multiple DSPs or those who use FireWire audio interfaces will want to add a PCI FireWire card to their systems. My three spaces were already filled with HD Accel cards, so this alternative requires buying into a PCI expansion chassis.

Of course, latency is an issue with all DSP platforms, and Duende is no exception. The good news is that latency is reported to the host for automatic delay compensation (ADC); the bad news is that Pro Tools LE users don't have the luxury of ADC and must compensate manually or through use

rackmount Power Tools! SM



Radial JD6 direct box - Designed for the most demanding professionals, the Radial JD6 features 6 Jensen Transformer equipped channels for exceptional signal handling, virtually zero-distortion and the warm Bessel curve that has made Jensen legendary. Channels 1 & 2 are decked out with front panel priority switching jacks, stereo to mono merge, low-pass-filter and RCA inputs for Swiss-Army connectivity. Perfect live and in the studio. Functional.



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of Digidesign's sample delay plug. For live overdubbing, I'd love to see a Kill button in Duende's Preference panel that would temporarily bypass the plug-ins wholesale in these instances, similar to the Universal Audio UAD-1. Track-freezing in Logic 7.1, and Steinberg Cubase SX 3 and Nuendo 3 or greater is supported, but this does not free up any of Duende's resources.

In terms of sound, this is the real deal. As with analog units, boosting the EQ favorably colors the signal with very natural-sounding phase smearing, remaining smooth even under extremes; things never seemed to get too brittle or grainy-sounding. The aggressive G Series settings make for meaty mids and emphatic ends—great for sculpting electric guitars and vocals. Similarly, cutting is a smooth process and doesn't impart that clinical emptiness that is typical of many EQs. The high- and lowpass filters have a gorgeously transparent sound that doesn't display the annoying "ring" you often get around the cut-off peak of many other filters.

Compared to Waves' SSL emulations, for example, I'd have to say that Duende's EQ and Channel Compressor seemed fuller, with more depth and punch. Likewise, the Bus Compressor plug-in absolutely nails the classic. Used subtly, it sounds as though it's gently riding drum overhead or instrument group faders to glue your mix together magically. The harder you push it, the thicker, rounder and more authoritative it sounds, infusing gobbs of analog saturation, density and smack in a pleasant and musical way.

POWERING DOWN

Duende retails for about the same price as the TDM version of Waves' emulation, which runs roughly only half as many instances on a card that costs more than double Duende's asking price. Knowing that the SSL plugs will run consistently using their finite DSP resources (rather than consuming a lion's share of your already taxed and fluctuating CPU) is well worth the investment, not to mention the fact that Duende sounds absolutely amazing and outperforms all the imposters with a cleaner, more aggressive and modern tonal character, thanks to the XL 9000 K's legacy.

Duende is also very beneficial for mobile users, capable of taking the mixing strain off of laptop systems and placing it firmly in your travel rack. Now every room can truly be an SSL room.

Price: \$1,899.

Solid State Logic, 212/315-1111, www.solid-state-logic.com. ■


Jason Scott Alexander is a producer/mixer/remixer in Ottawa, Ontario.

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The RADAR system has always been renowned for its simplicity, solid performance and sound. iZ Technology has upped the ante with the RADAR V line, offering the latest Adrenaline Plus engine, which is capable of *simultaneously* recording 24 tracks of 24-bit, 192kHz audio. Other features include dual-disk recording onto SCSI, IDE or SATA (Serial ATA) drives, a File Flatten menu that improves session consolidation and Gigabit Ethernet connectivity, and operation in Native Broadcast WAV format (BWAV), facilitating integration with other systems. My review unit was the flagship RADAR V S-Nyquist, operating up to 192kHz/24-bit.

Digital sync reference (word clock) is via BNC connectors (In/Out/Thru) accepting word clock or video sync. RADAR can also clock off of any of its digital inputs (AES/EBU, S/PDIF, ADAT optical) and LTC or MTC inputs. Positional reference is read and generated via two XLR SMPTE connections or MTC (MIDI In/Out/Thru), with all industry frame rates supported. All RADAR V machines have a Session Controller capable of managing 48 RADAR tracks, as well as a 24-track meter bridge with an optional 48-track meter bridge available.

The S-Nyquist review unit shipped with a 120GB internal drive and two 73GB SATA drives on cartridges. A new Adrenaline Plus card supercharged with the company's Trinity chip enables a Dual Disk mode, where audio can be recorded to both drives simultaneously, or a Span mode, which allows audio to spill over to the next recording drive when the current one is full. This will definitely prove beneficial during a live recording. A DVD-RAM/CD/DVD-R combo drive was provided for backup purposes; for bigger archival, a 35GB REV cartridge drive was included. RADAR can also tackle the data-transferring process to a Mac or PC with its Flatten Project capabilities and new Gigabit Ethernet connectivity. Flatten Project consolidates all project punches and audio files into continuous files. Once a project is flattened, the drive and audio files can be mounted on a PC or Mac.

RADAR IN SESSION

The RADAR V was integrated into a room with an SSL 4000E, a Studer 827A and,

conveniently, another RADAR (Classic II). After an easy installation (all cables from the Classic were compatible), RADAR was launched into a tracking session at 192 kHz. It recorded eight minutes of audio across 20 tracks before I received error messages and the drive crashed. I ran into the same problem with the second SATA drive. Neither drive would mount after the fact, and two songs were trapped on disk. A phone call to an iZ tech led to the discovery that a ribbon cable had come loose in shipping. In addition, when a user is running a session at 192k, iZ recommends using a 15k rpm SCSI drive. iZ quickly shipped out the 15k rpm drive, and I was able to salvage one of the two songs from the SATA drive. After resetting the cable and mounting the faster drive, RADAR recorded and played back flawlessly.

The first session was recorded at 192k, and during playback, everyone in the room—engineers and musicians—all had the same response: "This thing sounds great!" I experimented with a tune at 96 kHz and could still hear the difference between the two sampling rates. Don't get me wrong; 96 kHz sounds good—in fact, better than other 96kHz converters I have heard—but not stellar. When comparing the two, 192 kHz sounded like a blanket was lifted off the mix, with a very open top end and more depth. The snare sounded boxy at 96 kHz, and the entire mix suffered in the midrange. At 192 kHz, the low end was much smoother and, again, the top end was just airy; guitars had depth and a great midrange.

Another session was dedicated to comparing my Classic RADAR II and the new S-Nyquist: recording a drum kit to both RADARs simultaneously, locked to SMPTE.

The first test included both RADARs



running at 48 kHz. The results were close, but the V had a smoother high end and a tighter-sounding snare. The overall fidelity was better, leading me to believe that iZ has improved the converters from its Otari predecessor. Because RADAR II tops out at 48 kHz, I wanted to hear the difference in the leap to 192 kHz. The results were dramatic. The entire drum kit came to life. The kick was deep and rich, the snare transients were excellent and the cymbals had a very smooth decay. Only on the studio's Studer 827A have I heard that drummer and his kit sound that good.

SO WHERE DO WE STAND?

Once I got over the drive and ribbon cable problems, it was sonic splendor all the way. As for a full-on editor, I still prefer a traditional DAW, but iZ makes it easy to interface with your Mac or PC with Gigabit Ethernet connectivity, the File Flatten option or export to CD/DVD media. The S-Nyquist's converters are the best I have experienced on a DAW or recorder. The Session Controller is intuitive and incredibly easy to use.

Prices for the V Series start at \$14,995, and an S-Nyquist can reach \$19,995. Why invest in a RADAR V S-Nyquist? Sound! Sound! Sound!

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Phoenix-based Tony Nunes is an audio engineer.

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Digidesign Hybrid RTAS Soft Synth

Analog Sound and Feel With Easy-to-Use Interface

Digidesign took longer than some DAW manufacturers to add software synthesizers to its product line, but when the company took the plunge, it did it right. Released first as Xpand! (free to Pro Tools owners), which comes with a large sound library and does multiple types of synthesis, but it's not highly programmable; the user interface is limited to half-a-dozen macro knobs. Hybrid (S249) offers deeper programming features, but you don't need to be a die-hard tweeker to use its elegant and satisfying factory presets. A lot of sound design work went into giving Hybrid the kind of basses, pads and keyboard comps that mainstream pop music producers are sure to love.

MEET THE HYBRID

Hybrid is a virtual analog synth. Although it isn't multitimbral, its basic operating mode is dual, comprising a pair of three-oscillator voices side-by-side. The A and B parts can be layered, split or crossfaded. Each part is a complete synth, with multimode filter, envelopes, LFOs and effects. Each part has a step sequencer/arpeggiator, so catchy rhythmic effects can be dialed in easily. You can combine part A from one preset with part B from another preset for instant sound hybrids.

Oscillators 1 and 2 have seven different waveform modes, which include cross-modulation (equivalent to ring modulation), sync and a multi-sawtooth with detuning. Another mode provides access to a set of 100 digital wavetables. You can sweep through a wavetable using any modulator. The results, ranging from subtle animation to classic PPG-type effects, depend on the table you've chosen. The oscillators are anti-aliased to provide a clean high register and have a rich sound. Oscillator 3 is simpler: It offers only sawtooth, square and triangle waves, plus a square wave sub-oscillator and a noise amount, and has fewer modulation options.

The filter has 23 different modes, including lowpass and highpass with various numbers of poles, plus combinations such as band-reject with lowpass. The saturation stage in the filter is particularly fat and tactile-sounding. The filter has an audio rate FM input, which can use oscillator 3, noise or a mix of the

two. The FM from oscillator 3 is limited by the fact that oscillator 3 does not have a pitch-modulation input, but FM can be used for roughing up the tone a bit. At high-resonance settings, Hybrid's filter self-oscillates, so swirling FM sidebands are also easy to program.

Modulation starts with four envelopes and three LFOs. The filter envelope is an ADSR, but the amp envelope includes an extra decay stage; two general-purpose mod envelopes include a couple of extra stages. The LFOs can sync to the host's tempo and have a start phase parameter and depth modulation. LFO 3 is polyphonic and can use rate modulation instead of depth modulation. These are great features.

The A and B parts each offer a pair of insert effects in series. Algorithms for these effects include all of the standard types, from plate and hall reverb through chorus and flange to distortion and bit reduction. In addition, A and B parts each have sends for the global chorus, delay and reverb effects. The manual would lead you to believe that the global effects are routed in parallel, but they're actually in series. Careful listening tests reveal that each part has its own global chorus and delay, which share parameter settings.

MORPHOLOGY

The oscillator, filter and amplifier modules each have a set of three modulation inputs, which have bidirectional amount sliders. Each input can be assigned to any of the available destinations in the module; for instance, oscillator pitch, waveshape or level in the oscillators. All three inputs can be assigned to the same destination; you can modulate panning from three different sources at once.

Hybrid's four Morph knobs can each be assigned to control any knob with any positive or negative amount. The Morph knobs can then be automated or assigned to the MIDI mod wheel, after-touch and so



Main panel, showing oscillators, filters, effects and output level controls

on. These knobs can transform the sound in expressive ways. Morphing can also be applied to envelope shapes.

