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LIVE SOUND SPECIAL

- Monitor Lessons
- On Tour with The Artist, Jane's Addiction, Foo Fighters and The Rolling Stones

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Gate



Start with the gate. Set parameters for threshold, ratio, attack, hold, release, and output gain. See the effect of your settings on the graphical display, as well as on the gain reduction and audio level meters, they all interact in real time with your manipulation of the parameters. Start with a threshold setting of about -60dB to clean off the noise in between the vocal takes. You can save your final gate settings as a "gate preset" building block and recall it into any other setup you do.

Compressor



Then move to the compressor. The effects of the gate settings are still visible on the graphic display, so let that help you determine where to set your compressor threshold. The parameters you change here will also affect the curve on the graphical display in real time. Move through all the regular parameters, like threshold, ratio, attack, release, and output gain. For vocals use a threshold of about -25dB, a ratio of about 3:1 or 4:1, and a slow attack and fast release for the most natural sounding effect. Your compressor settings can also be saved off as a building block to be called up into any other preset.

Limiter



On to the limiter. Changes you make to the limiter settings are also seen on the graphical display. Adjust the level up or down to suit your needs. The flat top line of the display moves up and down as you adjust the level. You can also set the speed at which the limiter lets go of the signal as it goes below the threshold. This is truly smooth limiting, with patented dbx PeakPlus™ algorithms, so rest assured that where ever you set your threshold level, your tape will not distort, and your signal will not get butchered as it goes across the threshold. And like the other parts of the processor, your limiter settings can be named and saved for later recall.

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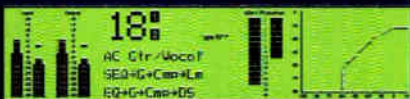
Midi bypassable via midi program changes.



De-esser



and More



De-essing works the same way, see the effects of your settings displayed on the graph. Parameters here are the common ones: threshold in frequency 800Hz to 8kHz, and amount in percent. Other available processing includes EQ - both in path and sidechain, for special effect types of processing. When you are editing any of the building blocks, its icon is visible on the display, and the parameters are shown on the graph, so it's always easy to know where you are. Parameters are easy to see in this page driven operating system. When it's as complex as this, it's nice to know somebody was thinking when it was put together.

You can also work in stereo, or set up a completely different and independent processing chain for the other channel. Also, notice that the audio meters are capable of showing both peak and average levels for input and output. Optional digital output with the TYPE IV™ Conversion System with TSE™ (Tape Saturation Emulation) provides up to 24-bit output in either AES/EBU or S/PDIF formats with the trademark digital processing of TYPE IV™. The DDP also has full MIDI/automation capability, with separate midi in and thru jacks. Entire processing setups may also be saved into one of 50 user defined presets, or use one of the 50 factory setups.

dbx digital

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- With the extensive metering of the DDP, you can see EXACTLY what is going on with ALL parts of your signal: input, internal processing, and output, with peak and VU, as well as gain reduction for both sides of the stereo image.

- And speaking of stereo, you can work in stereo with dbx's True RMS Power Summing™ for phase-coherent tracking, or in dual mono mode, without the two channels interacting at all, making the DDP a great processing valve.

IT NEVER FORGETS

- The DDP works right out of the box. It comes with 50 factory setups that are guaranteed to knock your socks off. There are presets for every application you can think of, and then some. dbx engineers are musicians and recording engineers. We know what a compressor is supposed to sound like, and we know it better than anyone else. We invented compression. We eat, sleep and breath compression.

- Want to duplicate that perfect compressor set-up? Each processor in the chain has all the parameters you would expect. After you set the parameters the way you want them, save it as a processor preset, available to be recalled any time. These building blocks allow you to save entire setups just for the way you like to work. It doesn't matter that you are doing a live gig one night, then mixing the tracks in the studio the next night, the DDP will be there, just the way you left it.

- When you save a preset, you also save the information that makes it work behind the scenes, too. Digital output (optional), sample rate performance, MIDI setup, as well as any of the other utilities, like sidechain setup and monitor, EQ settings, and SysEx functions.

- When you make changes to any parameter, you can see where your adjustments are affecting the signal, simply by looking at the Hi-Res graphical display, which shows the processing curve in real time as you make your adjustments.

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PROFESSIONAL RECORDING • SOUND AND MUSIC PRODUCTION

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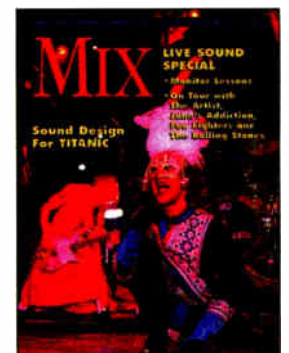
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Cover: The re-formed Jane's Addiction was out on tour at the end of '97, fronted by the flamboyant Perry Farrell. Front-of-house engineer Russell Fischer and monitor mixer Jason Alt used equipment provided by A-1 Audio (Hollywood). The P.A. comprised 16 EAW KF850 full-range cabinets, eight KF850 down-fills and 12 SB850 subwoofers. KF850s and SB850s were also used as part of the monitor system (sidefill and drum fill), along with one 2x15-inch bi-amped cabinet with a 2-inch horn (drum fill) and 12 1x15-inch bi-amped wedges with 2-inch horns. For more on the tour, see page 144. Photo: Steve Jennings



FROM THE EDITOR

THE RINGING GROOVES OF CHANGE

Poet Alfred Lord Tennyson once wrote, "Let the great world spin forever down the ringing grooves of change." Wasn't it cool of him to unintentionally use phonograph metaphors in his poetry 156 years ago? And not only that, he was right: Change is a constant. It affects everything, including audio magazines. And as we begin our 21st year, we're excited about some changes here at *Mix*. After some months of negotiations, *Mix* and its sister publication, *Electronic Musician*, are now part of the Intertec family of magazines. Many of you are no doubt familiar with other Intertec titles such as *Sound & Video Contractor*, *Millimeter*, *TCI (Theatre Crafts International)*, *World Broadcast News*, *Broadcast Engineering* and *BE-Radio*. We're proud to be part of this world-class organization. And we're moving forward with some innovative new features, products and programs that you'll enjoy.

This month we debut "Mix Masters," a regular feature of in-depth conversations with leading practitioners of the art of engineering and mixing. To kick it off, Los Angeles editor Maureen Droney (a talented engineer in her own right) talks to multi-Platinum sensation Tom Lord-Alge. You'll also notice that we've moved our "Feedback" letters section to the front of the magazine; the last page is now devoted to "Power Tools," a monthly user-to-user column providing insider techniques and undocumented shortcuts for specific products. The first column (by longtime Hollywood sound editor Dave Whittaker) tackles Digidesign's Pro Tools; in the months to come, we'll cover recorders, mixers, signal processors, software programs and just about anything else used to record sound.

Of course, there's much more in this issue, with articles on sound design for *Titanic* at Skywalker Sound, top engineers discussing "Creative Compression Techniques" and a retrospective on the recording of the Yes classic "Roundabout." And don't miss our detailed examination of the "Earwitness Project"—the creation of recordings from some of the most significant reproducing piano rolls ever made, featuring composers such as Ravel, Stravinsky, Grieg and Prokofiev playing their own works. History comes alive in stunning 96kHz/24-bit clarity.

Keeping with this issue's focus on Live Sound, check out our profiles of current tours, including the Rolling Stones, Foo Fighters, Jane's Addiction and the Artist Formerly Known as Prince. There's also a survey of top-of-the-line handheld vocal microphones, Mark Frink's monitor mixing tips, and a thorough debunking of stereo sound reinforcement by Bob McCarthy.

There's a lot more to this issue, and we think you'll like what's here. We're changing, sure, but we're not slowing down. Not now. Not ever.

Keep your seat belt fastened.



George Petersen
Editor



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FEEDBACK

NOT LIVING UP TO OUR NAME

Congratulations on a really great 20th Anniversary Issue! We have something in common. I also got my start in the recording industry 20 years ago in the Bay Area. (I still have my copy of that first issue of *Mix*.) I am amazed by how far we have come in those 20 years, and you certainly did an outstanding job bringing that fact into focus.

However, while thumbing through the issue, something else also came into focus. Minorities seem to be nonexistent or, at best, have minimal representation in technical areas of our business. I've always known that it has been next to impossible for minorities (especially those of color) to break into the film mixing arena. So, I wasn't surprised at all to see that judging from the pieces you did on film sound, that fact has not changed at all! On the other hand, I was very disappointed to see after 20 years, the landscape for minorities seems even more barren than it was in 1977 when I got my break.

I was happy to see that women as a group have made tremendous progress overall in many technical areas. I can remember when the thought of having a woman in charge of a recording session was outside the realm of reality for both record companies and recording artists alike. Since 1980, I've had the opportunity to mentor a few women myself, and I am proud to see they are still out there breaking down barriers.

I don't believe in affirmative action, but I do believe in equal opportunity. If one were to gauge minority involvement over the past 20 years in the industry by the content in the anniversary issue, you might conclude that minorities have made little, if any, contribution to "The Mix."

Jay Henry
Engineer/Producer
Native Life Records

GRATEFUL READER

This is just a thank you note to the editors of *Mix* and the very people responsible for my recording education. Some of us (your readers) cannot afford a formal education in a facility like Full Sail, etc. Thank God we had *Mix*. Your in-

depth articles provide a wealth of info to us poahfolks and have allowed some of us, like myself, to advance to a level we could only dream about. Today, I have my own studio, where I have recorded some of my childhood heroes like MC5, Frijid Pink, members of the Silver Bullet Band, Carl Carlton, Grammy Award-winning writer John Glover ("Songs in the Key of Life") and Madonna's brother, Martin Ciccone (we appear in her film *Truth or Dare*). This is not a bragging session about me but a testimonial from someone who knew nothing about the business until he got his hands on his first copy of *Mix* (1979—I still have it).

On a final note, today I am the president of Ramtrak guitars, featuring interchangeable pickups and electronics, a studio instrument I invented that has finally come to market (this is a plug). Had I not been a studio rat inspired by you guys, it never would have happened. Happy 20th and many, many more.

James Randolph, president
Ramtrak

SOUL CORRECTIONS

Reference is made to your recent interview with remixers Bobby Guy and Ernie Lake, a.k.a. Soul Solution, and the subsequent article that appeared in your Sept. 1997 issue. Mr. Guy and Mr. Lake were totally dissatisfied with the article. Among many serious errors, the following were outstanding.

The article states that Mr. Guy and Mr. Lake "wrote and produced" Toni Braxton's "Un-Break My Heart." Mr. Guy and Mr. Lake did not write and produce "Un-Break My Heart," nor would they ever have claimed to. In fact, it was written by Diane Warren and David Foster. Soul Solution remixed and has additional production credit on the maxi-single.

Page 72 has a misspelled name. What was printed as "Hash Corelli" should read Hosh Gureli, A&R, Arista Records.

The article also states that Soul Solution did the "producing/remixing on the Jellybean Recordings hit 'The Lover That You Are,' which charted Number One for Pulse Records." The work that Bobby and Ernie did on "The Lover

That You Are" was for the group Pulse featuring Antoinette Roberson and the label is Jellybean Recordings.

On page 76, it says, "We got together with David Morales to cut the song." Soul Solution never worked with Mr. Morales. In fact, Mr. Morales was the co-writer of the song and was not involved with the production in any manner.

As longtime readers and subscribers of *Mix* magazine, we are aware of your reputation for professionalism and outstanding journalism. However, we feel that this was careless management and damaging reporting. This article is a total misrepresentation of the interview. Besides the factual errors (of which there are many), the vernacular employed is not one that Mr. Guy or Mr. Lake are accustomed to using.

Mr. Guy and Mr. Lake would like to take the opportunity to apologize to all those involved for any damage, confusion or embarrassment that the article may have caused them.

Christine Ferrara
X-Mix Productions Inc.
New York, N.Y.

STYMIED

Am I alone in wishing that hard disk editors (e.g., Roland VS-880, Akai DPS12, Vestax HDRV8) would interface with CD-R recorders to record "one-off" and CD masters (with PQ subcodes)? They seem so incomplete without that capability.

While I'm at it, why can't I find a box with a hard drive, CD-R recorder and a good sound card that will interface with any old computer (e.g., laptop parallel port) for editing and CD burning?

Dick Werner
Hanover Park, Ill.

Send Feedback to *Mix*, 6400 Hollis St. #12, Emeryville, CA 94608; fax 510/653-5142; or *mixeditorial@cardinal.com*.

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World Radio History

CIRCLE #006 ON PRODUCT INFO CARD

CURRENT

INTERTEC PUBLISHING ACQUIRES MIX, EM

On November 17, Intertec Publishing (Overland Park, Kan.) completed the purchase of Cardinal Business Media's Music and Entertainment group, including *Mix* magazine and its sister publication, *Electronic Musician*, plus *Mix—Edición en Español*, *Mix* Bookshelf, the *Mix Master Directory* and the *Recording Industry Sourcebook*. These publications will join Intertec's Communication and Entertainment titles, which also include *Millimeter*, *Sound & Video Contractor*, *Broadcast Engineering* and *TCI* (Theatre Crafts International). *Mix* and *EM*'s national editorial and advertising headquarters will remain in their Emeryville, Calif., location. ■

1998 TEC AWARDS CALL FOR ENTRIES

The Technical Excellence and Creativity Awards Nominating Panel is currently accepting product nominations for the 1998 TEC Awards, to be held September 27, during the AES show in San Francisco. To qualify for review, a product must have been released and in commercial use during the eligibility year of March 1, 1997, to February 28, 1998. Product categories are: Ancillary Equipment, Amplifiers, Computer Software and Peripherals, Microphones, Sound Reinforcement Loudspeakers, Studio Monitors, Musical Instruments, Preamplifiers, Signal Processing, Recording Devices, Workstations, Sound Reinforcement Consoles, Small-Format Consoles and Large-Format Consoles. All results from the Call for Entries will be forwarded to the TEC Nominating Panel for final selection.

Companies wishing to nominate products should include the following information: product name and qualifying category, date first commercially available (proof of shipment may be required; beta test sites do not qualify), and a contact name and telephone number.

Send all information to: TEC Awards, 1547 Palos Verdes Mall #294, Walnut Creek, CA 94596; Attn: Karen Dunn, or fax to 510/939-4022. All entries must be postmarked by Monday, February 2. Late submissions will not be accepted. For more information, call 510/939-6149 or e-mail KarenTEC@aol.com.

SPARS INTROS MPGA TO NASHVILLE

The Nashville SPARS chapter recently hosted an event that combined a DTS/DVD marketing forum with the official introduction of the Music Producers Guild of America (MPGA, which debuted at the September AES in New

York) to the Nashville recording community. The discussion was held at Ocean Way Studios on November 25. Opening remarks were made by engineer Chuck Ainlay and producer Tony Brown, who had worked together on the first DTS 5.1 surround mix in Nashville earlier in the year, remixing Vince Gill's *High Lonesome Sound* at Masterfonics' The Tracking Room.

Later, Ed Cherney, George Massenburg and Chris Stone introduced the MPGA, shifting the focus to the role organized producers and engineers could play in a changing audio industry. "We think it's important to keep control of

—CONTINUED ON PAGE 16

MIX—EDICIÓN EN ESPAÑOL PRESENTS "CHILITOS Y AMIGOS"

Last November 3-5 in Tijuana, Mexico, *Mix—Edición en Español* presented "Chilitos y Amigos," a series of professional audio seminars organized by noted producer/engineer José "Chilitos" Valenzuela. Held at the beautiful Centro Cultural de Tijuana, the event drew more than 350 participants from countries including Argentina, Chile, Colombia, Mexico, Panama, Peru, Spain, Venezuela and the U.S.

The event was designed to provide a diverse, educational experience for engineers wanting to develop a broad range of skills. Topics included studio design, live sound, digital recording, mixing, MIDI applications, sound-for-picture and mastering. Professional participants included Julio Alvares, Jorge Arqueta, Carlos Campos, Roly Garbalosa, Horacio Malvicino, Ernesto Mas, Richard McKernan and José Valenzuela. All presentations were projected on a giant screen, giving



audience members detailed perspectives on everything from the Euphonix CS3000 upstage to computer diagrams of Pro Tools workstations downstage.

The highlight of the three days was the recording, mixing and mastering of a jazz-fusion trio featuring Marcos Mendoza, Renato Neto and Joey Heredia. The audience was taken through each step, with opportunities for hands-on experience.

With tight organization and good spirits all around, "Chilitos y Amigos" provided an intensive professional experience that left participants wondering when the next seminars will be. Stay tuned...

—Alex Artaud

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INDUSTRY NOTES

John Carey was appointed President of Nashville-based Studer Operations, USA. Carey formerly was vice president of marketing at Euphonix...Euphonix (Palo Alto, CA) appointed Tom Fristoe to the newly created position of vice president of worldwide sales. Previously, Fristoe served as VP of sales and marketing for Specular International, a software publisher of 3D design, automation and Internet design tools. Chris Pelzar, another pro audio industry veteran, was hired as East Coast director for broadcast system sales... Petaluma, CA-based Apogee Sound Inc. established two new companies: Apogee GmbH in Germany and Apogee Japan. The companies will provide sales and service of all Apogee Sound product lines. New appointments: Timothy Thornton was brought on board as inside sales manager; Matt Woolery as outside sales manager...Paul Carelli was named concert touring manager for Eastern Acoustic Works (Whitinsville, MA). EAW International Ltd. announced the appointment of SCV Audio as its exclusive distributor in France. Back in the States, there was a ribbon-cutting ceremony marking the opening of EAW's new 60,000-sq.-ft. production facility, built on the site of the former production facility, which was destroyed by fire in late 1996...PMI (Torrance, CA) happenings: Jaymi Names was brought on as national sales manager for the Joemeek line of products, and Fletcher ElectroAcoustics in Devon, England, is now the exclusive Joemeek distributor in both North and South America. Prior to the new agreement, Fletcher ElectroAcoustics was distributed by Joemeek Ltd. out of London by Malcolm Jackson... Cerritos, CA-based Young Chang America announced that Frank Conrad and Scott Shebeck were appointed district sales managers for both Young Chang acoustic pianos and Kurzweil digital pianos. Lee Sebel was hired as district sales man-

ager for Kurzweil Professional products...Harry Ander was appointed executive vice president/general manager at N2K Encoded Music (New York, NY)...Steinberg North America relocated to a bigger facility at 21354 Nordhoff St., Ste. 110, Chatsworth, CA 91311. Phone 818/993-4161; fax 818/701-7452... Sennheiser France SARL was named the QSC Audio distributor for France...Fairlight USA opened a New York office, located at 45 West 45th Street, Ste. 307. The telephone number is 212/819-1289...Farmingdale, NY-based Group One Ltd. announced that Marty Druckman of Network Pro Marketing won this year's Rep of the Year award; Most Improved Territory award went to Rick Parent, who covers Texas, Oklahoma, Arkansas and Louisiana... Former Neve employees wishing to attend an annual get-together in the UK should contact Robin Ireland at never@ire-sw.demon.co.uk or +44 (0) 1799-522872...Emtec Magnetics Corp. named Burlington A/V Recording Media Dealer of the Year... Drawmer Distribution Ltd. and SoundField Research Ltd. appointed Chicago-based Aadvert International to direct worldwide publicity... Lynda S. Smith was promoted to the position of national marketing manager, Technics Musical Instruments Division, at Panasonic Consumer Electronics Company (Secaucus, NJ)...Rane Corporation (Mukilteo, WA) has a new phone number. Call 425/355-6000; fax 425/347-7757...Quest Marketing opened new offices in Charlotte, NC, and Orlando, FL. Chris Jett will work out of the Charlotte office; Charles Miles will work out of the Orlando office...beyerdynamic (Farmingdale, NY) appointed two representation firms: the Peter E. Schmitt Co. Inc. will handle the New England territory, and Innovative Marketing Concept's territory covers Upstate New York. For more info, contact beyerdynamic at 800/293-4463. ■

—FROM PAGE 12, CURRENT

the [production] process," said Massenbourg, citing the potential for U.S. producers to participate in airplay royalties, as Canadian and some European engineers do. On the technical side, Cherney noted that, "If there had been an MPGA when the Red Book [CD] standard was written, there never would have been 44.1," which drew applause from the capacity crowd. Massenbourg added that organized producers and engineers could have that kind of effect on the pending DVD audio specification, a counterbalance to what he acknowledged were the "political considerations" that can affect technical standards.

The MPGA will host two Web sites, a general interest site and a soon-to-be-built intramural members-only site. Cherney also said that the organization had raised more than \$75,000 from manufacturer contributions alone thus far. But Cherney emphasized the human aspect of the business when, after a presentation of several community education initiatives that the MPGA is considering, he added, "It could also put an end to the kind of isolated lives that producers and engineers lead. In Los Angeles, I hardly ever see another producer or engineer—they're all always in the studio."

—Dan Daley

SHOWS THIS MONTH

The 1998 Macworld Expo is happening from January 5-9, at the Moscone Convention Center in San Francisco; more than 75,000 attendees are expected. For more information, visit www.macworld-expo.com or call 800/645-EXPO.

This month, thousands of music industry professionals will converge on the Los Angeles Convention Center to attend NAMM's International Music Market '98, taking place from Jan. 29 to Feb. 1. Visit NAMM's Web site at www.namm.com for details, or call 619/438-8001.

CORRECTION

Our November spotlight on the Ramsa DA7 digital console listed an incorrect phone number for Ramsa/Panasonic. They are at 6550 Katella Avenue, Cypress, CA 90630; phone 714/373-7277; fax 714/373-7903. ■

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“This allows the HR824 to move a large volume of air with minimal low frequency distortion & power compression.” EM Magazine*

Specially-designed 224mm low frequency transducer has a magnet structure so massive that it wouldn't even work properly in a conventional passive loudspeaker. But servo-loop-coupled to a 150-watt FR Series™ amp, it's capable of incredibly fast transient response and extremely low frequency output.

Inside the HR824 cabinet is 100% filled with adiabatic foam. Result: Unwanted midrange reflections from the low frequency transducer are absorbed inside the enclosure instead of being reflected back out through the cone into your listening space.

* **Electronic Musician, October 1997. All quotes are unedited.**

MACKIE

HR824

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Actually this paragraph doesn't have anything to do with the HR824. Mackie is further expanding its R&D/Engineering department and is looking for more analog and digital engineers with experience in pro audio. Log onto our web page for particulars.

“The enclosure — dressed in conventional yet classy black motif — are shielded.” EM Magazine*

Inside. Two separate FR Series power amplifiers with a total of 250 watts rated power — the most of any active monitor in the HR824's class.

On the back. HF Boost/Cut, Acoustic Space, Roll-Off and sensitivity controls, balanced 1/4" and XLR inputs. *“The Mackie HR824 is the only system (in the comparative review) that doesn't require the user to fumble around with tiny tools in order to make adjustments.”* EM Magazine*

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CIRCLE #011 ON PRODUCT INFO CARD

World Radio History

response was so flat that it to believe." Electronic Musician Magazine*

Ready to confront reality? The HR824 Active Monitor is now in stock at Mackie Dealers.

Owning a set of HR824 near field studio monitors has the potential of seriously altering your perception of sound.

For the first time, you'll be able to hear precisely what's going on all the way through your signal chain — from microphones right through to your mix-down deck. You'll suddenly discern fine nuances of timbre, harmonics, equalization and stereo perspective that were sonically invisible before.

Some tracks you've recorded will amaze you; others may send you back for an immediate remix.

But either way, for the first time, you'll be hearing exactly what was recorded — not what a conventional loudspeaker may or may not have been capable of reproducing.

Admittedly, these are pretty brazen claims (which is why we're backing them up with comments from a credible, third-party source).

But all you have to do to become a believer is to visit

your nearest Mackie dealer. When you compare HR824s to the competition,

you're going to hear some dramatic differences.

First you'll notice far more openness and detail. Critical listeners tell us that it's as if a curtain has been lifted between

themselves and the sound source.

Next, you'll notice low frequency output so accurate that you might look around for the hidden subwoofer (some of the world's most experienced recording engineers have

the traditional, narrow "sweet spot" directly

between the monitors, you'll discover that the HR824s really DO live up to our claim of wide, dispersion.

Their sweet zone is so broad that several people can sit next to each

other — or if you work solo, you can move from side to side in front of large consoles — and still hear a coherent, detailed stereo panorama.

Finally, let the salesperson go wait on somebody else and enjoy an

extended session with one of your favorite CDs. When you're through, you'll discover that when distortion and peaky frequency response are minimized, so is ear

fatigue: You can listen to HR824s for hours on end.

One final point... your monitors are the only part of all your studio equipment that you actually hear.

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"The low end was robust and present; the electric bass and kick drum thump-ed into my chest the way those huge UREI® monitors did back in the old days."

"Overall, the response was so smooth that I wasn't even aware of a crossover point."

"Stereo imaging and depth were fabulous."



Each HR824 ships with its own signed Certificate of Calibration attesting to its ± 1.5 dB 39Hz-22kHz frequency response.

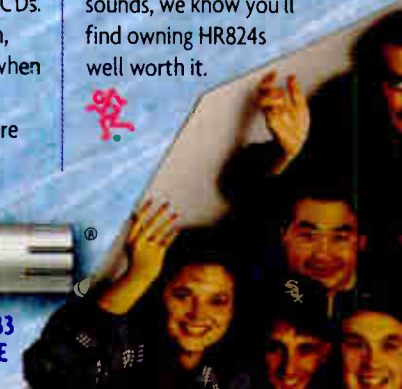
done this, so don't be embarrassed). The HR824 really IS capable of flat response to 39Hz. Moreover, it's capable of accurate, articulated response that low. Rather than a loudspeaker's "interpretation" of bass, you can finally hear through to the actual instrument's bass quality, texture and nuances.

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A NEW YORK MINUTE

GRUMPMEIER GOES TO AES



ILLUSTRATION: JACK DAVIS

I ran into my old buddy Grumpmeier at the AES show in New York, and he was not a happy puppy. "Look at this place!" he ranted, without even bothering to say hello. "It's got all the soul of an Erector set!" Somehow, the required "™" was missing from that sentence.

"Oh, it's not so bad," I countered. "There's plenty of exhibit space, all the booths are in one area, and it's easy to find things."

"Sure, if you don't mind walking three blocks to get to the demo rooms and conferences. Did you see how empty those corridors were? How few people bothered to make it to the sessions? I tell you, if you wanted to find the cleanest bathroom in New York, it was right there next to the meeting rooms."