STEPPIN' OUT

The sequencer/arpeggiator is limited to 16 steps, but can perform a variety of sophisticated tricks. Instead of using the steps, you can load a factory phrase or import your own Standard MIDI file. Step sequences include two rows of controller data, the outputs of which can be attenuated with real-time MIDI modulation. Putting the sequencer in controller-only mode is a great way to superimpose a rhythmic filter pattern over the notes you're playing from the keyboard. I had a lot of fun modulating waveshape from the sequencer controller outputs, creating lively Kraftwerk-like timbral patterns.

ENTER THE TONE ZONE

Hybrid is simply a great synthesizer, capable of both classic analog warmth and modern digital edge. Because it's RTAS-only, non-Pro Tools users can only be jealous. There's no free demo version, but you can rent Hybrid for two days for \$10. It also comes free as part of the Music Production Toolkit for Pro Tools LE and M-Powered.

Digidesign, 650/731-6300, www.digidesign.com.

Jim Aikin is a regular contributor to Mix and Electronic Musician.

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PreSonus

Dangerous Music Monitor ST, Monitor SR

Scalable Stereo and 5.1 Loudspeaker Control With Remote

Not quite as dangerous as it sounds, but certainly exciting, Dangerous Music's Monitor ST and Monitor SR are highly useful companions in today's ever-evolving studio monitoring setups. Flexible routing and monitoring are more critical than ever, with many users now working both "inside" and "outside-the-box." Toggling from stereo (with and without subs) to 5.1 for comparative analysis can be a headache, but the Monitor ST and SR resolve these issues with versatility and lots of features.

STEREO STALWART

The stereo Monitor ST (\$2,199) contains the main system, including the computer-based remote controller, front panel controls and rear panel access for power supply, controller cable interface, cue and talkback feeds, and multipin DB-25 connectors for inputs and outputs.

Users who work without a traditional console master-output section will welcome the ST's front panel controls: adjustable-level headphone jack, talkback mic, level control and external input jack. The built-in mic is all that's needed for most studio settings, while the external input comes in handy if the unit is placed at a distance from the main monitoring area. A "Main to Cue Level" control routes any selected source to the cue amp output.

Two other inputs are controlled via the front panel. The aux input-level control routes signal to main or cue, and can be enabled via the remote control for any number of scenarios in which this signal needs to be monitored—click tracks, computer audio, etc. An input 4 level pot quickly became a favorite: In many cases, my CD player's output was routed to this input, allowing me to instantly toggle to reference CDs to compare works in progress.

Rear panel connections include two XLR aux inputs, a pair of DB-25 I/O connectors, power supply DIN jacks, talkback remote jack, slate output, cue amp out and a port for connecting to the remote controller.

THE SURROUND MODULE

As an add-on, the SR surround module (\$1,499) has a straightforward layout. The rear



panel connectors are four sets of DB-25 I/O ports, power supply connections and routing for the remote controller. (The ST module functions alone or with the SR module.)

The first two speaker outputs are for two separate 5.1 surround systems and are configured identically, while output 3 has a stereo feed for the front channels and a combined (mono) feed for a sub, along with two other separate sub outs (LFE left and LFE right) for systems with multiple subs. Output 4 is for metering of any selected input source. On the SR's front panel are four recessed trim pots for adjusting left-rear, right-rear, center and LFE speaker feeds.

ALWAYS IN CONTROL

The real fun begins with the Dangerous Remote, a wedge-shaped, easy-to-read, multicolored, lighted remote controller. Fed by a Cat-5e cable, the remote can be placed anywhere; there are really no limits to the length of the cable run. After spending a few minutes consulting the occasionally confusing manual, it was easy to get up and running, and understand the various functions of the computer's memory storage and how the color-coded controls work. The blue buttons are for programming and updating system gain and configurations. The green buttons select inputs, speakers and subwoofer routing. The orange buttons handle mono and aux to main, talkback and dim functions. The red buttons provide easy mute/solo toggling in various listening modes.

Regardless of skill level and experience in setting up a room, the recessed speaker-feed adjustments make for easy 5.1 alignment. My setup involved a pink-noise source and

a Radio Shack SPL meter (model #3-2055). I followed the manual's suggestion of starting at 80 dB at the listening position and then I worked my way around the system, using the flat "C" mode weighting on the SPL meter. Going further with higher (and much lower) listening level tests, as well as several of my own stereo and surround projects, I quickly settled into a comfortable and finely balanced setting.

The system's quiet, smooth operation is one of its most enjoyable aspects. It uses no VCAs or DCAs in its output circuitry, and the sound quality is rock-solid and consistent at all listening levels. It's a comfort to hear the internal, inert gas-filled, gold-contact relays quietly clicking along as the absolute-value stepped attenuator moves from each position to the next. In both balanced and unbalanced operation, the ST/SR combination was transparent and smooth in operation.

EASY-LISTENING STREET

A few minor quibbles about the owner's manual aside, once you're dialed in and running, this is one smart and effortless controller that you'll want to play with while you work. After grasping the factory-default settings, I easily "rolled my own" to create setups and routings. In a very brief time, I was quickly working with easily repeatable results, changing monitoring environments as needed. Once you get comfortable with it, you'll wonder how you got along without one.

Dangerous Music, 607/965-8011, www.dangerousmusic.com. ■

Joe Hannigan runs Weston Sound & Video in Philadelphia.

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DIGITAL MOTION



COUNTRY ROYALTY

ALISON KRAUSS PRODUCES ALAN JACKSON

By Elianne Halbersberg

There's a story that Keith Stegall (Alan Jackson's longtime producer and no stranger to songwriting, performing and running record labels himself)

loves to tell. "Alan didn't get signed until 1990," he recalls. "On New Year's Eve 1988 or 1989, my wife and I were going to a bunch of parties. Alan was playing the Quality Truck Stop (in Nashville), and we had a table reserved there. Maybe 10 couples were in this club. Two couples walked in and asked who was singing. I said, 'Alan Jackson.' One woman said, 'Let's go somewhere else.' I said, 'In two years, you'll pay \$20 to see him.' They laughed and walked out."

Alison Krauss

That was 45 million albums sold and 31 Number One singles ago. Now, they can hear him sing a unique collection of songs selected by producer Alison Krauss on his latest album, *Like Red on a Rose*. In many ways, it's a departure for Jackson. Even his wife describes the album as "a cross between Don Williams and Norah Jones." Jackson, a guy so laid back that

he's practically horizontal, seems a natural for the CD's easy-listening mood, and as usual, his singing sounds effortless.

"It probably was [effortless] for me," he says, "but Alison was about worn out. I have the easiest part: I walk in and sing. That's what I did, and they made it sound good. We usually do a few takes. I burn out if I have to keep singing or punch lines in and out. I lose all the emotion and it comes out in my voice. It took Alison awhile to get used to that. She's really technical and always sings perfectly, and she had to get used to me singing a couple and going home."

"He's an artist and a gifted vocalist," Krauss says. "I get into the process of doing something, and even if it's the millionth time, I still enjoy it. He is a performer, and his heart's not in it the fourth or fifth time he has to sing something. He'd come in, sing, and he wasn't at the studio more than an hour or an hour-and-a-half. The first tracking day he was there all day. He was there most of the day the second and third tracking days. It's a real wise way to keep it fresh for yourself, and his best vocals were the first three times we did something."

Engineering was done by Gary Paczosa, who has worked with Krauss since she was 19 years old and singing on a Dolly Parton album. "I've now worked with Alison for 16 years, and my respect for her is stronger than ever," Paczosa says. "Everything that she fought for as a teenager, regarding her unwillingness to compromise when it came to making records, means just as much to her today, if not more."

Being in the studio with Jackson, however, was a new experience for the veteran engineer. "I mostly

—CONTINUED ON PAGE 120

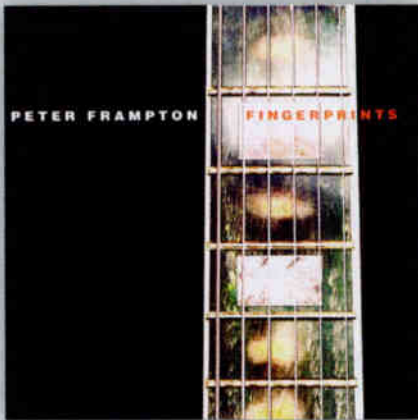


PETER FRAMPTON

SCENES FROM THE INSTRUMENTAL ALBUM *FINGERPRINTS*

By Michael Barbiero

When I was first told that Peter Frampton was about to embark on a completely instrumental album—a tribute to his musical influences—my first thought was to try to convince him to include a duet with Warren Haynes playing slide. It occurred to me at the time that those two seasoned road warriors could create a kind of magic playing together that one rarely gets to hear. Frampton brings more than four decades of guitar-slinging to this latest project. He was trading licks with David Bowie at the tender age of 10, and by age 16, he had already enjoyed several hits in England with his band, The Herd. Frampton came to worldwide acclaim with Steve Marriott and Humble Pie in 1969. Frampton went solo in 1971, five years before his double-album *Frampton Comes Alive!* became one of the most popular live rock music albums of all time, selling more than 16 million copies.



Consider also his 1977 Number One album and single, *I'm In You*; guest appearances on George Harrison's *All Things Must Pass* and Harry Nilsson's *Son of Schmilsson*; and his trademark "voice tube effect" for guitar, and it's no wonder that the fair-haired British rocker has been elevated into the rarified realm of rock guitar gods.

Meeting Frampton in August of 2004 at his New York City hotel, I asked him about his new album, *Fingerprints*. "It's basically a collection of [instrumental] music that I decided to one day do because playing guitar has al-



ways been my passion," he says. "I love singing, but as I said the other day to someone, if I had to choose something that I couldn't do anymore out of writing, singing or playing, I would choose to lose my voice!" [Laughs]

"The first person that really gave me the bug [for guitar playing] was Hank Marvin from The Shadows, which started off as Cliff Richard's backing band and then became an entity unto themselves," Frampton continues. "In the old Commonwealth countries, they became the instrumental Beatles! They were a phenomenon! They were much, much bigger than The Ventures in America to us, even though I loved them, too. It must have been '58 or '59 when I first saw the red Stratocaster with a tremolo strapped round Hank Marvin's neck. He'd modeled himself look-wise after Buddy Holly, with the big horn-rimmed glasses. So, really, I guess we can blame Hank Marvin for me!

"If you speak to Mark Knopfler, Pete Townshend, Jeff Beck, Keith Richards, they'll all mention Hank at some point in their beginnings," Frampton continues. "He was the guru for us. On and off, over my entire life, I've been saying I would do an instrumental album. The germ of the idea has always been there, but it went into second gear when I played in 1995—for the first time in many, many years—at the Shepherd's Bush amphitheater, when Hank Marvin came and saw our show. As it happened, that tour we walked on [stage] to The Shadows' 'FBI' single and walked off to The Shadows' 'Nivram.' We did it every night.

"So he comes backstage and, basically, I ignore everybody else that had come to see me. At that point, I asked Hank, 'Would you do me the honor of playing on an instrumental album I'm planning to do? You're the reason why I started playing guitar.' And he said, 'Of course!' So 10 years later, I e-mailed him, and I said, 'I know it's been awhile, but I'm ready. Are you still up for it?' And he just e-mailed me back with a very simple reply: 'I thought you'd never ask.' Getting Hank was the most important thing to me."