"But," I gently reminded him,

"don't you remember the days the convention was at the Hilton, when you could spend hours waiting for the elevators to get to the demo rooms? If you tried the stairs just to get from the fourth floor to the fifth, you always somehow found yourself on a locked stairway whose only exit was an alley off of 51st Street."

"Hey, so you'd duck into a deli, grab a knish and a coffee, and head back into the fray. You try the food here?"

I am constantly amazed at how fast he can change the subject. "It's not so bad," I sighed. "They have decent sandwiches and salads and fruit..."

"C'mon, your basic airport has all that now. This is New York!"

BY PAUL D. LEHRMAN

Food capital of the world! And those people who take ten minutes to find change for a fiver after you've spent two bucks on a cup of cold coffee—"

"Listen," I cut him off. "You want food? You've got to eat dinner every night, right? So make sure you go someplace wonderful and stop worrying about lunch!"

"Yeah, and by the time everyone's finished with their little after-show meetings and their cocktail hours and their press conferences, it's 10 o'clock, and you're so hungry and exhausted you'll be happy with Taco Bell," he bellows. "Not a great way to enjoy a meal, especially if you're blowing a hundred bucks per. Friend of mine and I stumbled into the Carnegie Deli one night around 11. He told me he hadn't eaten since breakfast,



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INSIDER AUDIO

and he was so wasted he couldn't even open the menu—so he'd just have a hamburger. Can you imagine? At the Carnegie Deli?! I wrestled him to the ground and held him there while I told the waiter to bring him a bowl of chicken soup with an extra matzoh ball and a pastrami on light rye, and keep the pickle bowl full. He thanked me afterward.

"And another thing!" (There was no stopping him now.) "Where are you supposed to go after the show closes each day? You think people come to AES just to look at gear? No—they come to see all these people they never get to see in person, the ones they talk to on the phone or, these days, e-mail. They want to get to know them, do the schmooze thing.

"You can't carry on any kind of conversation on the show floor—if you're working a booth, you have to pay attention to everyone who comes by, which sort of makes it hard to keep a train of thought on track. And if you're walking around and you do see somebody you know, it always turns out that at least one of you is in a terri-

ble hurry because some meeting ran overtime, or 12th Avenue was blocked by some damn bike race and the taxi couldn't get through, so the only thing you can think of to say is, 'See anything cool?' To which the answer is invariably, 'Nah!' and you both shrug your shoulders and run off. And then two months later, you read in *Mix* that there really *were* some interesting things there, but somehow you missed them all.

"So at 6 o'clock, the Javits Center goes totally dead—empties out faster than Shea Stadium in September when the Mets are down by ten in the eighth inning. Everyone goes off to their hotels, but they're spread out over a 20-block radius. So maybe you get five minutes to talk to someone on the bus, and then you've lost them forever. Ever try to track someone down in their hotel room? When the hotel clerks can't spell anything more complicated than 'Jones? Fageddabout it!'"

He was turning into Joe Pesci before my eyes. "But," I countered, "there are all these parties every night. Surely you can meet people there."

He exploded: "What the hell makes all these companies doing the parties

think that the people in *our* business want to spend their nights listening to bad music on bad sound systems at toxic SPLs?! We do that for a living—well, not the bad sound systems part, unless we're touring musicians—so why should we want to do that when we're *not* working? It's not like audio engineering types are known for being great dancers. You can't possibly hold an actual conversation at one of those parties. 'Hey, how you doin'?' 'Whaddayasay?' Maybe some people think this is fun, but either they're from another planet or they're kidding themselves. Nothing actually ever happens at any of these parties—unless someone from the company makes a speech, in which case you're definitely better off being somewhere else—but they figure if they keep the noise level high enough and the lights weird enough so no one can actually figure out what's going on, people will go home thinking they did something cool.

"Besides, if you don't smoke, you won't last ten minutes in there. So you're back out on the street, looking for someone to talk to. You take a cab over to the next party, but it's the same deal. You can keep it up all night, until

In the words of the reviewers:

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Roger Nichols, EQ Magazine

"I highly recommend that you get your hands on one of these units and check it out for yourself. Even if it doesn't change your musical life...I'm sure you'll agree that the MPX 1 is simply stunning. It offers outstanding effects and a brilliant user interface at a reasonable price."

Barry Cleveland, Mix Magazine



"It beams with intelligence and shimmers with outstanding sound...an excellent choice for live and studio applications."

Jon Chappell, Guitar Magazine

"...they'll have to pry it out of my cold, stiff fingers."

Jim Alkin, Keyboard Magazine

The MPX 1—get your hands on one today.

you drop from exhaustion. And meanwhile, you haven't said more than three words to anyone."

"Well, you can always go back to one of the bars at the hotels," I suggested. "They're quiet, and usually pretty well-ventilated."

"Yeah, but where?" he retorts. "There isn't any one hotel that everyone goes to any more—there are 'official' hotels, but without the exhibits and demo rooms, there's no reason for anyone to hang around. So folks are spread out all over midtown and worse. I went one night to the Hilton bar, figuring that *someone* would be there. Turns out the only other person there was Alan Parsons."

"You really didn't know anybody else there?" I asked.

"No, dummy, there *was* nobody else there. Except for us and him and his friend—every other table was empty. Used to be on a Saturday night you couldn't find a waiter there for hours, you could die of thirst, but at least the conversation was hot and heavy, and if you hung around awhile, you could run into *everybody*. That night, the only people we *could* talk to were the wait-

ers, who were hovering over us like a cloud of gnats. I never want to see a bowl of goldfish crackers again as long as I live. Hell, I even struck up a conversation with the piano player."

"Well, Alan's a very cool guy. Did you get to talk to him?"

"Sure did. Turns out the only reason *he* was there was that they were seeing *Riverdance* at Radio City Music Hall across the street. Being English, they wanted to get a drink during the intermission—the interval, he called it—and Radio City doesn't have a bar, so this was the closest one they could find!"

He stopped screaming and turned thoughtful. I even detected a hint of wistfulness. "Do you remember going away to summer camp?" he asked. "Sure," I said. "The latrine stank, the food was terrible and I got beat up a lot." "Besides that!" he snapped, and went nostalgic again. "You were with the same bunch of kids all the time. You did all these activities together during the day, and at night you sat around the campfire, or lay awake in your bunk, and tried to scare each other or gross each other out with stories. You talked about girls and the

counselors and your mean teachers—all the things that mattered. Then you'd wake up in the morning and have those same people to deal with all over again.

"By the end of the summer, you *knew* these people, and whether you liked them or loathed them, you couldn't imagine life without them. When it came time to go home, you swore that you would see all of them every week all winter, and you'd all be back next year. Of course, you saw them maybe once, and the next year, half of them didn't show up. But the intensity of the experience, the—boy, do I hate this word—the 'bonding' that went on during those few weeks, imprinted itself on your psyche pretty deep. I'll bet you still remember those kids' names, faces and worst habits."

"I suppose I do," I said. "There was Jimmy, the son of a famous actor, who liked to expose himself in front of the girls coming back from the lake. And Dickie, who still sucked his thumb at age 12, although he tried really hard to hide it. And Bobby, who couldn't bring himself to use the latrine and so for two weeks—"

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a must hear..."

Peter Freeman,
Electronic Musician



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INSIDER AUDIO

"Yeah, that's it!" he mercifully cut me off. "I'll bet you can't tell me stuff like that about your own kids!"

"My point is,"—I figured he had one somewhere—"conventions are our generation's summer camps: You make connections with people you would otherwise never know. You find out that so-and-so was just as nuts about some obscure '70s band as you were, and maybe that's why the equipment he designs is so weirdly appealing. Or you find out that Joe Blow grew up in the next town and dated your sister, and that explains why you've always figured him to be a jerk. Or someone else is working on a project in his spare time that has nothing to do with what he does for a living, but that happens to be close to your heart, too, and maybe you can collaborate. Not to mention the folks who get romantically involved, either short-term or long.

"But to make that work, you've got to have an atmosphere where people can stop doing their arts and crafts and nature walks and swimming lessons—you know, stop writing orders and checking out the competition and doing

nonstop sales pitches—and just sit down and be together. It works in Anaheim, where there just aren't very many places to go, but, of course, none of us will be going to Anaheim for the next



ILLUSTRATION JACK DAVIS

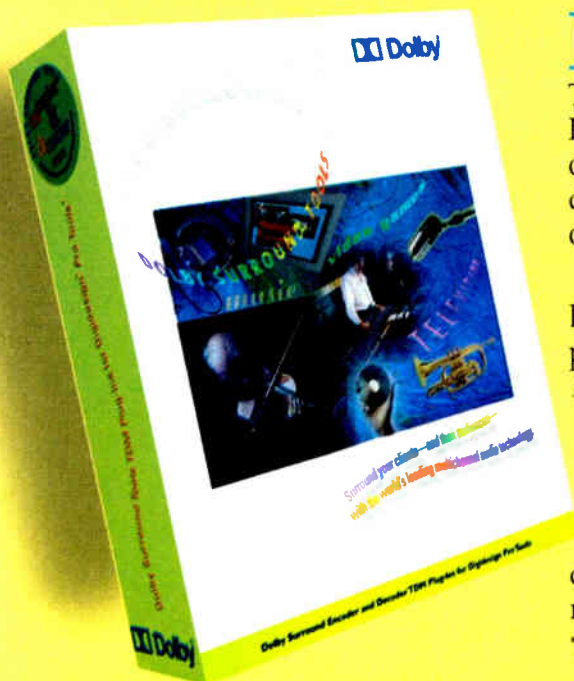
couple of years, unless we're going to Disneyland. For some people it works in Las Vegas, and it used to work great in New York. But now, with everyone off to hell and gone after the 6 o'clock bell, there's no chance. And Los Angeles? Fageddabout it." Uh-oh, Joe again.

I bought Grumps a drink and told him I had an important meeting to go to. Actually, I was off to the movies, by myself. I like to be around people, too, but anything was better than his complaining.

I didn't see Grumpmeier again until early morning on the last day of the show. Actually, I only caught a glimpse of him standing in Times Square in his underwear, unshaven, screaming and cursing. Poor guy, I thought. He really misses his summer camp, and now he's gone off the deep end. But I found out later he wasn't to blame—his beautiful, ultra-modern, world-unto-itself non-official-AES hotel was on fire, and he had to evacuate from the 26th floor. By the stairs. ■

Paul Lehrman swears that the events described here are all true. He has his doubts, however, about the people describing them.

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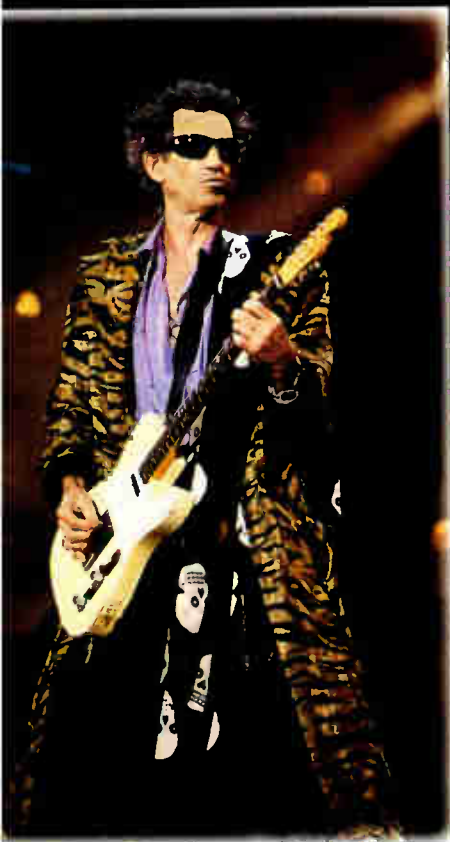
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The Rolling "BRIDGES"



PHOTOS: STEVE JERNIGAN

STUDIO SOUND

Late last summer when word hit the streets that the Rolling Stones were about to embark upon their "Bridges to Babylon" world tour, Chicagoland began humming and buzzing like a huge, defective subwoofer. For it was there in the blues capital of the world that the Stones would start, with shows on September 23rd and 25th at Soldier Field. Tickets sold out almost instantly. Even scalpers' tickets quickly dwindled to only those bearing stratospheric price tags or altitude sickness precautions. Anyone with even remote connections to the event became fair game for beleaguering requests from ticketless friends, relatives and half-tanked strangers in bars.