As I listened to Frampton describe his project, I became even more convinced that Haynes would be a great addition to his guest roster, and when I finally broached the subject, I was thrilled to find that Frampton was interested. I wound up calling Haynes straightaway to give him Frampton's contact information, trusting that the stars would align and nature would take its course. Months later, while Haynes was touring with Gov't Mule in Cincinnati, he asked Frampton to sit in with his band. They got along wonderfully, as I suspected, and nearly 18 months after my first meeting with Frampton, I got a call from Haynes asking me to do the recording for the dueling solos session I'd suggested. It was certainly worth the wait.

We finally set up on March 12, 2006, in Right Track Studio A on 48th Street in New York City. Both Frampton and Haynes played Gibson guitars through matched Soldano SLO-100 heads. Frampton's head went to a slanted Marshall four-by with 25-watt Cele-

—CONTINUED ON PAGE 122

PUBLIC ENEMY'S "FIGHT THE POWER"

By Gaby Alter

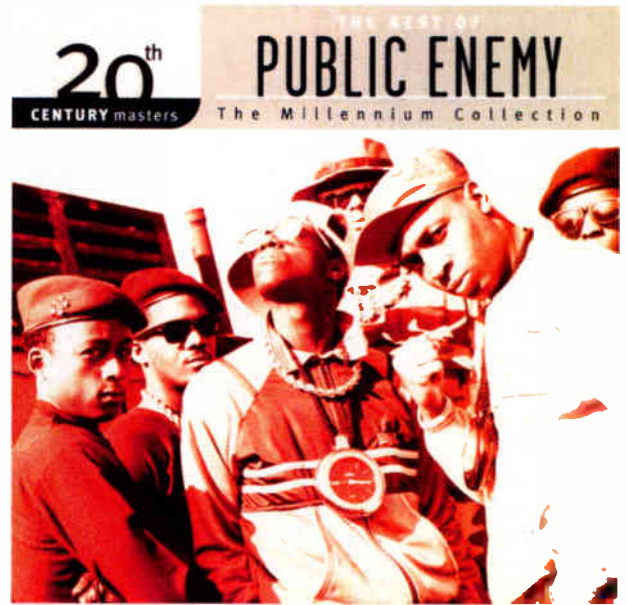
It is hard to forget the impact of the opening sequence of Spike Lee's *Do the Right Thing* (1989). Actress Rosie Perez, her face a mask of determination, does a combination of dancing and shadowboxing, a fierce and beautiful image that sets the stage for the movie's depiction of racial tensions, anger and, finally, revolt against racial injustice. Equally memorable is the song she was dancing to, a fiery hip hop track at once jarring and funky, like almost nothing else heard up to that point. The basic groove sounded like a James Brown cut deconstructed and rebuilt again with scrap metal. The chorus, with its heavily distorted and layered samples, called to mind a group of ghetto-blasters tuned to different stations.

Public Enemy's "Fight the Power" was a quantum leap for rap music. In the late '80s, hip hop songs used only a few samples each, with the beat often created with single break from an old funk recording (frequently, at the time, Clive Stubblefield playing on James Brown's track "The Funky Drummer"). But "Fight the Power" featured a large number of samples that were layered and altered so heavily that it was hard to identify the sources. (Two of its creators, when pressed to remember, could only name a few.) Recorded not too long before the legal clampdown on sampling, "Fight the Power" was a masterpiece of sound collage.

The song, along with the success of Public Enemy's previous album, *It Takes a Nation of Millions to Hold Us Back*, also helped usher in a brief period when radical black politics pervaded mainstream hip hop. Politics had certainly always been in rap (Grandmaster Flash's "The Message" and early Run-DMC), but Public Enemy was arguably the most politically extreme group to achieve sustained commercial success. Their backup dancers wore combat berets and held fake uzis, emphasizing the group's militant views; their raps were filled with pointed criticisms of the white establishment. On "Fight the Power," rapper Chuck D labels Elvis Presley a "racist," with Flavor Flav chiming in "Yo, motherf****, him and John Wayne!"

Public Enemy formed on Long Island in the early '80s, while Chuck D (aka Carlton Ridenhour) attended Adelphi University as a graphic designer. He and Hank Shocklee, later the group's executive producer, were both working at Adelphi's radio station, WBAU. They were later joined by Hank Shocklee's brother, Keith, the record maven of the group, and Eric "Vietnam" Sadler, forming Public Enemy's production team (known as "The Bomb Squad").

An early demo tape, "Public Enemy No. 1," reached the ears of Def Jam Records co-founder Rick Rubin, who courted and signed the group. In 1987, Public Enemy toured as an opening act for the Beastie Boys to promote their first album, *Yo! Bum Rush the Show*. With sampling done using a fairly primitive 8-bit Ensoniq Mirage sampler, it was more rudimentary and less commercially successful than next year's follow-up, *Nation of Millions*. *Nations* showed Public Enemy



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growing creatively, exploring more complex sampling with the more advanced Akai S-900 and E-mu SP-1200 samplers. The album broke through to Platinum status, despite a lock-out by commercial radio.

It was at this moment in the group's rise that Lee asked them to contribute a track to *Do the Right Thing*. Lee originally envisioned it as a collaboration between Public Enemy and jazz composer and trumpeter Terence Blanchard. "Immediately I didn't feel it, not because I don't have respect for Terence Blanchard and his work. It was like trying to mix apples and donuts—two different worlds," explains Hank Shocklee. Nor did Hank Shocklee like Lee's idea that they rework the African-American National Anthem, "Lift Every Voice and Sing." "I wanted to do something that exemplified the sentiment of the inner cities, the streets, something anthemic because [Spike] wanted an anthem, basically."

Convincing Lee to let them do their own thing was no easy matter. The group spent two meetings arguing with him over the idea. "We were going at it toe-to-toe," Hank Shocklee recalls. "Spike is a very strong-minded and strong-willed person." Ultimately, PE decided to follow their own instincts, crossing their fingers and hoping Lee would like the results.

"Fight the Power" was recorded at Greene Street, one of the main studios where hip hop was made in New York during the late '80s. Greene Street had A and B studios with two different consoles, an Amek APC-1000 and a Trident TSM. While they generally alternated recording on the two consoles, "Fight the Power" was mixed and mainly recorded on the Amek, partly for that board's automation capabilities. "We had a lot of rides and a lot of muting," says Keith Shocklee. "Automation was our best friend."

Public Enemy's process of composition was a collective one, closer to that of a rock band than many hip hop outfits. They would get together and essentially jam, collectively and individually, until they found something they liked. "The key of PE's style was that it was clean and dirty; it was tight and messy," Hank Shocklee says. "Everybody is pitching in ideas, and the idea that was stronger is what ended up on tape."

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PE was notoriously heavy on preproduction. "It was all ready to go on the SP-1200," says Rod Hui, who engineered that album, as well as "Fight the Power" and the follow-up, *Fear of a Black Planet*, with Nick Sansanos. "Eric 'Vietnam' Sadler was the main person in control of that. He was a great programmer. Everything would funnel to him, and he would make it all make sense, and then I would just lay it down on 2-inch."

A key to the lo-fi sounds found on "Fight the Power" and other Public Enemy records of the period were the technical limitations of their samplers, which the group enjoyed and embraced as part of their noise-based aesthetic. The S-900 and SP-1200 used 12-bit samples—more advanced than the Mirage, but lower than today's standard of 16 bits. Hank Shocklee explains that he likes the low-res sound because "you can't pick out the exact instrument and things that are going on, and it kind of meshes it all together, so the frequencies of where the guitar and the bass come in are not clearly defined."

This was enhanced by the fact that the group often used longer sample loops than the equipment was intended for. "I think the SP-1200 had eight or 12 seconds tops for all 16 pads," explains Hank Shocklee. "It wasn't designed to do what we were doing. It was just designed to put in kicks, snares, hi-hats, rides. To get more time, we would speed up the record, play it at 45 and we got almost double the time." Once the sped-up sample was loaded in, it had to be pitched down, resulting in a further degradation of the sounds. Add to that the fact that the SP-1200 cut off the ends of its samples sharply. "The cut-off gave it a rough sound, a real edgy sound," says Keith Shocklee appreciatively.

Another key to Public Enemy's unique sound was their beat-creation process. Unlike many of their contemporaries, who would lift a beat from a recording more or less intact, PE would frequently doctor beats to create a different kind of rhythm than the original.

PE also often played their own individually sampled kicks, snares and hi-hats over whatever rhythms they had looped. Because the natural reverb that came with these individual drum samples would "wash the sound back," according to Hank Shocklee, he and Sadler layered the kicks and snares. Thus a single kick would be a composite of several samples that covered different parts of the frequency spectrum to give it a fuller, more powerful sound.

In terms of the rapping, Hui recalls that much of Chuck D's writing occurred spontaneously in the studio. "Ninety percent was inspired by the tracking," he says. For D's vocal chain, Hui used a Neumann

87 microphone, an API mic pre, an 1176 compressor/limiter and an LA-2A compressor. He remembers that the rapper never liked to punch in; if he made a mistake, he would simply retake the entire vocal. It was actually Hui who mixed the song on the Amek console, mixing onto half-inch analog tape at 30 ips on a Studer 820 tape machine. (Hui also mixed *Nations* and *Black Planet*.)

When the song was completed and delivered, the group didn't hear back from Lee. Hank Shocklee was skeptical that he would accept the song. But when the movie came out, Hank Shocklee ran into some people who had been to a screening. "They said, 'Yo, "Fight the Power" is all over it!'" he recalls. "I guess that was a way of Spike saying that he liked it without telling us that he really loved it."

Both movie and song proved momentous for their creators. *Do the Right Thing* was Lee's biggest film and earned him an Oscar nomination for the screenplay. "Fight the Power" topped the rap charts and helped push Public Enemy's next two albums into *Billboard's* Top 10. Public Enemy's major record sales faded after the early '90s, coinciding with (though not necessarily due to) a change in their sound as new sampling laws made the collage techniques of "Fight the Power" and *Nations* too expensive. The group continued to make music for a smaller but devoted following; their latest album is actually a collaboration with another radical rapper from the late '80s, Paris. Hank Shocklee, after parting ways with PE, has gone on to produce records by other artists and is currently writing a book about the recording of *Nation of Millions*; Keith recently contributed to rapper Xzibit's latest album, *Full Circle*. So while Public Enemy and much of politically oriented rap have disappeared from the charts, both thrive outside the mainstream. ■

COUNTRY ROYALTY

FROM PAGE 116

work with female artists, so working with Alan was a great change of style for me and definitely a challenge," he says. "Alison chose to cut most of the songs in lower keys than Alan would normally have sung in, so the challenge was finding edge and big, defined low end in his vocal. He's an incredible country singer. He did tend to deliver the good stuff on the early takes, so it was mandatory to catch those vocals in good form."

Jackson and Krauss went into the project

with the intention of making a bluegrass album. However, there's not a note of bluegrass to be found. "Actually, when Alan asked me, I thought of a song right away, and said, 'Does it have to be a bluegrass album?'" remembers Krauss. "I thought he meant a straight-ahead bluegrass record, and I had a different idea for him, which turned out to be something he always wanted to do anyway: an album by a reflective, romantic, mature man looking back on his life. By romantic, I mean musically romantic."