IN

STADIUM

SPACES



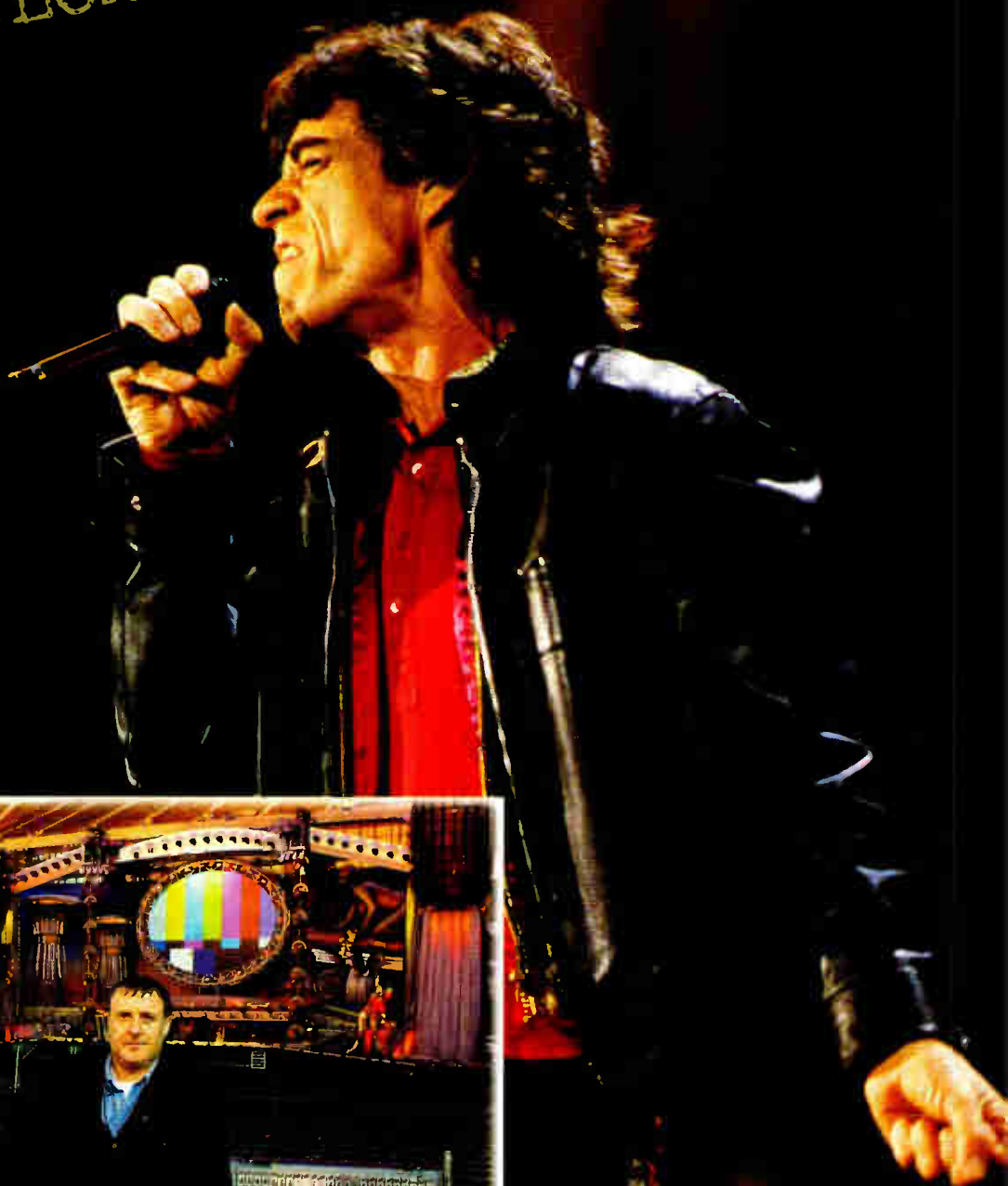
BY GREGORY A. DETOGNE

Stones

TO

BABYLON[®]

TOUR



FOH engineer Rob McGrath



And so the Stones rolled again. As masters of an act almost as old as rock 'n' roll itself, Mick and his mates have proved that they can still fill a stadium at warp speed.

Production for the Stones this time around is larger than in the past in some respects, pared down to lean and mean proportions in others. Three Oz-like steel systems composed of girders and towers leapfrog from venue to venue to support the lavish main stage elements. While one of these skeletal structures is completed and in use for the evening's staging, the other two are either en route or under construction at the next venue. A crew of 25 travels with each steel system. And according to production manager Jake Berry, it takes a touring group of approximately 250 to make this gig run on time.

This impressive road show not only heralds the Stones' return to the concert stage but also introduces the first large-scale P.A. from Electro-Voice since its Manifold Technology system, which was first seen in the late '80s. Supplied for the tour by Des Plaines, Ill.-based db Sound, the new X-Array loudspeaker system was developed by an R&D team led by EV's Mike O'Neill and Dave Carlson, with input from audio professionals around the globe, including db Sound's Harry Witz, who assisted in design and beta-testing efforts. The X-Array system is based around three space-saving main loudspeaker cabinets: the Xf coaxial

THE ROLLING STONES "LIVE FROM THE 10 SPOT"

Ever ready to make productive use of mass media, the Rolling Stones managed to squeeze a couple of TV appearances into their "Bridges to Babylon" tour itinerary. On October 24 the band opened the musical portion of the VH-1 Fashion Awards show with a two-song segment and, the following day, appeared at the 900-seat Capitol Theater in Port Chester, N.Y., on MTV's "Live From the 10 Spot." For both shows, live music mixing facilities were provided by NYC's Effanel Music in the shape of the L7 recording truck, which features expanding walls (for a total width of 14 feet) and a recently installed 128-input Neve Capricorn console.

Mixing the shows for the TV

audio feed were the redoubtable team of Stones regular (and 1997 TEC Award winner) Ed Cherney and Effanel's John Harris, himself a veteran of many MTV live shows. Though Cherney had not previously used the all-digital Capricorn (and has clearly expressed his reservations with digital audio in general), he soon got comfortable and professed himself agreeably surprised by the 24-bit console's performance. Mic inputs were simply



Effanel's John Harris, left, and Ed Cherney at the Capricorn

split from Stones FOH engineer Robbie McGrath's feeds, and Harris in particular was pleased to see widespread use of the Audio-Technica 4050 condenser, a mic that Harris has been using extensively for live recordings. "McGrath is doing a superb job at FOH, and there really wasn't any need to add mics or suggest substitutions," says Effanel owner Randy Ezratty. "We've recorded Keith Richards a number of times, and I've never heard his guitars sound better."

The signal chain included a TC Electronic Finalizer followed by a Crane Song HEDD unit on the two-mix feed. "We've never used any 'black box' devices before," says Ezratty of the Crane Song unit. "But the HEDD adds just the right amount of subtle harmonic enhancement, and really works well on rock 'n' roll." To mitigate the often clumsy and oppressive limiting imposed by MTV and

—CONTINUED ON PAGE 42

THE ROLLING STONES AT THE CAPITOL THEATER, PORT CHESTER, N.Y., 10/25/97

Track assignments for the Sony 3348

- | | | |
|---------------------------------|-------------------------------|---|
| 1. Snare 2 (B&K 4011) | 16. Ron Electric 2 (AT 4050) | 34. Keyboard Right (DI) |
| 2. Kick (Beyer M88) | 17. Mick Electric (AT 4050) | 35. B3 High Left (SM57) |
| 3. Snare 1 top (Shure SM57) | 18. Keith Acoustic 1 (DI) | 36. B3 High Right (SM57) |
| 4. Snare 2 bottom (SM57) | 19. Keith Acoustic 2 (DI) | 37. B3 Low (Sennheiser 421) |
| 5. Hi-hat (Audio-Technica 4033) | 20. (Open) | 38. Sampler Left (DI) |
| 6. Ride (AT 4033) | 21. Mick Acoustic 2 (DI) | 39. Sampler Right (DI) |
| 7. Tom 1 (AT 4050) | 22. Mick Acoustic 1 (DI) | 40. Andy's Keys Left (DI) |
| 8. Tom 2 (AT 4050) | 23. Spare Vocal (Sony RF) | 41. Andy's Keys Right (DI) |
| 9. Overhead Left (AT 4050) | 24. Mick Vocal (Sony RF) | 42. Baritone Sax (421) |
| 10. Overhead Right (AT 4050) | 25. Backing Vocal 1 (Sony RF) | 43. Trombone (421) |
| 11. Bass 1 (DI) | 26. BGV 2 (Sony RF) | 44. Trumpet (421) |
| 12. Bass 2 (DI) | 27. BGV 3 (Sony RF) | 45. Tenor Sax 2 (421) |
| 13. Keith Electric 1 (AT 4050) | 28. Keith Vocal (SM58) | 46. Tenor Sax 1 (421) |
| 14. Keith Electric 2 (AT 4050) | 29. Darryl Vocal (SM58) | 47. Audience Left (Audix SCX1, AT 4043, AT 4049) |
| 15. Ron Electric 1 (AT 4050) | 30. Chuck Vocal (SM58) | 48. Audience Right (Audix SCX1, AT 4043, AT 4049) |
| | 31. Piano Left (DI) | |
| | 32. Piano Right (DI) | |
| | 33. Keyboard Left (DI) | |

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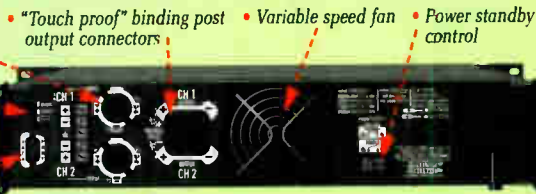
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World Radio History

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two-way midrange enclosure, the coaxial three-way, full-range Xn and the Xb bass bin. Built in the now common trapezoidal shape and ranging in weight from 184 to 192 lbs., all of the cabinets are uniform in size at 36 inches high by 23 inches wide and about 30 inches deep. As a final complement to the system, a ground-stacking true subwoofer cabinet (model Xd) rounds out the product category. An innovative rigging system allows both flexibility in arraying and orientation, and speed for setup and tear down.

Proprietary developments found on the inside of each X-Array enclosure are based around transducer and horn designs employing neodymium magnets, Kevlar-impregnated, high-internal-damping cones and asymmetrical

phase plugs. Then there's Ring-Mode Decoupling (RMD).

"We located a number of resonant modes found in all P.A.s," says EV's director of R&D Mike O'Neill. "If you fix one or two of them, you obtain minor improvements in system fidelity. Go through and fix as many as you can, and the net result is a very audible change, especially in vocal qualities."

In its most simple sense, RMD solves ringing problems in P.A.s that can't be corrected electronically with mechanical and acoustical solutions. O'Neill says the net result of EV's efforts is level-independent sonic accuracy. In other words, turn it up, and not only will you get powerful sound (these boxes are capable of posting long-term averages of 140dB SPL with 150dB SPL peaks), but you get constant response, which eliminates the need to adjust EQ as SPL increases. For the Rolling Stones, the result is unprecedented clarity and the ability to bring studio-like audio qualities to arenas and stadiums.

The person chosen to master all of this front-of-house audio technology is touring sound veteran Robbie McGrath, a tall and friendly Dubliner. McGrath has been pushing faders professionally

since the early '70s, starting with Irish rockers Horslips. He's since logged a bazillion miles with headlining acts such as Thin Lizzy, AC/DC, Tears for Fears and Sinéad O'Connor. McGrath spoke to *Mix* about some of the challenges of working on this impressive production.

You have a long, rich history with touring sound. Did you ever think you'd arrive at the point you're at today?

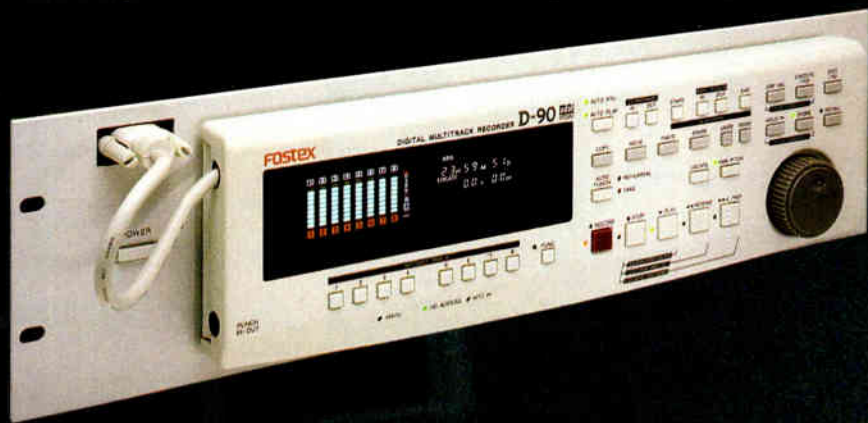
The thing is years ago I ran away to join the circus. When I got there, it was all so bloody serious. It was like "hell-ooo,"—if I wanted this, I would've become a bank manager. Not at all what you'd expect. Before you could laugh, you had to ring your lawyer to make sure it was okay.

Being that you've seen a lot in this business, are you old-school when it comes to your approach?

Oh no. I went into the computer age kicking, I will say that—I wasn't too sure if it was going to make things easier for us at first, or whether we'd just be playing with more toys. But I adapted. Automation is especially nice.

I see from your equipment list that

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ALL TRADEMARKS ACKNOWLEDGED

you're using two consoles on this tour—both Midas XL4s. I assume that's one for each of the two stages out there, right?

Yeah, two XL4s, one for each stage. There's a main stage and a B stage right out in the audience. The main stage is involved in a much bigger production and, obviously, sounds much different than the B stage, which is essentially the Rolling Stones rockin' on a postage stamp. They wanted to create kind of a club atmosphere out there, so of course the processing is completely different.

When is the B stage used?

In the middle of the show, basically for three blues numbers. It's stripped down to drums, bass, guitar, piano and vocals. When the band is on the B stage, the main stage is dark. The first time we worked out there, we were pumping it up the same as on the big stage. It was quite odd, like it shouldn't be happening. The sound and visuals were all wrong. We had to take a completely different approach.

There has to be a significant challenge to mixing for a band that far out in front of the P.A.