"She had an interesting idea and a similar direction as I wanted to go for my next album, as far as mood and being more reflective," he says. "So we did three songs to evaluate and see if it would work, and then we decided to do it. She brought all the songs [the album features one Jackson original, 'A Woman's Love'], we picked the ones that worked together, she picked the players and I left it up to her. It was nice."

The initial conversation took place in October 2005, and tracking began in February 2006. "We cut the tracks at Masterfonics Studios in Nashville, and did most of the overdubs there," says Paczosa. "My assistant, Brandon Bell, did the overdubs with Alison while I was working on another project, then I started mixing at my studio, Minutia, while they were wrapping up background vocals. After I got the mixes pretty close, we moved over to Blackbird Studios, to George Massenburg's new room, so that we could fine-tune the mixes in a different listening environment. The way that the room is set up at Blackbird made it possible to quickly duplicate my complete home studio setup, bringing in the same console, computer and onboard package."

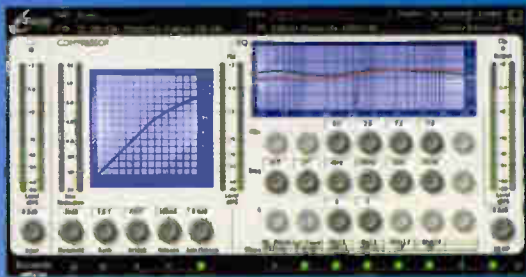
"In the past with Keith [Stegall], he always had an old tube mic for vocals since day one," Jackson says. "With Alison, they had their own version of that, some funky-looking old mic, and we tried it and everybody was happy with the tone of my voice. I listen to the roughs and like to hear my voice a certain way, like anybody would, and if it sounds right, I'm not that particular about it. I just use regular headphones that I pull off halfway to see if I can stay on pitch better."

"This project was recorded at 24/96, first into Pro Tools HD, then transferred to Nuendo for all vocals, overdubs and mixing," says Paczosa. "I prefer Nuendo but did not have all the converters I needed to pull off the tracking date. The converters I am currently using, and loving, are the Mytek 8x192 AD/DAs. I cut Alan's vocal on the BLUE Bottle microphone with the B7 capsule, using the Vintech X81 preamp, along with the GML EQ and compressor.



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"Alison liked cutting Alan in lower keys than he was used to to force him to sing differently," Paczosa continues. "There was also more space around some of the vocals on this record, more than he was comfortable with, so I think the feeling of being so exposed made him sing differently."

"I knew Alison was a perfectionist with music and a funny character anyway—witty and a little different—and I am, too, so we work well together," says Jackson. "She's a hard worker, puts time in to get it done, and a lot of energy and thought into it. She and her guitarist came to my house and spent two weeks figuring out keys before recording."

"All records produce a feeling," says Krauss. "And different keys evoke different feelings. His voice a half-step higher or lower gives the song a different feeling. I can't arrange the songs until I can imagine the piano and guitars. Alan is a very natural singer, and I felt I learned more about singing while working with him than in all these years combined." ■

PETER FRAMPTON

FROM PAGE 117

tions located in the iso booth next to the control room. Haynes' head also went to a greenback Marshall four-by, but it was out in the large room for separation. Both bottoms were miked with a Shure SM57 and a Sennheiser 421. (Warren's were adjacent, on one driver, at 45-degree angles to one another, with the 421 straight on the driver, halfway between the driver's edge and the element, and the 57 perpendicular to the angle of the cone.) Frampton's mics were placed on different drivers (the top two), both straight on and equidistant from the center and the edge of the cones. Two Neumann U87 room mics were placed for Haynes' ambience, about 16 feet apart and about 16 feet from the Marshall bottom. (Frampton's performance was later played out through studio loudspeakers and recorded through Haynes' room mics to add the same ambience.) All of the mics went through Neve 1081 mic preamps, flat and direct to Pro Tools.

AINLAY IN THE STUDIO

When I put up the blues track we were to work on, the first thing I noticed was the rich drum sound on the submix Frampton had brought. "There's no 'verb on that," he told me. "That's the sound of my room!" I later asked Nashville engineer Chuck Ainlay (who did all the tracking for *Fingerprints*) what

working in Frampton's home studio was like.

"The room sounds great," Ainlay says. "Well, Chad Cromwell—his drums sound great anyhow, but [it's not like] those real large rooms where the drums kind of just get lost in them. Peter's room creates [just] enough compression. It sort of loads up, but doesn't load up too much. He's also got a lot of other usable spaces. We basically utilized the whole house while his wife was out of town. We were able to use the upstairs for the piano and the guitars, and there's a big TV/den/children's playroom off the studio, which we used for his guitar rig. Then he's got an exercise room, which just sounds amazing. We did a couple of guitars in there.

"I love recording to tape. It knocks off the transients on the drums and you can get them louder. You just have a bit more headroom and it also sort of takes off that brittle high end. It warms things up."

"BLOOZE"

Magic is often harder to come by in a recording studio than in a live venue, but there was magic between Haynes and Frampton on the very first incredible take of "Blooze," which is now the title of the song Haynes and Frampton played on together. It was decided that Frampton would play verse one, Haynes on verse two and both musicians trading licks on verse three. The pair went for it. Frampton was so captivated by Haynes' playing on the intro that, for a moment, he forgot to play his part in verse one. With the exception of that slip, and a few better licks that were taken from one of the other two takes we did, the entire final performance was from take one.

"It was great," Haynes tells me later. "I mean, he plays amazingly, and we were able to communicate right from the beginning. You know, there's nothing like a great first take when it happens. I felt like the first take had that natural flow about it that the following takes didn't have."

MUSICAL CONVERSATION

More recently, I caught up to Frampton while he was in Chicago, on tour, and had the chance to ask him a few more questions.

Has owning your own studio liberated you creatively?

Liberating is definitely one of the words I would use to describe it. I've always had some form of studio. As much as I've been a guitar player and a songwriter, I've always been very involved in electronics.

What kind of console do you have?

I have an SSL E Series with a G computer, 56-in, and I love it to death! I got that because

it's a standard, and a lot of people still like to mix on it. Also, I've been collecting outboard mic pre's: Neve [1081 and 1073], Vintech [473 and X81], Universal Audio [2108 and 610], an old Jensen. I've got enough to do a complete drum kit with skins on top and underneath. [Laughs]

Who designed your home studio?

I had been to many, many studios. I remember going to the Townhouse, the Phil Collins room, and the combination of surfaces in that room was wood, stone, a little bit of fabric and no parallel walls! And it was very tall. It was the smallest room, but very tall. And the drum kit got set up right in front of a stone-faced fireplace that went from floor to ceiling. So, basically, I made my studio area [like that]. I call it the drum room. If the drums don't sound good, I'm frustrated. That's where it all starts. The drummer drives the band, and the drums have to sound great. I have sidewalls of cherry wood, the complete wall behind the drums is stone and then, opposite where the drums face, I have a little bit of padded fabric and more wood.

So you did it yourself, based on your experiences in the past.

Yes. But I did have someone: Dave Mattingly, who built Chuck Ainlay's studios, Backstage and Soundstage, and a lot of other studios around the country. I know the ingredients of a great studio, and he knew how to make a great control room and how to make a control room sound. And I'm not using big speakers; I'm only using near-fields with a subwoofer. So it was hit or miss. But I have to credit Dave Mattingly with building me a phenomenal studio.

Could you share a memory of one of those moments in your career when an accident or something completely improbable turned out to be wonderful?

Some of my better-played solos [occur] when I don't think about what I'm playing. The session with Warren was like that. We only did two or three takes of my solo and then we chose between them. I'm trying to emulate what happens onstage, which is what I think we did on Warren's session. It was as live and as off-the-cuff as it could possibly be. I didn't even tell Warren what the chords in the bridge were! I have to say that those are the happy accidents. We said, "Shall we talk about this or not?" and we both said, "No. Let's just go for it. Let's just do it." And [almost all of it] is the first take! That's magic! That's the best that can happen, when there are questions and answers, and we talk over one another, just like you do in conversation. ■

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L.A. GRAPEVINE

by Bud Scoppa

A few months ago, A-list mix engineer Mike Shipley contacted L.A.-based Delta H Design about creating a private studio for him. "Mike came to us," recalls company founder/principal Hanson Hsu, "and said, 'I'm building a room, and I want two big 4x4-foot windows right behind my speakers. I want it to sound like a world-class control room—and you can't do angled walls.' In other words, we couldn't alter the shape of the rectangular room, which was 22x13x8."

Hsu, the one-time chief engineer

materials—all the geometries needed to make any rectangular room sound like a world-class recording studio," he asserts. "Our clients' reaction to our work is that the rooms not only have a charismatic signature sound, but are also quiet, with excellent isolation.

"We're a design firm—we don't just design studios," Hsu continues. "But studio design has been our bread-and-butter for a long time now, and the hardest part about designing a recording studio is, it's got to have a good vibe, a good feel and the aesthetics have to match the client or his clientele. At the end of the day, of course, it must sound good.

"I remembered Mike from my days at Westlake Audio," Hsu recalls, "and I knew that he had a really good set of ears. I knew he wanted a certain look, and he was very specific about the sound, the time parameters and what he *didn't* want to do. So I told Mike, 'I've got this design that works on paper; I've run the numbers on it and done the equations. If you decide to do this, you'll be the guinea pig, but it could turn out great.' Mike was incredibly supportive of the concept and willing to take the risk for the possible benefit."

The Delta H team built all the geometries into the walls and covered them with flat cloth so that the room maintained its rectangular shape. "But it basically does more than the angled walls," says Hsu. "The concept is so simple, but the application of it, because of all the math and geometry involved, is enormously complicated. We're currently testing prototype software that will predict every angle of reflection with any speaker system. We have to calculate each room out so that the mixer doesn't get any aberrant or negative acoustic anomalies. Basically, ZR design extends near-field into the entire room, so that once the sound goes past your mixing position, it never comes back. With ZR, you hear only your content

—CONTINUED ON PAGE 128

NASHVILLE SKYLINE

by Rick Clark

When I was a kid fresh out of high school, the idea of going to college to learn how to produce and engineer rock records, promote a band or learn the dynamics of the music industry was a pipe dream. At the time, college music departments were designed for those who wanted to play in orchestra, learn music history or become high school band teachers. I remember dropping out of string-bass class because my classically trained teacher regarded me and other electric bass players as "electricians."

Today, Nashville has an abundance of great educational opportunities for musicians. One of the best is only a few blocks from the heart of Music Row, Belmont University and the Mike Curb College of Entertainment & Music Business. Ever since the inception of the school's program for audio and music production in the early '70s, Belmont has provided students with a well-rounded offering of courses that dig deep into every aspect of the industry. The staff members are very experienced, and most of the teachers add to their resumes as they continue to achieve notable successes in all areas of the music industry.

Assistant professor James Elliott and adjunct instructor Ashley Gorley have enjoyed hit recordings as songwriters. David Moser, an associate professor, teaches courses on intellectual property and legal issues, and just published an in-depth analysis of copyright law and its application to the music industry titled *Moser on Music Copyright*.

For sheer cool factor, any school that hires Mark Volman to teach is okay in my book. Volman was the frontman for The Turtles and was a member of Frank Zappa's Mothers of Invention. He has also appeared on numerous great recordings by John Lennon, T-Rex, Bruce Springsteen, Alice Cooper, Steely Dan, the Psychedelic Furs and others.

The Mike Curb College is undergoing a national search for a new dean to fill the vacancy created by Jim Van Hook, who has moved on to Christian music powerhouse Word Entertainment. In the meantime,



Delta H Design developed its patent-pending Zero Reflection technology to meet the requirements of Mike Shipley's studio.

at Westlake Audio (his mentor was Glenn Phoenix), knew that Shipley's final stipulation would be particularly challenging: How would he solve the fundamental acoustical problems associated with two sets of parallel walls, plus a parallel floor and ceiling? After a week of endless calculations, Hsu had his "Eureka!" moment. After checking his math and checking it again, he confirmed that he had indeed figured out a way to make a rectangular space mimic a polygonal room so that it was free of standing waves and resonant frequencies.

Hsu called the apparent breakthrough ZR, for "Zero Reflection," and immediately applied for a patent, because, to his knowledge, the design was unprecedented. "I was able to come up with a method that enables us to build—within the depth of a 4-inch-stud wall and using everyday

NEW YORK METRO

by David Weiss

associate professor Wes Bulla is operating as the school's interim dean.

Notable Belmont alumni include Chuck Ainlay, Doug Howard, Mark Wright, Bil Vorndick, Trisha Yearwood, Brad Paisley, Steven Curtis Chapman, Jeff Balding and Mark Bright, who produced seven tracks on Carrie Underwood's debut CD, *Some Hearts*. Many of these former students have maintained relationships with the school, operating in advisory positions.

The Mike Curb College operates nine distinctive and renowned recording studios housed in three separate facilities: Ocean Way Nashville, RCA Victor Studio B and the campus-situated Robert E. Mulboy Studios.

Award-winning Ocean Way Nashville features three studios and is housed in an 1850s-era Gothic Revival graystone church on Music Row. As a commercial facility, Ocean Way Nashville's artist client list includes Matchbox Twenty, Harry Connick Jr., Sheryl Crow, Los Super Seven and Kid Rock, among others, as well as producers Byron Gallimore, Peter Asher, Desmond Child, James Stroud and Tony Brown.

Belmont's acquisition of RCA Studio B in 2002 was a major coup for the school,

—CONTINUED ON PAGE 128

Have the Last Poets—perhaps the foremost of the many forefathers of hip hop—made their last stand? Not if New York City-based producer Will Roberson and a dedicated all-star team of artists have anything to say about it. They're making a push for one of Western music's most influential groups to release their latest album, a brilliantly accessible opus as yet unheard.

It's entirely conceivable that if the Last Poets hadn't officially formed on May 16, 1969 (Malcom X's birthday), and begun broadcasting their highly political, distinctively deep and rhythmic wordplay to the world, rap and hip hop might sound very different today. Founded by Jalal Mansur Nuriddin, Omar Ben Hassan and Abiodun Oyewole, the group's self-titled debut pried open eyes in 1970; the jazz-funk of the 1972 *Chastisement* gave birth to "jazzoetry," and the members (and their resultant splinter groups) have kept going ever since.

For Roberson, a fast-advancing producer with a diverse clientele ranging from the French hip hop group KDD to multi-Platinum new age artist Jean-Michel Jarre, Jose Feliciano and the upcoming comeback for '80s dance icon Shannon, his own musical journey with the Last Poets began in 2002. That's when he got in touch with Hassan and Oyewole to suggest an album pairing them with some of their favorite musical admirers—a proposal that was met with the sound of one hand clapping.

"Over the years, they had approached other artists about doing collaborations that never worked out, so they were not enthusiastic about the outcome," acknowledges Roberson, seated in his

PHOTO: DAVID WEISS



Engineer Philip Painson was brought in for the Last Poets project.

intimate Upper East Side Pro Tools HD-equipped personal studio. "But I knew everything was right: The timing was right, everything in the world was right, and they were going to come back to the forefront."

With the likes of Common, Erykah Badu, Keith Murrar, John Legend, Chuck D., M-1 and Sticman of Dead Prez, Doug E. Fresh, Capone and Riverside Drive onboard, the artistic success of the album seemed like a slam dunk. All they needed was a studio that would accommodate the schedules of this busy stable of stars, not to mention the Poets. Enter Jambetta, a studio on Third Street in the East Village owned by Charlie Gambetta. An experienced New York City producer, Gambetta offered his heart, soul and facility to the project, working first and foremost with the album's engineer, Philip Painson, just to get the room in working order.

"We had good technology, but it was scattered all over the place," recalls Painson. "The whole basement was a wreck, and every day I would go down there to fix something. The first board that was there was a generic Ramsa console, then Charlie found a 28x28x2 Trident console on eBay, which was small but very flexible. There were good monitors on hand, including Ascents, Yamaha NS-10s and Mackie 824s. We tracked most of the vocals using a Neumann U87, API or

—CONTINUED ON PAGE 128

PHOTO: MICHAEL KROUSKOP



Dr. Wesley Bulla, dean of the Mike Curb College of Entertainment & Music Business, teaches a class in RCA Studio B.

BEHIND THE GLASS

TODD SNIDER'S *THE DEVIL YOU KNOW* OLD FRIENDS RELAX AND RECORD

Singer/songwriter Todd Snider has perfected an easy, conversational sound in concert and on the albums he records in his friend Eric McConnell's (unnamed) home studio. With deadpan humor and a Southern drawl, he comfortably imparts some of the most incisive indictments of modern society you'll hear on record. "He's such a performer," McConnell says. "When he goes out there, he doesn't need a band."



Snider does like to record with a band, however, including co-producer/guitarist Will Kimbrough; songwriter/guitarist Tommy Womack; steel guitarist Lloyd Green; drummers Craig Wright, Paul Griffith and Paul Buchignani; keyboard player David Zollo; and others.

According to McConnell, the vibe is very casual—a group of friends making music, mostly live—recording to his trusty 8-track Otari tape machines. The

studio is built into his 100-plus-year-old Victorian home. He's done no acoustical treating, but uses different rooms to get different sounds. "The front room is real live," McConnell says. "If we want something real slappy, we'll put it in the kitchen. The living room is the drum room."

Likewise, McConnell's studio is not long on gear. He has a Sound Workshop console and an assortment of microphones; he rents other gear needed for a given project, logically reasoning that, "In Nashville, any piece of gear you want, you can get it in about 45 minutes. If you want 400 microphones and a reverb, it's all here." He does have a lot of musical instruments on hand—pianos, organ, bass, guitars, drums—and musicians know they will find what they need: "Lots of times, a drummer will come over and not even bring sticks," observes

McConnell.

On Snider's albums, regardless of the song arrangement, Snider's vocal is the key element because his fans actually listen to the lyrics. But once again, the importance of equipment is downplayed, as Snider's voice is miked with what McConnell calls "a podium mic with a switch on it. It was like 10 bucks. We just started using it, and it sounded good."

McConnell has been making a living recording at home for five years, and the key seems to be

a warm atmosphere where the players are enjoying themselves and feeling so relaxed that people who drop by end up staying. "My friend [engineer] Joshua Muncey came in to calibrate the tape machines," McConnell recalls, "and he ended up mixing the whole record with me. He got along good with Todd."

Similarly, Jack White and Loretta Lynn dropped into McConnell's place a few years ago to do some pre-production and ended up tracking the Grammy-winning album *Van Lear Rose*. "They came over and recorded seven songs one weekend, and everybody was digging it, so we got back together and recorded seven more," McConnell says. "I get a lot of that, where people just show up and we record something." ■



Todd Snider and engineer/studio owner Eric McConnell (at the console)

CANADIAN KITTIE METAL AT RETROMEDIA



Canadian all-girl metal band Kittie is tracking their upcoming album at Retromedia Sound Studios (Redband, N.J.) with producer Jack Ponti and engineers John Noll and Adam Vaccarelli. The album, slated for release on Platform Group/EMI, will be mixed by Kevin Shirley.

L-R: Trish Doan, Mercedes Lander, Tara McLeod, producer Jack Ponti, Morgan Lander, associate producer Rick Moulder

MIXING AT TRACKMASTER LAST CONSERVATIVE IN BUFFALO



From left: producer Robby Takac, engineer Anthony Casuccio and assistant engineer Mike Brylinski

The band Last Conservative's album *Pretty New Things* (Good Charamel Records/Koch) was mixed at Trackmaster Studios (Buffalo, N.Y.) this summer. The release was produced by Robby Takac (Goo Goo Dolls) and mixed by engineer Anthony Casuccio with assistant Mike Brylinski. Last Conservative headed from the studio to an opening slot on the first leg of the Goo Goo Dolls' summer tour.

CHANGING HANDS

RUDIN'S NEW SPACE A MONEY PIT REBORN



Engineer/producer Dan Rudin

Dan Rudin, engineer/producer of music by Newsboys, Riders in the Sky and others, purchased and renovated Nashville studio The Money Pit. Renamed My Space Recording, the Neve V-60 and Pro Tools HD3-equipped facility will be used for Rudin's own projects, and is the new home of commercial music house IV Music. Rudin says he's pleased with the "comfortable, professional environment that I can do entire projects in, track to mix."

ENGINEER'S STUDIO SHARKBITE SOUND BYTES



L-R: Machine Head bass player Adam Duce, engineer Mark Keaton and singer/guitarist Robert Flynn

One way to get job security: Engineer Ryan Massey has purchased Sharkbite Studios (Oakland, Calif.) from his employer. The busy facility recently hosted Communique, who finished mixing an EP with Massey and Mark Keaton. Machine Head began recording their new album, to be titled *The Blackening* (Roadrunner Records), with Keaton engineering.

TRACK SHEET

SOUTHEAST

At Doppler Studios (Atlanta), Juanita Bynum recorded a Christmas album with engineers Rick de Varona, Aaron Holton and Trent Privat. Jive artist Money Over Sex finished his debut album with engineer Mark "Exit" Goodchild...Jeff Carroll of Bluefield Mastering (Raleigh, NC) mastered a new release by Canadian band Hidden Cameras. The album, *AWOO*, was recorded by Don Kerr...Local group Death Becomes Even the Maiden recorded two new songs at The Jam Room (Columbia, SC). Steve Slavich engineered...Kristina Hess and Ted Kynard are recording and producing the Bill Noonan Band at Lazy Ridge Music (Concord, NC).

MIDWEST

Chicago's Wax on Radio were in Chicago Recording Company's Studio Five working on a new album for Downtown Records. Mathieu Lejeune engineered and Sean Geyer assisted. Also at CRC, Atlantic artists Skillet worked for several months on their new Brian Howes-produced album; JVP engineered, and Dave Rieley and Geyer assisted...Epic recording artist Howie Day was in Echo Park Studios (Bloomington, IN) recording with producer Mike Flynn and engineer Warren Huart.