The set designers were kind enough to phone me and ask if I'd have a problem



Monitor mixer Chris Wade-Evans

with it before they went about firming up the idea. My answer was it could be done, but the band would have to meet me halfway. There's a combination of wedges and in-ear monitors out there. Keith won't wear in-ears; I don't know how he keeps time in that situation. He's quite unique in that respect.

He's quite unique in a lot of respects.

So is your P.A. I know db Sound played a role in beta testing the X-Array system. Were you involved in its development, as well?

Oh, they rang me a few times and I had a listen to the boxes, I mixed a couple of small bands with them and gave my opinion, but I wouldn't say I was involved.

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The response to this system has been phenomenal. Based upon media reaction in Chicago when the tour began, you'd think it was the show itself. And it didn't stop there. The press—mainstream publications like the Boston Globe and Chicago Tribune, not just trade books—have been singing its praises.

This system is so clear and clean—I mean when I did Soldier Field that first night in Chicago, there was so much clarity—it was like “*ooops!*” This is not the Stones! Everybody said, “Oh, wonderful show,” but I didn’t think I actually captured the essence of the band. I wasn’t prepared for the fact that I was going to have to rough things up a bit to provide that characteristic ragged edge, make a bit of racket. We were still listening to a P.A. that night.

Or a CD maybe? Is the X-Array that clean?

Well, this is a quality that I personally have never heard in a big space before. But CD? I dunno; define CD for me. It’s very crystal-clear. Everything arrives at your face at the same time.

Okay, then, would it be safe to say that you can now obtain studio-quality audio in stadiums?

Have a listen tonight and make up your own mind. I’m sure you’ve seen loads and loads of shows. If I’m wrong, please come up and tell me. But I don’t think I’m that far out. This would be a great rig for studio engineers who want to come out once in a while and do live gigs. It’ll give them a response they’d never expect in their wildest dreams.

Does a system like this warrant a lot of respect?

Very much so. It hasn’t bit me in the arse yet, but it has the ability to, I’ll say. From the console, it’s like sitting in a very fast, exotic sports car that goes around corners beautifully with exceptional form and grace. Accelerate too quickly, however, and you can definitely wind up looking at yourself.

With a system this clear, how do you capture the Stones, then? How do you get that raw edge, that fuzziness, if you will? Do effects play a role?

MONITOR MAGIC FOR THE ROLLING STONES

WEVANS’ WORLD

by Gregory A. DeTogne

Christopher John Wade-Evans is his full name. But since his school days in England, everyone has just called him “Wevans.” He is currently on his third tour with the Rolling Stones.

“I’ve always done monitors,” he says of his career, which began nearly 20 years ago in London’s punk scene. “I never embraced the idea that I was on my way to becoming an FOH engineer. Right from the beginning, I felt this was a different challenge, one which was a bit more interesting to me. There’s fewer people who are really good at it, as well.”

Wade-Evans’ monitor rig for the Stones’ Bridges to Babylon tour is a straightforward collection of gear designed to sustain a neutral stage environment, enabling the band to create their own dynamics.

“The Stones are essentially a very big bar band,” Wade-Evans notes. “But they create a lot of dynamics you normally don’t associate with rock ‘n’ roll. I mean, how often do you have a jazz drummer sitting in the middle of a rock band who’s quite adept at kick drum? My job is to create a comfortable situation for them so that wherever they may go onstage, everything is basically audible. There aren’t huge differences between the mixes.”

Incorporating two distinct rigs for the main stage and a second stage located at the end of a thin ribbon of walkway extending approximately 150 feet directly out into the audience, Wevans’ World is fueled by Crown MA-36x12 amplifiers outfitted with PIP cards. With 26 loudspeaker mixes found on the main stage, all monitor systems are supplied by Bryan Olson’s Hyde Park, N.Y.-based Firehouse Productions.

A pair of Cadac M-Type monitor console frames loaded with various modules are bused together for main stage mixing chores, while a Midas XL4 is used for stage B. Seated within easy reach of his processing racks and consoles, Wade-Evans performs his duties from a subterranean lair built into main stage left. Virtually invisible to the audience, he peers

through an opening above the Cadac desks to keep tabs on the main stage, while four Sony color monitors above the adjacent XL4 enhance his view of stage B.

Wedges for both stages are proprietary Firehouse designs, which are loaded with TAD drivers on EV horns and either JBL or EV woofers. More than 100 of the compact and low-profile wedges are distributed about the main stage and stage B.

“Bryan [Olson] and I worked on the concept of these wedges with the idea that there shouldn’t be any processing in the crossover sections,” Wevans recalls. “We wanted these boxes to perform as flat as possible mechanically. That way we wouldn’t be using up amplifier headroom boosting bottom end we couldn’t use anyway.”

One problem peculiar to stage B is that it places the band about 150 feet in front of the P.A., a sure recipe for time arrival problems. Wade-Evans chose Shure’s PSM600 Personal Stereo Monitor systems to provide Mick Jagger, Ronnie Wood and bassist Darryl Jones with a direct mix to help overcome the delayed signal of the P.A. Keith Richards and keyboardist Chuck Leavell use only wedges, and drummer Charlie Watts dons a standard pair of Sennheiser headphones to supplement his own wedge.

Wade-Evans keeps effects minimal—“bits of reverb here and there,” he says. A trumpet effect arrives in the mix via a Yamaha SPX 900, while Lexicon PCM 80s manage vocal reverb for Mick Jagger and backing vocalists. Six Smart Research compressors are inserted along with one side of a Klark-Teknik DN3600 on all radio mics.

On a final note, Wade-Evans says he is left with a loose leash to perform his tasks as he sees fit. “They’ve never been a band for wanting to discuss in great detail how things should be done,” he says. “They developed their own ways of doing things years before monitors were even invented, and just leave you to get on with it.” ■

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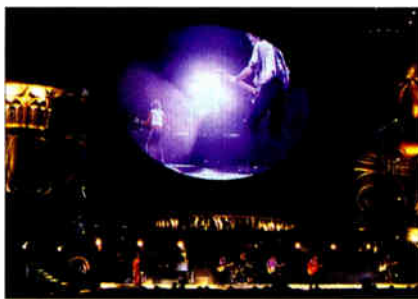
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What plays a bigger role is compression. We've got a Smart Research compressor on vocals, and we have a pair of stereo tube compressors from TL Audio on guitars. [That's] what I really need to do with [Keith Richards and Ron Woods'] guitars—because they play tennis with one another a lot.

Yeah, they engage in an antiphonal call and response kind of thing..

Antiphonal call and response! See—you should have this bloody job! Right—if you leave those passages too clean it will never sound right. So you have to pull the sound around to the side. That way, you can build the two guitars in a fashion where they are playing ball with one another, and not walking off the field. If you don't do that, your dynamic field will be too big, and they'll use it all up.

So at this point you've rounded and fattened your guitar sound and curtailed their freedom of movement within the dynamic field of what you're doing. What happens next?

I put them into a subgroup with a stereo Summit tube compressor across it. Now when they start playing off of one another, the volume of what they're doing remains consistent. That's important because one day Keith could be louder than Ronnie by like two or three dB because that's just the way he feels onstage. Or Ronnie could be on top. What this Summit compressor does is help me deal with whatever moods they're in.

I'm sure every song could be different too. Are situations like this common with regard to processing in general?

There's a lot of switching going on in the XL4, I'll say that. I have processing in and out on various numbers, inserts here and there, matrixed things, something else going to a subgroup. Without a desk like this, you may as well forget it, because you'd just be tossing with it all night. The XL4 came along at just the right time for this crystal-clear P.A.

So you are indeed processing the show song-by-song.

I have to pay attention to all the different numbers. Certain numbers with the

brass section, like "Jumpin' Jack Flash"—they want a thin brass line, kind of a brass canopy across the whole song. That's because "Jumpin' Jack Flash" is basically a guitar number, so you can't use the same processing as you would on "Tumbling Dice," which has a big brass overlay.

Any other tricks for creating the Stones' "dirty" sound you'd like to share?

I've got another Smart compressor across the whole system as well. That tightens it down. And because I come from way back, I'm very aware of how compression reacts with your EQ. You can actually use compression on your mids with your EQ to create little bits of phase cancellation which dirty things up as well.

We haven't said anything about effects yet..

[Laughs] Yes, we still use them—old-fashioned things like reverbs and what-not. There's a pair of Eventide H3000SE UltraHarmonizers for thickening vocals.

How about the horns?

One number gets a lot of H3000. It's good for that. But in general the horns are on a Lexicon PCM 70. Sometimes I use the PCM 70 to build them up from behind without taking away from their attack. Other times, I just want the whole thing swapped, so I use a normal vocal play with a very small amount of pre-delay so it bursts into the mix and expands.

I noticed you have a Yamaha REV5, too.

The REV5 is basically on snares. There's a Yamaha SPX 90 in there for drums, as well. I use the Yamahas for drum reverb because they can get nasty, they help to focus the attack. I've also found over the years that putting Lexicons on the toms—I have a Lexicon 300 in there—makes them sing a bit, gives them an expensive edge. But for me, the Yamahas are just so filthy dirty, well they've become just like meat and two veg for me. It's a combination of everything put together, really.

How about keys and vocals?

I like the Lexicons and finer reverbs on keyboards and vocals. That way the whole dynamic is built up from rough proportions into something that's very smooth before it travels into the H3000 for vocals. I'm using a lot of processing, but you don't hear it, except for in instances like "Sympathy for the Devil," where there's some upfront reverb and echo on Mick's voice in the beginning. But I mean that's been there forever, since Day One.

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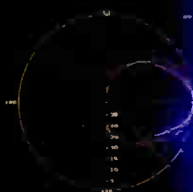
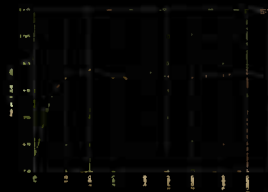
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GARWOOD



some of the crucial elements that make up the Rolling Stones' sound?

Charlie Watts' drum sound is very important. Mick has said that to me, Keith has said that to me, they all have said it to me. If you get Charlie, you get the band. He brings a great amount of emotive force to the whole thing. But obviously, everyone else contributes their share too. No one sings like Mick Jagger, and no one plays guitar quite like Keith Richards. Each time he hits those opening chords to "Start Me Up," it's over—sends shivers up me back. ■

—FROM PAGE 34, "LIVE FROM THE 10 SPOT"

local cable companies, Harris sent pre-show alignment tones at 0 VU, but set the overall two-mix output well below that point. "It seems to have fooled them," says Ezratty. "Of course, for TV the whole mix is compressed considerably more than it would be for a record, but we preserved a much better dynamic than is usual for these shows." Reverb was provided by a TC Electronic M5000 divided into four "machines." "Because we can use the M5000's digital I/Os, there is enough processing power available to create four independent stereo reverbs," explains Ezratty.

As the show's title implies, the "Live From the 10 Spot" set went out completely live, but Effanel recorded everything to Sony 3348 and Tascam DA-88 digital multi-tracks for possible future use. The digital audio was fed direct from the Capricorn's digital outs, bypassing the tape machines' own A/D converters. Because the VH-1 show was prerecorded, Cherney was able to touch up his original live mix before broadcast, a process much accelerated by the Capricorn's automated recall of the previous mix.

—Chris Michie

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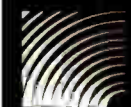
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Interestingly, only days before, several of these people professed an intense love for mid- to late-period Beatles records and the British Invasion. Imagine The Beatles' "Yer Blues," off of the *White Album*, or "Revolution" without the inspired touch of monster compression causing the cymbals to roar in and out of the mix and make the bass throb the way it did; I don't know if I want to.

This applications article is about compression, with no apologies, especially as it is used to turn up the rockets or provide unusual color to a soundstage. Sure, we all love meticulously miked recordings of symphony orchestras, chamber groups, jazz combos and so on, but this information is not for those purely interested in documentary recording. As renowned recordist Richard Dodd states, "What a sound is and how we perceive it are two different things. If you have ever heard a gunshot outside, it's nothing

like the sound we hear in movies. It's a perceived thing."

KEN KESSIE

Ken Kessie is an L.A.-based producer/engineer who has worked with En Vogue, Tony Toni Toné, Brownstone, Vanessa Williams and Celine Dion. Recent credits include five songs on En Vogue's EVIII, mixing for All-4-One's upcoming release, and producing and engineering for L.A. buzz bands Sevensoft and Tuscaurora. His production of French superstar rapper Doc Gyneco's debut album has resided at the top of the French charts for over a year.

Creative compression is all about breaking rules—doing what you're not supposed to. If you've got a deadline, you've got to go for what you know works. But when you feel that urge to step out and break new ground, try these ideas.

I sometimes make a cool faux stereo sound out of a mono one. Not by time manipulation with a delay or pitch changer, but by dynamics. If you mult a single sound source to two faders, process them differently with two compressors and then pan them left and right, you'll get a sound with no addi-

tional time slop, but with space still in the center for a lead vocal. Try compressing one side really hard, while barely touching the other. With any luck, there will be some motion across the speakers. This works great on hi-hats, snare drums and other percussion instruments.

Another effective compression move involves the bass drum and bass. In a lot of the R&B mixes I do, the kick drum and bass often play at the same time. When in R&B-land, I always make the bass and kick huge—that's one reason I work a lot!—then always have a problem fitting them both in the mix. What I do is compress the bass with the kick drum. You need a stereo compressor, with stereo linkage, and attack and release controls. So far, the Drawmer DL241 is my favorite. Send the kick drum to channel A, and slave channel B (the bass) to it. Every time the kick hits, it knocks down the gain of the bass, and by using the attack and release controls, you can get a perfect blend between the two. Settings vary for this, of course; use your ears rather than the meters.