NORTHEAST

Dubway Studios (NYC) had Debbie Harry in to sing guest vocals on Moby's greatest hits album, and Cat Power was in to track songs for a promotional project. Dubway staff engineers Mike Crehore, Jason Marcucci and Eric Spring handled the sessions...StarCity Recording (Bethlehem, PA) handled post-production for an upcoming segment of *MusicLab at World Café Live* that will feature country stars Big & Rich. Producer/engineer Jeff Glixman and staff engineer Zak Rizvi worked on the project...In Avatar Recording's (NYC) Studio A, Anthony Ruotolo engineered a live performance by The Roots for MTV-U's *Live Leak* program. In Studio B, Nile Rodgers produced Interscope artist Lanz. Engineering was by staffer Ruotolo and Brian Montgomery; Justin Gerrish assisted. In Studio C, Kevin Killen mixed Elvis Costello's contribution to an upcoming Joni Mitchell tribute album; Ruotolo assisted. And in Avatar's G room, Sheryl Crow sang a duet with Willie Nelson for a June Carter Cash tribute. The track was produced by John Carter Cash and engineered by Ruotolo with Eddie Jackson assisting.

NORTHWEST

Keith Urban was in Studio 880 (Oakland, CA) doing a video shoot for Walmart's *Soundcheck* series. Also for *Soundcheck*, John Lucasey mixed songs from Clay Aiken's upcoming album, *A Thousand Different Ways*, and from Five for Fighting's album *Two Lights*...Ixxion overdubbed guitars for their latest record at Wormwood Sound (Idaho Falls, ID) with studio owner/engineer Joel Keyes...At The Banquet Studios' (Sebastopol,



At A-Volve Studios (Austin), Quartershockle recorded a new song for submission to the upcoming compilation CD from Edge mogozine. Pictured (L-R): Chris Forrell, Bloine Motte (seated) and Aaron Wright, engineer Rob Hinton, second engineer Paul Zanetti and Joe Schlouff.

CA) new digital facility, poet Darryl Read recorded an album project featuring The Doors' Ray Manzarek on piano...Kevin Nettleingham of Nettleingham Audio (Vancouver, WA) mastered release: by Portland-area artists Graxxus, John Sherwood and Ouroborus.

SOUTHWEST

Engineer/producer Clarke Rigsby finished mixing Floyd Dixon: *A Celebration* at Tempest Recording (Tempe, AZ). The release features performances by blues greats Pinetop Perkins and Henry Gray, and Kim Wilson of the Fabulous Thunderbirds...A Penny for Lane recorded their debut album at Tierra Studios (Houston); Aaron Morris engineered. Tierra also did some location work: Engineer Glenn Wheeler and assistants Matt Krocak and Larry Murphy recorded *Trial by Jury* and *HMS Pinafore* at the Wortham Center for the Gilbert & Sullivan Society of Houston...Pop rock band Lemmon Avenue are tracking for an upcoming CD at County Guitars & Recording (Grandview, TX) with producer/engineer Joe Brooklyn.

SOUTHERN CALIFORNIA

40 Cycle Hum mixed their self-produced debut album *Secret Skin* (NSF 5 Records) with engineer Michael Schlesinger at Sound Asylum (Canoga Park). The album was mastered by Kevin Bartley at Capitol Records Mastering (Hollywood)...The Melvins' new album was tracked at Westbeach Recorders (Hollywood) by engineer Toshi Kasai and assistant engineer Ian Petersen...Morning becomes really eclectic: Gotan Project, a collaboration of Parisian tango and electronica artists, were in The Village (West Los Angeles) for a live broadcast for KCRW's *Morning Becomes Eclectic* program. Ariana Morgenstern produced, Jason Wormer engineered and Ghian Wright assisted...Sage Sound (Hollywood) is under new management. Owners Marc and Steffan Fantini constructed a new Studio A earlier this year—designed by George Augspurger and equipped with a vintage Neve 8048—and hired veteran studio manager Michelle Moore. ■

Send your news for "Track Sheet" to: hschultz@mixononline.com.

and the transducers; the room is no longer part of the equation."

As it turned out, Hsu's design sounded as good in Shipley's "guinea pig" space as it looked on paper—and so did the environment as a whole. "Mike is really vibey," says Hsu. "As he puts it, 'I've been in dark caves all my life; I want two big windows that open to let the air in. And I'm tired of flying to London and New York; I just want to stay in one place. I want my clients to ISDN me everything, and I'll mix it and ISDN it back.' If you look at Mike's room, it's like a womb with the curtains closed, and if you pull the curtains back and open these two swivel windows, it goes from that dark, candlelit interior to almost like being outside."

When the room was up and running, Shipley did a blind A/B test on a newly done mix from his place and another he'd done at a major studio, and the home mix was the unanimous winner.

Having proved to his own satisfaction and that of client Shipley that ZR worked, as did the other key elements, Hsu and his three full-time staffers—CTO Scott Waterman, project manager/designer Christine Huynh and architect/designer Lena Kim—went about applying the concept to the two-room studio of composer/sound designer Neil Uchitel, who, after hearing Hsu describe ZR, decided to take the plunge. "I told Hanson, 'I'm a composer, not an acoustical physicist, so I'll take your word for it,'" Uchitel says. "It was nontraditional, but it made sense to me."

The projected 5.1 mix room was a ballroom and onetime speakeasy next to the main house. It dated back to the 1920s, with wood floors, stucco walls and five antique glass windows. "I couldn't physically change the structure at all because of the historic nature of the home," says Uchitel. Once again, the space was rectangular, and Uchitel had a wrinkle of his own—he wanted the mix room fitted with bass traps in the ceiling.

The construction was done in the space of three weeks, with Hsu incorporating the exposed Douglas fir beams into the bass trap. In contrast to Shipley's personal needs, Uchitel's room was designed to accommodate high-end clients from the advertising world.

The mix room was completed just days before Uchitel's wife gave birth to the couple's first child, and at press time, the studio has yet to be tuned. Hsu had stopped by with a Bruel & Kjaer 2250 analyzer to measure the place's acoustical accuracy. "We couldn't see the room on the analyzer, and we couldn't hear it, either," says Hsu with satisfaction. "It was as if I'd plugged the CD player straight into the analyzer and we were watching the graphic EQ of the CD."

Early in 2007, the Delta H team will begin converting the garage adjacent to the ballroom into a live room, once again employing ZR. Current projects include the Pepperdine University Fine Arts Division music lab, Yahoo Music Live Sets at Fox Studios Stage 17 and Chalice Studio F. ■

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NASHVILLE SKYLINE FROM PAGE 125

providing students with a hands-on opportunity to find out what earned this studio the moniker "Home of 1,000 Hits." Studio B is operated by the Country Music Hall of Fame and Museum in partnership with Curb, and Belmont has refurbished much of the original gear and instruments in RCA Studio B. The Mike Curb Family Foundation also purchased the Bradley's Barn collection of historical microphones, almost all of which were originally used at RCA's Nashville studios. These microphones are currently being refurbished and will become educational tools.

However, one of the most important parts of Belmont's curriculum is addressing the ethics of good business. Assistant professor Tim Tappan, who teaches Audio Engineering and Survey of Recording Technology, says, "I have also added leadership perspective into my production classes because we don't operate in a vacuum. Future producers need leadership training to effectively and morally deal with this industry.

"In the marketplace, producers are often individuals of great influence. This influence should be tempered with ethical leadership values," Tappan continues. "My introduction of leadership into the course is an attempt to get future producers thinking about how they will make decisions that are based not only on money and personal benefit, but also with an eye on the well-being of people and a heart that is plugged into doing things that benefit humanity, not tear it down." ■

Send Nashville news to mrburke@aol.com.

NEW YORK METRO FROM PAGE 125

Neve mic pre's, and LA-2A straight into a Pro Tools MIXPlus system."

"The production quality on this Last Poets record can take them as far as they can go," Roberson says. "We did this record with the integrity of the Last Poets, but with the ability to have commercial appeal. They're two of the greatest voices in the world and they complement each other. Omar has this tense, angry focused sound. 'Dun' is relaxed, but any minute can turn into Darth Vader." ■

With that duality came the need for discipline by Roberson and Painson as they oversaw the songs' creation, from the writing through to the mixing. With their propensity to rhyme for five or six minutes at a time, the intense creativity of Hassan and Oyewole was constantly at odds with the production team's goal of making an album that would play to all the stations at Clear Channel, and not just the coffeehouses.

"We needed a mainstream package with underground viciousness, if you know what I mean," Roberson notes, "so the first thing we had to do was create a formula for how we were going to edit the rappers. The album's track 'Panthers' is the blueprint: The format was a basic song structure with 16 bars of Omar, four bars of Common, 16 bars of Sticman or M-1. It's a different way of doing poetry because it had to mix with hip hop."

Keeping things on the dramatic side was the fact that Hassan and Oyewole were usually not self-editing when they hit the mic. And often, they would not find out that their lengthy rhymes had been cut down by the production team until they heard the mixdowns later, leading to some hostile confrontations in Jambetta.

In the mix phase, Roberson's talents for gorgeously rich background vocals on songs like the soaringly soulful "Grace," as well as tight, punchy drums on tense tracks like "Panther" come shining through. "I like to work in the moment—a lot of music and words are written in the moment, and I want to keep that same energy," he says of his mixing style. "For backing vocals, however, I do a minimum of 25 background tracks, and I've done up to 60. It widens the whole sound and it creates a pocket. I create a dome with the different frequencies, and it tickles your ears when you listen in the headphones.

"When I mix drums, instead of using compression, I'll put the Sony Oxford limiter on the drum bus, with a fast attack and a slow release. I don't use it excessively, but that helps me to get the drum level to the highest point possible without creating an imbalance with the other music."

So why all the talk about this soon-to-be-classic disc, but no record-release bash? The holdup is that although multiple record companies have tried, no one has yet come up with a deal to satisfy the Last Poets camp. "There's been several offers on the table, but no agreement with all parties," Roberson reports. "It's one of the greatest records ever made, with some of the great artists of yesterday and today. The world already knows about this album: We just have to get it to the people." ■

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—FROM PAGE 24, DOUBLE MAJOR

using my musical skills and knowledge and adapting them to the images. The language I was relying on was the language of sound, not of vision.

I now have a greater appreciation for what filmmakers do, and that has helped quite a bit with projects I've done since. I can communicate more effectively and efficiently with directors and editors. But I also know very well that I could *never* do what they do.

Daniel Levitin, the McGill University music and psychology professor whose work with the Boston Symphony Orchestra I talked about in my July 2006 column, agrees with me that working with visuals and working with music are two very different animals. In his fascinating new book, *This Is Your Brain on Music*, he goes into detail about how incredibly complex the connections are between our ears and our brains, and about how many different processes we use, unconsciously and in parallel, to interpret what we hear. "Music composition and editing are fundamentally different from video 'composition' and editing," he explains. "They certainly invoke different brain processes. Anything involving audio will entail the temporal lobes, anything involving video will entail the occipital lobe

and parietal regions, and there is almost no overlap of function there." Visual perception is equally complex but, as Levitin says, uses completely different mechanisms.

There is a "widespread anecdotal observation," he goes on, "that there are 'film' people and 'music' people, and very few who can do both. I'm not a very visual person, and I like to think I'm pretty good with sound. I know people who are the opposite."

So why are so many audio institutions expanding their curricula? For some, the reason is financial: Digital video production is hot, the way digital audio was a decade ago, and to attract today's students, you gotta give them what they want. That's legitimate, but let me propose the radical notion that what students, and the industry, really need is the exact opposite: Schools that teach video need to expend a lot more effort in making students understand the role of good sound and how to get it.