When I'm working on an SSL board, I sometimes record through the stereo bus compressor. Here's the patch to ac-

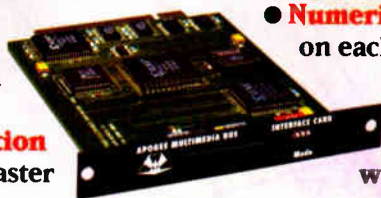
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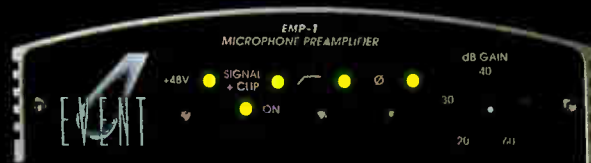
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cess the compressor: In the SSL patchbay, find the section called Pre VCA and Post VCA. Using two patch cords, connect Pre VCA (top row) to Post VCA (bottom row). This bypasses the stereo compressor and the master fader. Inputs to the compressor are Pre VCA bottom row, and the outputs are Post VCA top row. **WARNING!** This patch is possibly lethal to speakers or talent with headphones on. Only attempt at low volume in case of a disaster, and please note that the master fader is out of the circuit and cannot be used to lower the volume. It's worth it, though—this compressor sounds great, especially on acoustic piano.

Euphonix consoles have a dynamic filter preset called a "de-esser" in their dynamics presets. Since I don't over-EQ anymore—yeah, right!—I don't need de-essers as much, but I found that by lowering the frequency into those pesky cheap mids, the device can also act as a harshness filter, especially when there are lots of nasty midrange parts. I run it across the stereo bus, and tune it to remove just a pinch of ugly midrange when the track gets loud. It has a very smooth-sounding effect on the mix.

Many guitar stomp boxes have lots of personality, punch and, let's face it, horrible noise. Interface them with a preamp or DIs, or just plug and overload. Not only are these great for all rock sessions, they are practically required for proper indie cred.

Look, we all know about short signal paths by now, but sometimes you gotta throw the book away. Sometimes it takes several compressors chained together to create the impact or smoothness needed for a standout sound. Sometimes one box acts as a peak limiter while the other works as a low ratio compressor. There's no formula; just use your ears. And I do mean use your ears—compression meters are often misleading. Like Joe Meek said, "If it sounds right, it is right."

RICHARD DODD

Grammy Award-winning producer/engineer and mixer Richard Dodd's creative use of compression has won many fans who love recordings with a pulsing energy that enhances the essence of a song. Dodd's first hit project was the Carl Douglas smash "Kung Foo Fighting," (!)

but he is best known for his work with Tom Petty (solo and with The Heartbreakers), Boz Scaggs, the Traveling Wilburys, Wilco, Robert Plant, The Connells, Clannad, and, most recently, Green Day and the Why Store.

What I go after with compression is to purely emulate the ear and a perception of sound, because obviously what a sound is and how we perceive it are two different things. Does a tree falling alone in the woods make a sound? I don't know, but if it does, I imagine it to be one thing, and in actuality it might be something else. Have you ever heard a gunshot outside, as it were? It is nothing like what we hear in the movies. It's a perceived thing. I typically use a compressor or limiter to achieve my perceived envelope—to add excitement and sensitivity or presence or change or add perspective, much in the same way that some people use reverb.

Just because you have compressed something, you don't have to use it all. If you compress something to the extreme of any perceived tolerance, it is obviously exaggerated and probably of no use. But if you then mix that in with the unaffected sound, you have something very useful. People sometimes say to me, "You use compression so well. It is so compressed, but it doesn't sound like it is compressed." The trick is that I am using both. I will have one signal that is totally pure mixed with the desired amount of the compressed signal.

What has become readily available in the digital world is multiband compression. Basically, that is of more use than an equalizer in many cases. What it has led me to realize, of course, is that even the old-fashioned analog units are actually multiband compressors, in as much as their inefficiencies and deficiencies, as it were, change the tonalities. They do it in an irregular fashion, and in some cases that is wonderful, and in other cases, it's a negative. The way to recover that is by mixing in either a completely unaffected signal with it, or a partially effected signal to achieve the right thing.

In other words, I may go to the compression extreme to get the effect I want, and then I will analyze what it has done to the sound. If I need some of the purity back sonically, I'll add back some of the unaffected sound. It's no more difficult than that.

If somebody has already made the mistake of committing to digital, then I prefer to be in a hard disk-space world, rather than a tape-based digital world. If I am already committed in the digital

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CIRCLE #028 ON PRODUCT INFO CARD

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end. Try sending the bass through the compressor and key (sidechain/trigger) it with the kick drum, so every time the kick hits, it pushes the bass back a little. Set the release time of the compressor so that the bass comes right back up after the kick sound stops. That's an easy way to control low-end buildup without losing punch. Just don't tell the bass player about it.

I also used to set up two compressor/limiters with a two-way frequency crossover in a way that I could send a bass or guitar, for instance, through that frequency crossover and then connect two different types of compressor/limiters to the output of the crossover—one to the low-end out and the other to the high out. The outputs of the two compressor/limiters are patched back to two line inputs of the console. That gives me the chance to use a limiter on the high end and a compressor on the low end with different attack and release times. Low frequencies don't like

fast release times too much—you'll get distortion that way. On the other hand, I could ride the high fader on the console on clicks and string pops without losing the low-end content of the mix or the melody line of the bass, or I would brighten up the bass in the choruses even in the days before EQ automation.

If you happen to have one or two of the old 1176 UREIs, you can use them on the room mic(s). Push all four ratio buttons in. The compression will be immense. Patch an EQ before the 1176s, and that will take quite a bit of high end off (shelving) and then bring up a little low end—maybe 2 to 3 dB around 80 to 100 Hz—then set the attack time to a slow setting and the release to a faster setting. Then set the input level so that the needle goes back to at least -10 dB. Your drummer will not want to hear any other mics in the mix.

There are a whole bunch of different compressors out there. You don't always have to use the \$10,000 Fairchild. In fact, some of the "cheap" compressors do a great job because you can hear them work. It's like with microphones—every single one has a different sound and can be used suc-

cessfully on a variety of instruments. Experimenting is the secret.

MICHAEL BRAUER

New York-based mix master Michael Brauer has amassed an astounding list of credits over the years. Included in Brauer's lengthy discography are the Rolling Stones, Bruce Springsteen, Jackson Browne, Billy Joel, Luther Vandross, Stevie Ray Vaughan, Michael Jackson, Jeff Buckley, Tony Bennett, Eric Clapton, David Byrne and many more. Brauer is also a consultant for Sony Studios and has recently been doing extensive work on DVD remixing.

One of the most versatile compressors on the market is one designed by David Derr called the EL8 Distressor Compressor. It's the kind of compressor that can be really clean and gentle and warm and transparent. But if you want it to be vicious, there is no compressor that I know of that can get you up to 40 dB of compression, which is what it might take to get something really wicked. I always tell people to buy three, because you're going to end up using two of them in stereo and you're going to use that third one for bass or vocal or whatever.

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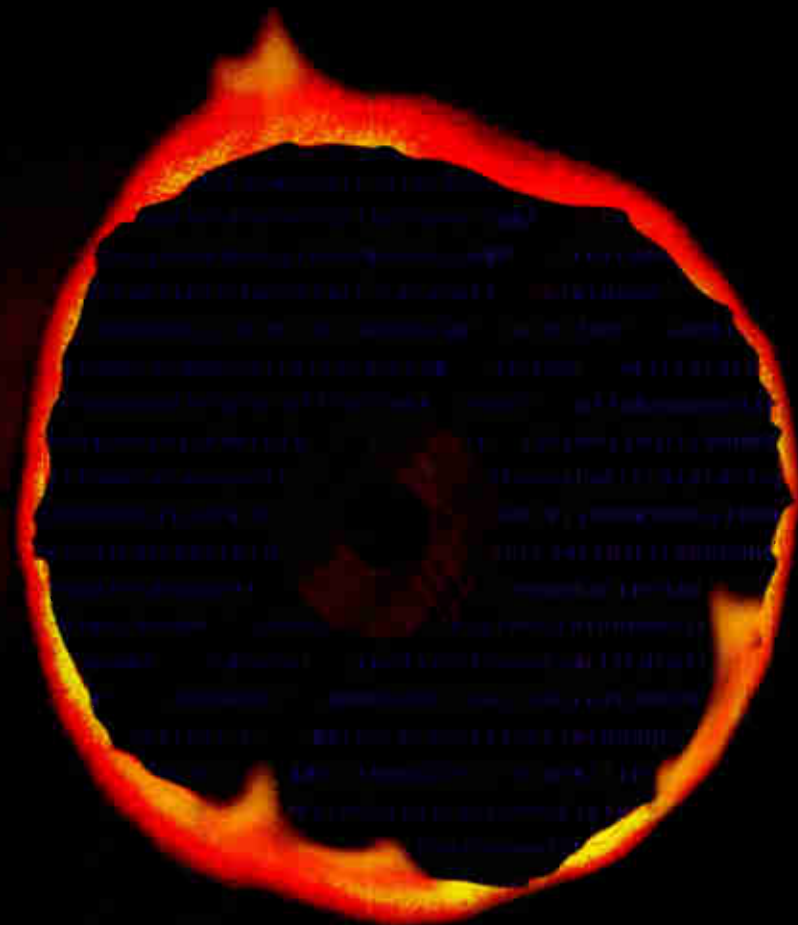
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CIRCLE #032 ON PRODUCT INFO CARD



With this unit's ability to get 40 dB of compression, you can take a regular lousy snare drum and turn it into a John Bonham kind of snare. What that means is that if you want to create your own reverb without reverb, you can! You can absolutely pull the "room" out of your snare drum. You take the snare drum, or whatever sound you are working on, and sub-group or mult it to two channels. On the first channel, the dry or source channel, apply more gentle compression with a slow attack. By "gentle" I mean around 5 to 10 dB of compression, which is a lot on other compressors, but not on this one. The resulting sound will be this smack or really hard sound. The higher numbers on the attack knob are slower. Now, on the second channel crank the compression up to 40 dB with a very fast attack and release. When you completely remove the attack, it brings up the room ambience. So now you've got this one sound with a horrendous attack punchiness to it, and another sound that captures the room reverb. You mix in the one where all the attack has been removed, you bring that up with the first fader, and you have a natural room without any reverbs, yet you hear the reverb from the snare. By the use of your compressors, you are creating your own reverb.

Now, if you are going to put in 40 dB of compression, you are going to want to crank the output gain up to make up for this extreme compression. When you crank up the output, it just becomes a different animal. That is a key function of this. With the Distressor Compressor, you won't get any buzzing or humming or crapping out. It's amazing.

The Distressor Compressor also really does a great job on vocals. It has this setting, which I guess is a midband emphasis setting, that is really designed for vocals that get thin and harsh and hurt your ears and cause you to EQ that section every time they get into that range. When you hit this setting, it automatically attenuates that area and warms it up, so you have this warm vocal all the way to the top of the range, where normally it would get very harsh. If you are dealing with a really thin voice, you can also add this DIST2 harmonic distortion setting, and it adds warmth and a little fuzz to the vocal. Depending

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CIRCLE #034 ON PRODUCT INFO CARD

World Radio History

Remember what happened with computers?



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It used to take a whole room of electronic gear to do a fraction of what your palmtop computer can do. Now Sabine brings the same quantum leap in processing power (and price!) to your big racks of audio gear.

The new **POWER-Q™** combines the functions of seven separate products (*all running concurrently!*) into one easy-to-use 2U package. 24-bit A/D processing and Analog Devices' new SHARC floating point processor means every **POWER-Q** function delivers top quality, without cutting corners like other multifunction products – and the price is unbeatable.

The **POWER-Q** does so much we can't fit it all in this little ad. For more information, check our website, www.sabineinc.com, or our FaxBack service at 904-418-2002, or call for a brochure at 904-418-2000.



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POWER-Q Features available only from Sabine:

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Flattens room response in less than 6 minutes per channel.

■ ClipGuard™ Adaptive Clip Level Control**

Automatically expands dynamic range to more than 110 dB and input/output signal peaks up to 28 dBV. ClipGuard™ eliminates digital clipping forever!

■ Next Generation FBX Feedback Exterminator®

12 independent, patented FBX filters per channel automatically find and eliminate feedback, in setup and *during the program*. All new algorithm places filters with greater speed, accuracy, and unsurpassed discrimination between music & feedback.

■ PowerView Interface

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on the application, it just sounds great.

Here is another idea, this one based on the 1176. It is called the British Setting. If you are familiar with the 1176, you basically have two knobs, an in and an out, and you have four buttons. With those four buttons, you can select your compression ratio. What you do is press them all in. Depending on the vintage of the unit, because you can't do this on some of the newer 1176s, hitting these four buttons makes it freak. The compressor needle, or indicator, will slam over to the right. Normally, whenever there is anything going on, the needle does the opposite. This looks really weird, but as long as it slams over this way, you know that it's working. This setting gives the sound a certain sense of urgency. It strains it. It's great for a vocal that needs extra urgency. Of course, you are going to be able to control the amount of strain in the voice by the input level. In the beginning, the needle may not move at all, so you have to keep bringing the gain up until the needle starts slamming over to the left.

Here's the additional touch for this: The compressor is so wild in what it's doing with the vocal [for example], that although you don't hear the vocal coming in and out, you are hearing this intense sound. That's the best way I can describe it. Then you start bringing that second channel up to where it would normally phase out totally. Because the compression is moving this sound around, it kind of goes in and out of phase. So you back it off, just before you get to it. You have to play with this, but what that can do—especially with a vocal or instruments—is make the sound explosive.

There's a sweet spot, and you have to play around to find it. If you feel that it's starting to phase out, or it's disappearing, you might want to play with that second channel. Remember, if you bring the whole thing up out of phase, no matter what it is, it's going to disappear. But when you have that kind of compression going on, and you put it right before its cutoff—it's 180 degrees out—weird things start happening. It's pretty wild!

Contributing editor Rick Clark is a writer, songwriter and producer based in Nashville.

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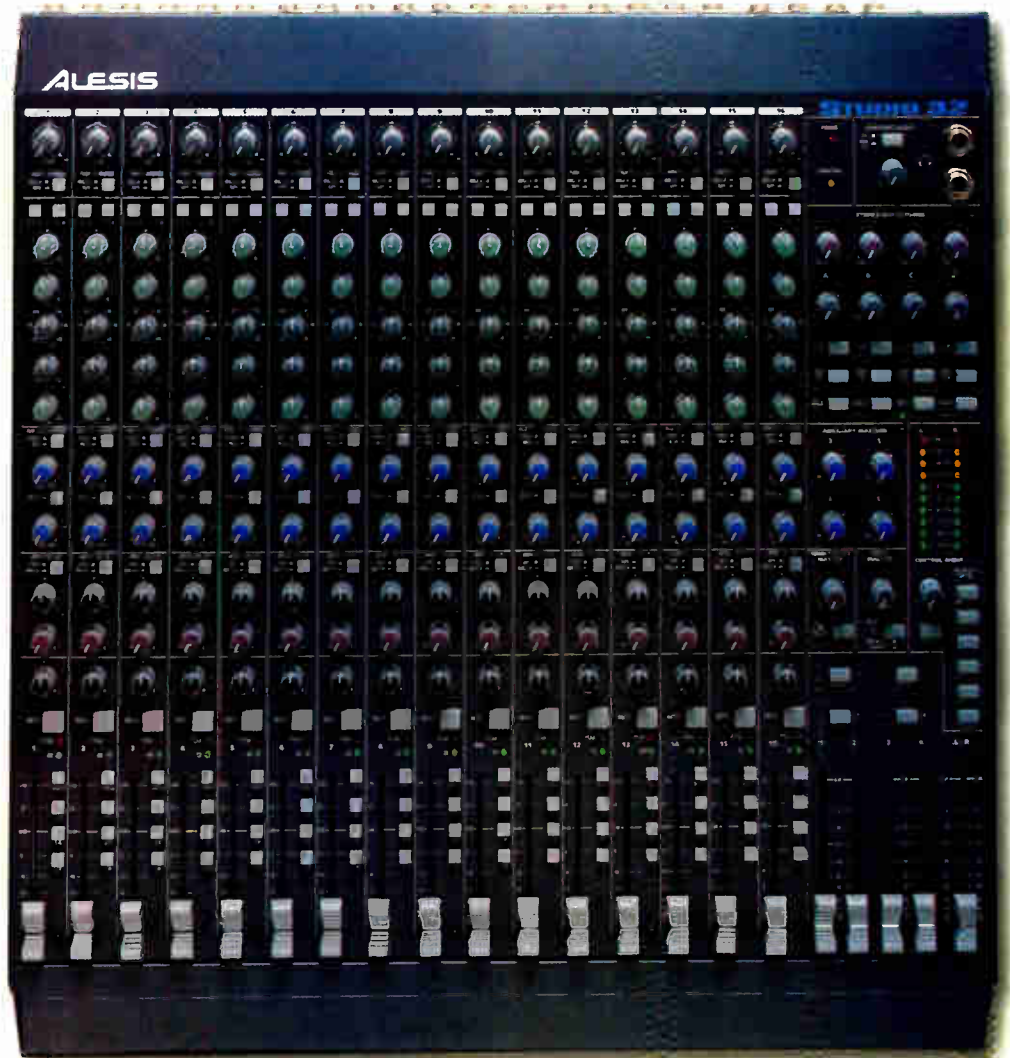
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CIRCLE #036 ON PRODUCT INFO CARD

World Radio History

The Recording Console That



The Studio 32's inline design gives you balanced XLR mic inputs and balanced 1/4" TRS line inputs, channel inserts, tape inputs and direct outputs on each channel. Four group outputs, six aux sends (four pre-fader and two post-fader), phantom power for every channel and separate control room outputs are also provided. And since all of these connections are on the rear panel, your studio stays neat and professional-looking.



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The Studio 32 offers 16 hybrid/discrete mic preamps that combine extremely low-noise performance (-129dB E.I.N.) with a wide 60dB range, making them perfect for driving digital recorders. In fact, the Studio 32 offers a wider dynamic range than all of the currently-available "affordable" digital consoles (and it's a whole lot less expensive).



Audio sources in your studio multiply quickly. Instruments, miked drums, vocals, and stereo signals from synth modules keep adding up. Fortunately, the Studio 32 has twice as many inputs as an average 16-channel mixer, so simultaneous recording or mixdown of multiple sources—live or in the studio—is no problem.

It's the world's most affordable 16-channel console that offers inline monitoring capability. Inline monitoring means that each channel can send signals to a recorder and receive signals coming back from tape...at the same time.

So, unlike your average mixer, the Studio 32 can hook up with sixteen tracks of ADAT® (or any other recorder), instead of just eight. That's *double* the tracks you can access.

Other stuff that makes the Studio 32 stand out from the crowd: fully-parametric midrange EQ and super high-quality mic preamps that are more comparable with the consoles you see on magazine covers than on other compact mixers. 40 inputs available at mixdown...again, twice as many as most other small consoles. All at a price so low that you can afford to get that second ADAT (now that you can use it).

▲
Above: a 16-track digital recording studio that can fit into a corner of your living room. Centered around the Studio 32 and a pair of ADATs, this setup is a professional-quality, low-cost solution for serious recording.



The Studio 32's EQ section provides more than just high- and low-shelving EQ. You'll also find a fully-parametric midrange EQ with individual gain, frequency sweep and bandwidth (Q) controls.

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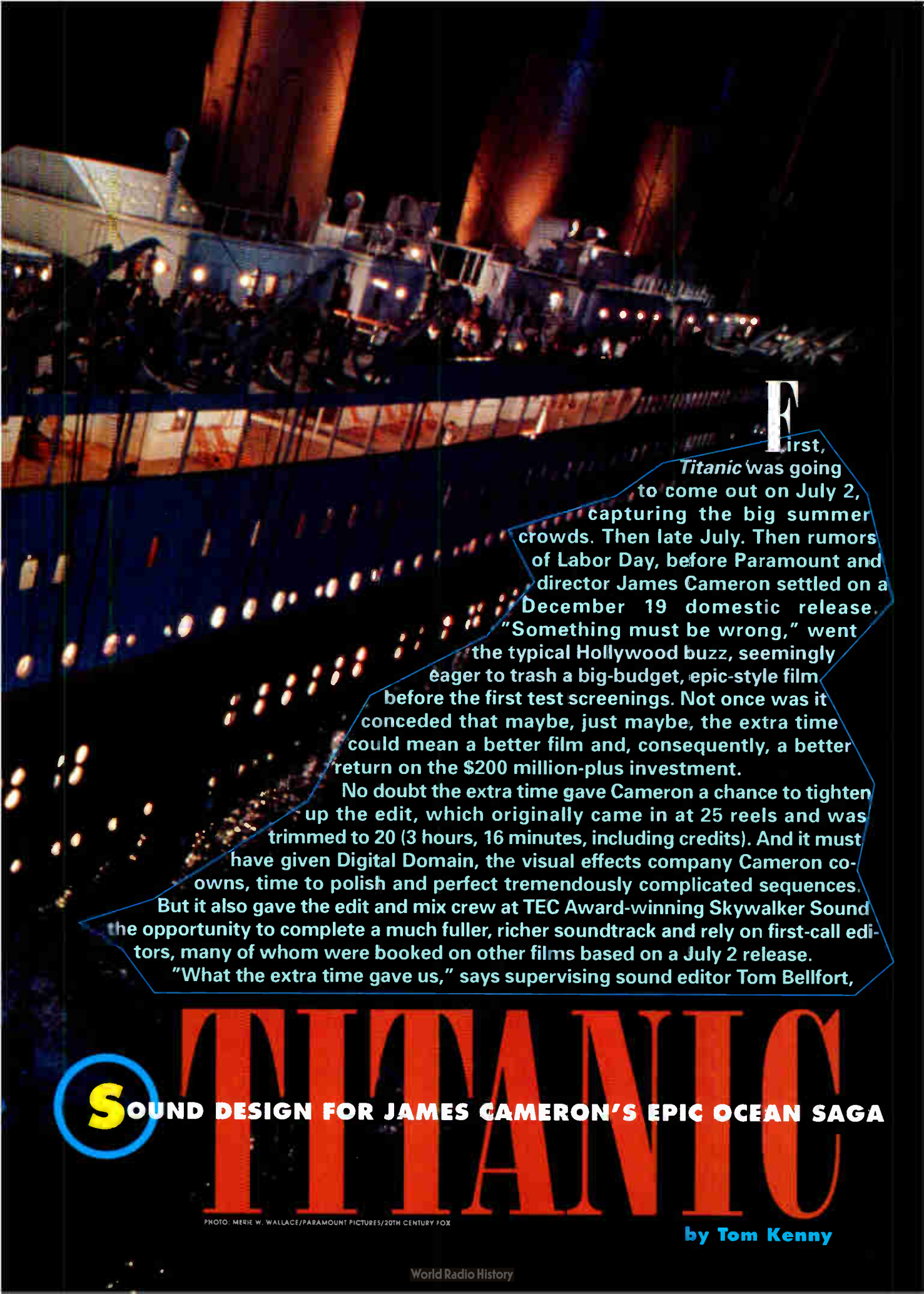
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CIRCLE #037 ON PRODUCT INFO CARD

World Radio History

ALESIS





F

irst, *Titanic* was going to come out on July 2, capturing the big summer crowds. Then late July. Then rumors of Labor Day, before Paramount and director James Cameron settled on a December 19 domestic release. "Something must be wrong," went the typical Hollywood buzz, seemingly eager to trash a big-budget, epic-style film before the first test screenings. Not once was it conceded that maybe, just maybe, the extra time could mean a better film and, consequently, a better return on the \$200 million-plus investment.

No doubt the extra time gave Cameron a chance to tighten up the edit, which originally came in at 25 reels and was trimmed to 20 (3 hours, 16 minutes, including credits). And it must have given Digital Domain, the visual effects company Cameron co-owns, time to polish and perfect tremendously complicated sequences. But it also gave the edit and mix crew at TEC Award-winning Skywalker Sound the opportunity to complete a much fuller, richer soundtrack and rely on first-call editors, many of whom were booked on other films based on a July 2 release.

"What the extra time gave us," says supervising sound editor Tom Bellfort,



TITANIC

SOUND DESIGN FOR JAMES CAMERON'S EPIC OCEAN SAGA

PHOTO: MERIE W. WALLACE/PARAMOUNT PICTURES/20TH CENTURY FOX

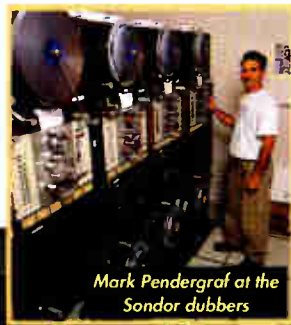
by Tom Kenny



L to R: Mix Technician Tony Sereno; Re-recording Mixers Lora Hirschberg and Gary Rydstrom; Sound Designer/Re-recording Mixer Christopher Boyes; Supervising Sound Editor Tom Bellfort; Re-recording Mixers Tom Johnson and Gary Summers; Mix Technician Gary Rizzo. Left: Custom joysticks on the Capricorn, modified from a Logic design.