Any audio person who's worked with video has encountered the attitude that sound is no more than "the noise coming out of the back of the box." Budgets and schedules too often are skewed toward visuals, with rarely enough money or time to do a good job with sound. Despite the growing understanding among filmmakers that audiences will tolerate bad picture far more eas-

ily than they will tolerate bad sound, many producers and executive producers don't get it. It's not something that audiences understand naturally. When most people watch movies, it's the actors, the glitzy visuals and the special effects that get their attention, and even though the sound has a huge effect on how they respond to the film, they're rarely aware of it.

So this has to be taught to any student interested in producing multimedia. Otherwise, they will find that their films will turn off audiences because the level of their soundtracks jump all over the place, or the audio is noisy or is recorded off-mic, or the music drowns out the dialog.

So, to you schools that are expanding in the area of visuals, I say go right ahead. But keep in mind what's important and what the students *won't* be getting by themselves. And remember that after they leave you, they will have to learn how to deal with new types of visual media. But whether it's analog or digital, two channels or 11, sound will always have to sound good. ■

Paul D. Lehrman's new book of his collected works for Mix, plus a couple dozen pages of jokes, is The Insider Audio Bathroom Reader, published by Thomson Course Technology PTR.

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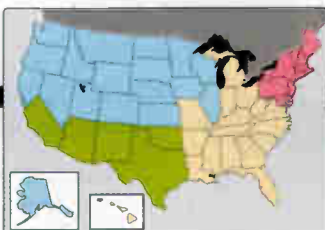
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Apogee Electronics	www.apogeedigital.com	67
Argosy Console	www.argosyconsole.com	58
Ask The Experts	www.mixonline.com	96
Audio Technica	www.audio-technica.com	97
Aviom	www.aviom.com	13
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B&H Pro Audio	www.bhphotovideo.com	101
BIAS	www.bias-inc.com	62
Cakewalk	www.cakewalk.com	59
Cedar Audio USA	www.cedaraudio.com	53
Center for Digital Imaging Arts	www.CDIABU.com	58
Conservatory of Recording Arts & Sciences	www.cras.org	66
dbx Professional Products	www.dbxpro.com	91
Digidesign	www.digidesign.com	9
Dolby Labs Inc.	www.dolby.com	1FC
DPA Microphones	www.dpamicrophones.com	7
DTS	www.dts.com	19
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Grace Design	www.gracedesign.com	81
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Guitar Center	www.gcpro.com	31
Guitar Center	www.gcpro.com	69
Heil Sound Ltd.	www.heilsound.com	76
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Holophone	www.holophone.com	29
Ilio	www.ilio.com	73
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Lexicon	www.lexicon.com	40-41
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MPathX	www.mpathx.com	55
MPathX	www.mpathx.com	57
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MXL Professional Microphones	www.mximics.com	45
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Crystal Clear Sound	www.crystalclearcds.com	136
Discmakers	www.discmakers.com/mix	138
D.W. Fearn	www.dwfearn.com	138
Gator Cases	www.gatorcases.com	138
Healey Music	www.healeymusic.com	136
Josephson Engineering	www.josephson.com	138
Little Labs	www.littlelabs.com	133
Lonely Records	www.lonelyrecords.com	135
Northern Sound & Light	www.northernsound.net	134
Odds On	www.oddsonecording.com	133
Play-It Productions	www.play-itproductions.net	132
Presonus	www.presonus.com	135
Rainbo Records	www.rainborecords.com	132
Sonic Circus	www.soniccircus.com	136
Sound Pure	www.soundpure.com	133
Steve's Music Store	www.stevesproaudio.com	135
Ultrason	www.ultrason.com	137



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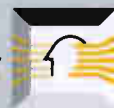
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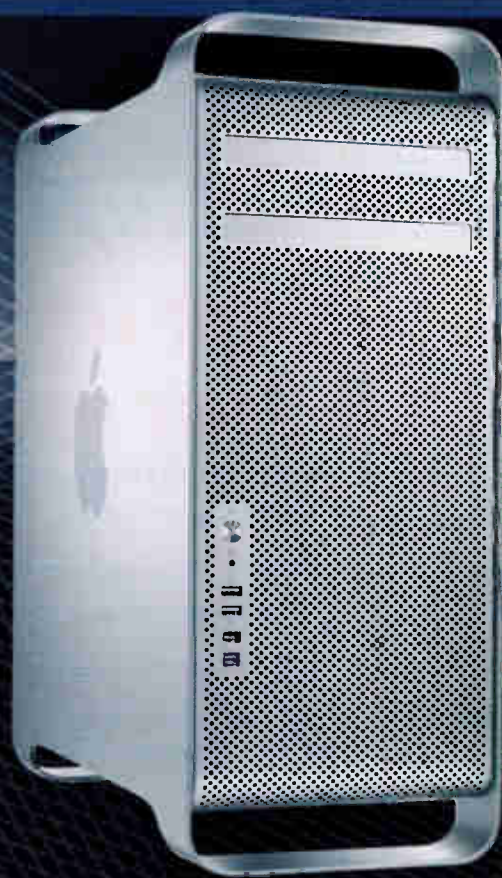
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Build Your Intel-Powered MOTU Studio

Run Digital Performer 5 and the rest of your Universal Binary MOTU studio on Apple's new Intel-Xeon Quad Core Mac Pro Tower for unprecedented virtual studio power and performance.

Meet **Mac Pro**. Running at speeds up to 3GHz, Mac Pro not only completes the Mac transition to Intel processors but delivers advanced performance, expansion and audio I/O configurations for your MOTU studio. The Mac Pro's 64-bit Dual-Core Intel Xeon "Woodcrest" processor — in double dual-core "quad" configuration — makes Mac Pro one of the fastest building computers on the planet. At 3GHz, the Mac Pro runs up to 2x faster than the Power Mac G5 Quad, allowing you to run an astonishing number of **SPX** and **MOTU UltraLite** interfaces together with a wide array of third-party instruments and plug-ins. Add up to 4 Terabytes of internal hard drive storage for massive track counts. Install up to 16 GB of RAM for optimal virtual instrument performance. Connect **MOTU** **UltraLite** **and other audio** via three PCI Express slots, four Firewire ports and five USB2 ports. Your MOTU Studio is now faster than ever.



Bus powered Firewire I/O

The ultra convenient **MOTU UltraLite** connects quickly to your Intel Mac Pro or Macbook and instantly delivers 10 inputs and 14 outputs, including two mic / line / instrument inputs with pristine preamps. Mix and match condenser and dynamic mics with individual 48V phantom power, 20 dB pad and Precision Digital Trim™. The UltraLite is the only interface of its kind to offer complete seven-segment front panel metering for all inputs, plus full front-panel LCD programming. The LCD also gives you full access to the UltraLite's 8x20 CueMix DSP mixer, which can also be controlled from the convenient CueMix Console software for PC and Mac. The UltraLite is a sturdy all-around interface with ASIO, WDM, Wave, GSIF, Core Audio, and Core MIDI drivers and support for all popular Macintosh and PC audio software. Mix and match the UltraLite with other MOTU interfaces as your studio needs grow.

Waves native processing

With 24 State-of-the-art sound processors, **Waves Gold Bundle** is a comprehensive set of audio processing tools for DP5. Now fully compatible with the new Intel-Based Macs, the **Waves Gold Bundle** is bigger and better than ever, including IR-L Convolution Reverb, Waves Tune LT, Doubler, and RenAxx. IR-L Convolution Reverb: The world's best rooms at your fingertips. Grand Ole Opry. Sydney Opera House. Birdland. Trinity Church. Want to record in the world's greatest venues? Now you can. IR-L puts the meticulously captured sound of these and many other renowned spaces and hardware devices in your hands. Waves Tune LT: Advanced dynamic pitch correction with formant correction, natural vibrato detection, MIDI and ReWire compatibility, and ultra-powerful real-time editing capabilities. Doubler: Fat tracks with richness and texture. RenAxx: The ultimate compressor for guitar. For tracking, mixing, and mastering, the Gold Bundle is an ideal DP5 companion.

The MOTU experts at Sweetwater can put together the perfect Intel DP5 rig for you. We'll help you select the right components to build a system that seamlessly integrates into your workflow, and we can even install, configure and test the entire system for you. Why shop anywhere else?

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Submersible Music Drumcore delivers access to twelve world-class drummers, such as Terry Bozzio, Matt Sorum, Sly Dunbar and Zoro. The perfect tool for songwriters and composers who need drums quickly in a multitude of styles. Features include an Audio and MIDI librarian (quickly find that perfect groove), "GrooveSets" (for easier songwriting), MIDI instrument (loaded with each drummer's MIDI drumkits) and the "Gabrielizer" (groove generator). Simply drag-and-drop from Drumcore to your Digital Performer 5 tracks or Clippings window.



Exquisite grand pianos

Synthogy's Ivory set a soaring new standard for virtual pianos. Now, you can expand Ivory's three-piano repertoire with the **Italian Grand expansion pack**, a 16 GB, 12 velocity masterpiece of exquisite playability. Load up the Italian Grand, and Ivory becomes far and away the most powerful virtual piano for Digital Performer 5. Once you lay your hands on Ivory, you'll agree with the pros at Sweetwater: "Ivory isn't just a virtual instrument... it's an experience."



Advanced waveform editing

Your DP mastering and processing lab awaits you: **BIAS Peak Pro 5** delivers award winning editing and sound design tools, plus the world's very best native mastering solution for Mac OS X. With advanced playlisting, Superb final-stage processing. Disc burning. Plus PQ subcodes, DDP export (optional add on), and other 100% Redbook-compliant features. Need even more power? Check out our Peak Pro XT 5 bundle with over \$1,000 worth of additional tools, including our acclaimed SoundSoap Pro, SoundSoap 2 (noise reduction and restoration), Sqweez-3 & 5 (linear phase multiband compression/limiter/upward expander), Reveal (precision analysis suite), PitchCraft (super natural pitch correction/transformation), Repli-Q (linear phase EQ matching), SuperFreq (4, 6, 8, & 10 band parametric EQ) and GateEx (advanced noise gate with downward expander) — all at an amazing price. So, when you're ready to master, Peak Pro 5 has everything you need. It's the perfect complement — and finishing touch — to Digital Performer 5.

Universal plug-in control

As a Universal Sound Platform, **Native Instruments KOMP** operates not only as a plug-in within Digital Performer but also as an instrument host application. It allows you to integrate all your VST- and Audio Units-based software instruments and effects into a single, unified interface. KOMP provides greatly increased control, overview and ease of use in all creative situations. Both Native Instrument's own range of instruments and effects as well as third-party products are supported. The seamless integration with KORE's advanced hardware controller gives hands-on control with unprecedented analog feel, finally turning today's software synthesizers and samplers from applications into true instruments.



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Advanced compact controller

Digital Performer 5 gives you unprecedented control over your MIDI and audio tracks. And what better way to take advantage of this hands-on control than the new **M-Audio Axiom 25**, which kicks off the more advanced Axiom line of MIDI controllers. Built around an even more rugged chassis, the Axiom 25 includes 25 semi-weighted velocity-sensitive keys with assignable aftertouch, eight MIDI trigger pads, six reassignable transport buttons, 20 non-volatile memory locations and more. And if you need more keys and controller options, the 49-key **Axiom 49** and the 61-key **Axiom 61** complete the new line. Don't let the compact size of the Axiom 25 fool you. This advanced 25-key USB mobile MIDI controller features both semi-weighted action and assignable aftertouch, plus eight rubberized trigger pads that put drum programming and performance at your fingertips.



Rich Lexicon reverbs with plug-in convenience

Lexicon is noted for reverbs, and now the new **MX400** and **MX400XL** dual stereo/surround reverb processors bring that classic Lexicon sound to your MOTU desktop studio, without the taxing CPU overhead associated with high-end software-only reverb plug-ins. The new single-rackspace, 4-in, 4-out MX400 combines an intuitive front-panel design with Lexicon's "Hardware Plug-in" technology,

a unique USB connection and AU plug-in interface that lets you control and save your MX400 reverb settings directly from within your Digital Performer projects, just like your other plug-ins, while offloading the intensive reverb processing the MX400 hardware. Featuring a wide array of rich, complex reverb algorithms, delays, effects and dbx dynamics, the MX400 series also offers

4-channel surround algorithms that dovetail perfectly with Digital Performer's state-of-the-art surround mixing. A 4-in, 4-out design, the MX400 series offer pro connectivity through XLR balanced I/O (MX400XL), or TRS I/O (MX400). Both products also offer . In any application, the MX400 series products provide versatility and sound that is unmistakably Lexicon.



Control room monitoring

The **PreSonus Central Station™** is the missing link between your MOTU recording interface, studio monitors, input sources and the artist. Featuring 5 sets of stereo inputs (3 analog and 2 digital with 192kHz D/A conversion), the Central Station allows you to switch between 3 different sets of audio monitor outputs while maintaining a purely passive signal path. The monitor outputs pass through amplifier stages including op amps, active IC's or dbps. This eliminates coloration, noise and distortion, enabling you to hear your mikes more clearly and minimize ear fatigue. In addition, the Central Station features a

complete studio communication solution with built-in condenser talkback microphone, MUTE, DIM, two separate headphone outputs plus a cue output to enhance the creative process. A fast-acting 30 segment LED is also supplied for flawless visual metering of levels both in dBu and dBfs mode. Communicate with the artist via talkback. Send a headphone mix to the artist while listening to the main mix in the control room and more. The Central Station brings all of your inputs and outputs together to work in harmony to enhance the creative process and ease mixing and music production.



Power conditioning

A large-scale MOTU-based multitrack studio is not only a finely-tuned instrument, it's an investment. Protect that investment — and get the best possible performance from it — with the **Monster Pro Power™** and **Pro Power PowerConditioner™**. Many so-called "power conditioners" only protect against random power surges and/or voltage spikes. But AC power line noise and noise from other components is an equally harmful and constant threat to your gear's performance. To prevent this, Monster's patented **Quiet Power™** filter circuitry (U.S. Pat. No. 6,473,510 B1) provides separate noise-isolation filtered outlets for digital, analog and high-current audio components. The result is high quality sound that's free from hums, buzzes and other power line artifacts, revealing all of the rich harmonics and tone in your recordings. Get All the Performance You Paid For™. Get Monster Pro Power.



Automated mixing & control

Imagine the feeling of touch-sensitive, automated Penny & Giles faders under your hands, and the fine-tuned twist of a V-Pot™ between your fingers. You adjust plug-in settings, automate filter sweeps in real-time, and trim individual track levels. Your hands fly over responsive controls, perfecting your mix — free from the solitary confinement of your mouse. Mackie Control delivers all this in an expandable, compact, desktop-style design forged by the combined talents of Mackie manufacturing and the MOTU Digital Performer engineering team. **Mackie Control Universal** brings large-console, Studio A prowess to your Digital Performer desktop studio, with a wide range of customized control features that go well beyond mixing. It's like putting your hands on DP itself.

Accurate monitoring

The **Mackie HR Series Active Studio Monitors** are considered some of the most loved and trusted nearfield studio monitors of all time, and with good reason. These award-winning bi-amplified monitors offer a performance that rivals monitors costing two or three times their price. Namely, a stereo field that's wide, deep and incredibly detailed. Low frequencies that are no more or less than what you've recorded. High and mid-range frequencies that are clean and articulated. Plus the sweetest of sweet spots. Whether it's the 6-inch HR-624, 8-inch HR-824 or dual 6-inch 626, there's an HR Series monitor that will tell you the truth, the whole truth, and nothing but the truth.

The MOTU/Intel experts

When it comes to building your Intel-based MOTU recording system, nobody does it better than Sweetwater. Whether you're building a simple portable recording rig with an UltraLite and a new MacBook or a 200+ track powerhouse Digital Performer studio centered around the latest Quad Mac Pro tower, Sweetwater can help you select the perfect components for your MOTU system, from the specific MOTU audio interface model, to control surfaces and hard drives, to plug-ins and studio monitors. Even better, we can install, configure, test and ship a turnkey system straight to your door — all you'll need to do is plug in the system and start making music. Why shop anywhere else? **Call the experts at Sweetwater today!**



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MOTU MachFive Universal Sampler

Fun With Release Samples, Drum Processing and Crazy Whistling

The MOTU MachFive Universal Sampler's highly flexible routing capabilities and effects matrix make processing a breeze, whether it's applied globally across an entire preset or independently to individual samples. Here are some tips for taking full advantage of all this power while avoiding some common pitfalls.

PLEASE RELEASE ME

A trip to MachFive's List Editor is essential for tweaking many parameters independently for one or more keygroups without affecting the others. And where both normally triggered samples and release samples are lumped together in the same preset, the List Editor helps you to quickly identify the samples by type.

The List Editor's right-hand column indicates whether each sample's trigger is currently selected as a MIDI Note-On event (the proper assignment for normal samples) or Note-Off command (for release samples). To change a trigger assignment, click on the associated sample's Trigger field in the List Editor and select either Note-On Trigger or any of the four variations of Note-Off triggers from the resulting pop-up menu.

If a release sample is too long, then shorten its duration by lowering the release time for its amplitude envelope. To do this, go to the List Editor and select the sample you wish to tweak by clicking on it so that its row is highlighted. All of the controls in MachFive's Keygroup Parameter section will jump to their stored settings for the selected sample. Drag down the release-time slider in the Amp & Pan Controls section to reduce the currently selected release sample's perceived duration. If, on the other hand, you can't even hear a release sample, then it may be because its amplitude envelope's attack time was inadvertently set too high (slow) so that sample playback actually ended before the envelope generator's attack phase was over.

Once you've finished editing an individual keygroup's parameters, deselect it by clicking on the Select button located in the bottom-left corner of the Keygroup Mapper and choosing Select None from the pop-up menu.

GROUP THERAPY

Each of MachFive's four Insert effects can be selectively applied to a single sample or to several keygroups at once. For example, a reverb effect that has a moderate decay time can be applied to the lower velocity zones of a snare drum multi-sample while the same-type (or different) reverb—one that is programmed for a much longer decay time—can be applied only to the uppermost velocity zone for the same snare. With this setup, only the loudest snare hits will trigger the bigger-sounding reverb. Other parts of the drum kit may be given an entirely different treatment or even left completely dry.

To set this up, select the part you wish to modify with the Insert effects and click on the INS (Insert Effects) button in MachFive's four-way FX switch. Open the List Editor and shift-click the keygroups assigned to the snare drum's lower velocity zones to select them all, as shown above. For any of the currently selected keygroups, click on Insert box iA, for example, to activate it at once for all those keygroups. Program a reverb with a moderate decay time for Insert effect A (accessed in the lower-right-hand corner of MachFive's GUI). Then select the uppermost velocity zone for the same snare drum multisample, click on Insert box iB and program a reverb with a long decay time for Insert effect B. Bang away!

Immediately to the right of the four Insert boxes for each keygroup in the List Editor is the audio output assignment field. Here, you can route any keygroup(s) to a pair of stereo buses in your DAW for further processing or for simply parsing selected samples for independent panning or level adjustments.



The top-most blue-shaded List Editor screen shows the three lowest-velocity zones (highlighted here) for the same snare drum. Below those in the list, the highest-velocity zone for the same snare is shown to be routed to Insert B. Although Insert effects A and B use the same Simple Reverb algorithm, Insert B's effect is programmed for a longer decay time.

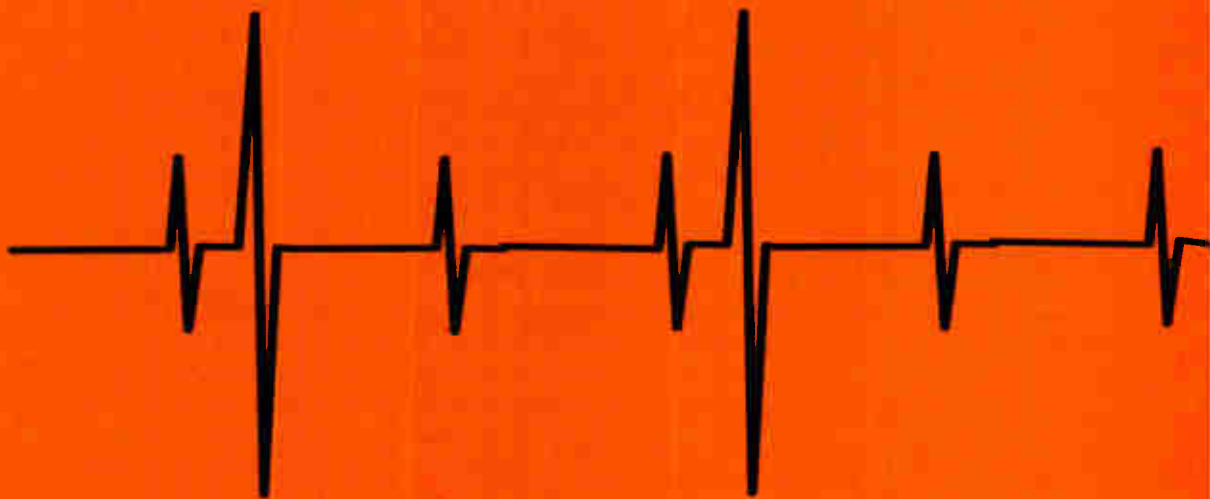
WHISTLE WHILE YOU WORK

Although MachFive's UVI-Xtract utility can import a wide variety of sample formats, it can't reasonably be expected to adapt programming perfectly that was fashioned in other software or hardware that has a different architecture. What might be a moderate parameter value for a sample played back by its parent hardware sampler, for example, may sound like an extreme setting in MachFive.

For this reason, MachFive's UVI-Xtract utility sometimes converts Akai S3000 pitch and filter programming in a way that high-velocity samples will exhibit intense whistling. If you hear mysterious artifacts when playing a freshly imported library, then click on any single sample that exhibits the problem in MachFive's List Editor or a keygroup in the Keygroup Mapper and observe any extreme settings that suspect Keygroup Parameter controls jump to, such as filter resonance. As a quick fix, click on the Keygroup Mapper's Select button, choose Select All and adjust the relevant parameter setting(s) downward for all samples in the imported preset at once. Alternatively, select only those keygroups that exhibit the problem and decrease their troublesome parameter values. ■

Mix contributing editor Michael Cooper would like to thank MOTU product specialist Dave Roberts for assisting with this article.

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Introducing the **8PRE**



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