Marni Hammett, left, and Dee Selby in transfer

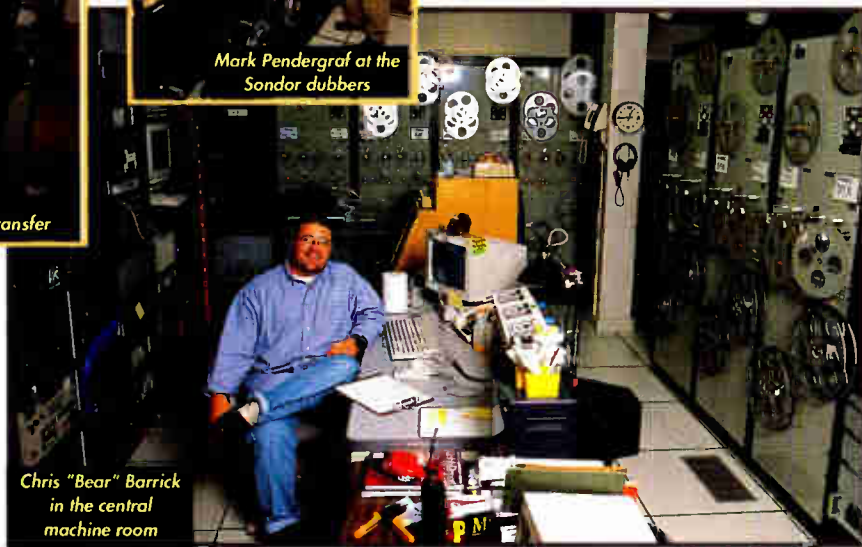


Mark Pendergraf at the Sendor dubbers



Jonathan Greber in dialog transfer

ALL PHOTOS: STEVE JENNINGS



Chris "Bear" Barrick in the central machine room

"was the ability to come to terms with all the material and try to articulate all the possible sounds that would create the sheer size and elegance of the ship before it hits the iceberg. It also gave us the time to approach the job [in the post-iceberg section] in less of a mechanical way. It's easy to do a mechanical job as compared to more of an emotional and psychological rendering of what's going on aboard the ship while it's sinking."

Of course, the later release also gave more time for the mix. Premixing began in early August and the final mix was finished in late October, in time for the world premiere at the Tokyo Film Festi-

val on November 1. The schedule might seem luxurious in today's film sound climate, but the length made it essentially two movies, and the complexity of the material (127 speaking parts, 4,000 principal loops, intricate water Foley, at least three big, protracted action scenes)

was daunting. By all accounts, it couldn't have been done without the stage setup on the new Mix A at Skywalker, which includes the 156-input AMS Neve Capricorn digital console pictured on last month's *Mix* cover, along with two Pro Tools systems for effects

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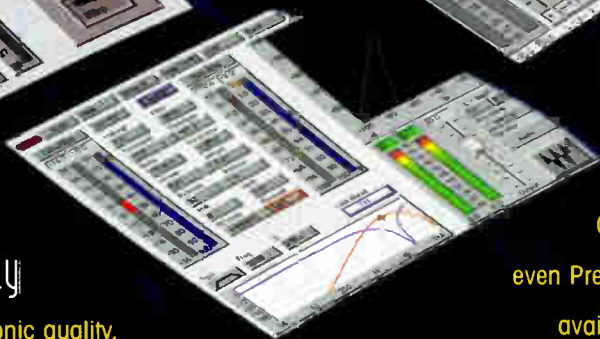
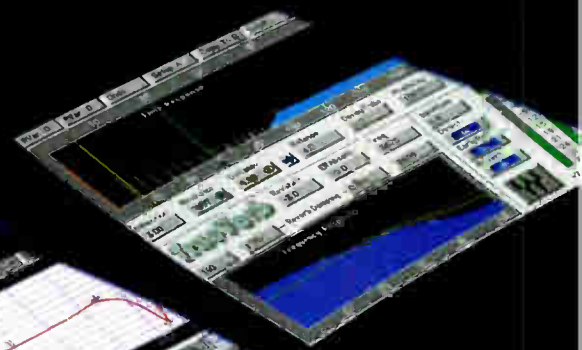
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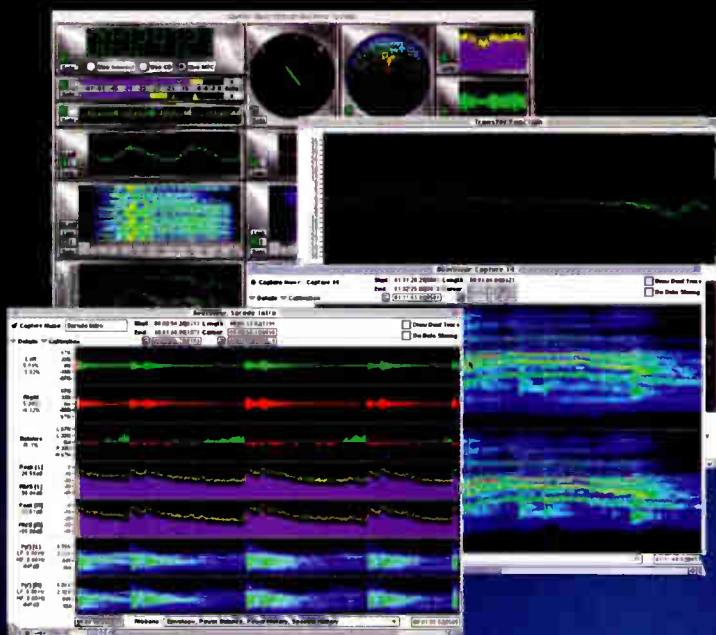
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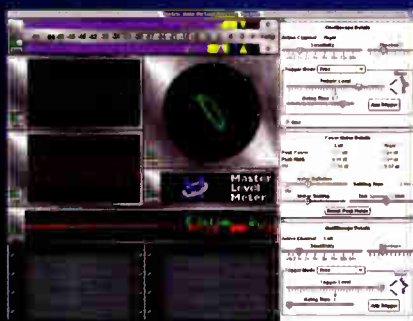
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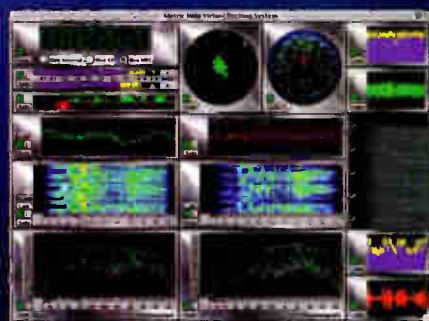
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CIRCLE #039 ON PRODUCT INFO CARD Radio History SEE US AT NAMIM @ Apple Computer Booth

fixes, two Studioframes for dialog and a Sonic Solutions system for music. Premixes and finals were recorded to Skywalker's Sordor mag machines with Dolby SR.

"With a digital, fully automated console, we were able to audition alternate effects that we premixed, and we could cut elements on the stage," says effects re-recording mixer Gary Rydstrom. "I could take those inputs to the board, and since it's fully auto-



Left: Sound Designer/Re-recording Mixer Christopher Boyes in his Chris Pelonis-designed sound design room, complete with 40-input Oram BEQ console, Pro Tools and Synclavier (monitoring through Tannoy AMS 10As). Top: DiCaprio and Winslet fight their way to the surface. Above: Director James Cameron talks with DiCaprio on the set.

PHOTO: STEVE DEJONGHUIS

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mated. I could pan it, EQ it, make it echo, and it sits right in. It's almost like being able to edit, premix and final mix at the same stage. So it gave us a lot of flexibility."

Working with Cameron demanded flexibility. He makes full use of the four outputs on his Avid system during the picture edit and creates a detailed temp mix (which was used at the first test screenings). The re-recording team would then solo those tracks before going into a reel to isolate Cameron's ideas. Sometimes he wanted the single effect from his temp, sometimes he wanted a different sound or more full-

ness. And because he was so involved with other aspects of the film at the time, there was really no way of knowing before he sat in for the final, at which point he would inevitably ask for changes.

"Jim [Cameron] is very good about pacing when he does his temps," says music re-recording mixer Gary Summers. "He is very conscious of where there's going to be effects only, where there's going to be music, the interplay of them, and how dense it is. When you say he likes effects big, well, he also likes music big, but he's very, very selective. I remember that from *Terminator*

THE TITANIC CREW

Titanic required a massive and incredibly detailed film sound job, involving editors in Los Angeles and Northern California, with the bulk of the work done at Skywalker Ranch in Marin County. Supervising sound editor Tom Bellfort says, "This is one of the few films where I feel that *every* member of the sound crew and *every* member of this facility did just an astounding job. And I think I've been on some fairly difficult jobs, but really nothing like this one." Here is that crew:

Re-recording Mixers:

Gary Rydstrom, Tom Johnson, Gary Summers, Christopher Boyes, Lora Hirschberg

Supervising Sound Editor:

Tom Bellfort

Sound Designer: Christopher Boyes

Assistant Sound Designer:

Shannon Mills

Sound Effects Editors: Ethan van der

Ryn, Scott Guitteau, Christopher Scarabosio

Supervising ADR Editor: Hugh Waddell

ADR Editors: Suzanne Fox, Harriet Fildow

Winn, Richard G. Corwin, Cindy Marty,

Lee Lamont

Dialogue Editors: Gwendolyn Yates

Whittle, Claire Sanfilippo, J.H. Arrufat,

Richard Quinn

Supervising Foley Editor: Thomas Small

Foley Editors: Scott Curtis, Tammy

Pearing, Dave Horton Jr.

Supervising Assistant Sound Editor:

Scott Koué

Supervising Assistant ADR Editor:

Jonathan Null

Assistant Sound Editors: Beau Borders,

Jessica Bellfort, Mary Works, Michael Axinn

Paramount Foley Mixer:

Randy K. Singer

Foley Artists: Sarah Monat, Robin Harlin

ADR Mixers: Dean Drabin, Brian Ruberg,

Tony Anscombe

Composer: James Horner

Scoring Engineer: Shawn Murphy

Supervising Music Editor: Jim Henrikson

Music Editor: Joe E. Rand

Recordists: Cary Stratton, Ann Hadsell,

Joan Chamberlain, Scott Jones,

Darren McQuade

Re-recordists:

Ronald C. Roumas, Scott Levy,

Al Nelson, Mark Pendergraft

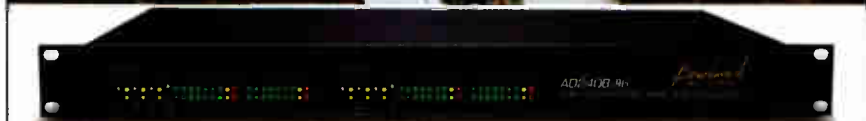
Machine Room Operators: David

Turner, Steve Romako, Christopher Barron

Mix Technicians: Gary A. Rizzo,

Tony Sereno, Sean England, Kent Sparling,

Jurgen Scharpf



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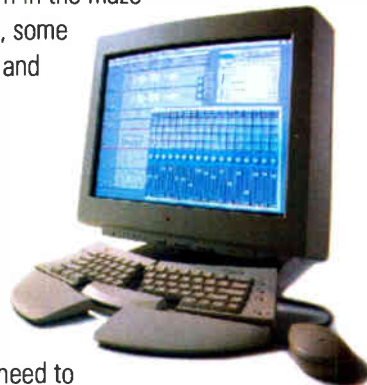
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SONIC SOLUTIONS

2—at any given moment, there's only certain things you're going to hear."

IN THE BEGINNING

When Bellfort, Rydstrom and sound designer Christopher Boyes flew down to Los Angeles in early March to see the film, it was really "a rough assembly of scenes," according to Rydstrom, and it clocked in at 5½ hours. The job seemed a bit overwhelming; the obvious place to start was field recording aboard ships.

Many of the water and ship recordings come from four sessions aboard the Liberty ship Jeremiah O'Brien, an old working vessel with roughly the same engine-type as the Titanic, docked in San Francisco Bay. The Jeremiah O'Brien actually had been used in filming for some interiors of the engine room, so Boyes thought it would be ideal to get the sound of the engine, which he knew would be crucial in selling the size of the ship and the drama of switching to full-reverse when the iceberg is hit. But as is usually the case, he says, "The real sound never really works." (For the curious, the basic building blocks of sound of the Titanic's engine, which was the biggest steam-driven device ever built, are a piston from a racing-engine block, a massive air compressor and a stamper machine, combined and played on a Synclavier.)



DiCaprio and Winslet on deck, where wind and water occupied much of the audio track

PHOTO: MERIE W. WILSON/EAGLE-OUTLINE PICTURES/GETTY IMAGES FOR FOX

The O'Brien sessions weren't a complete wash, however, as the recordists came back with plenty of metallic door closes, hatch openings, distant engine rumbles (which run throughout the film, to give the sense of movement), bells, clangs and the like. The O'Brien also was taken out into San Francisco Bay, so the sound team was also able to capture a tremendous variety of bow wash, mid-side wash, propeller wake, hull laps and other water movement sounds, which occupy much of the first 11 reels, before the collision with the iceberg. The O'Brien crew even threw the engines into full-reverse about 20 times, simulating the climactic moment, which provided a wealth of creaks, groans, distant rumbles, perspective shifts, and countless backgrounds used to re-create

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ping along at 23 knots. A huge engine is roaring away, and water is thundering past the hull. The sense is that you are moving fast and can't be stopped. Then deck officer Murdock spots the iceberg, issues the order to full-reverse with a turn, and sets up an intense audio drama, culminating in the lethal rip along the hull.

"Jim really wanted to tell the audience with audio how difficult it is to take this massive engine from full-speed forward to full-speed reverse," Boyes explains. "I found a recording from one of the cargo holds of the [Jeremiah O'Brien] during the ramp-down/ramp-up of the engine—not a straining, but sort of this steel moaning, crying sound. I started applying ramp-down square waves to it and came up with these sounds that feel like a tremendous amount of power winding down, then later winding up."

Boyes took that sound, along with the piston, compressor and stamper effects, but still wasn't getting the rhythm he wanted. "So Gary and I sat down and basically created a loop on the Synclavier keyboard that I was able to apply speed to," he says. "I could slow these four main sounds down so that they came apart and you could hear each of the sounds distinctly from one another, and then as we sped it up, they would sort of blend into each other and reach full syncopation. It felt like you had the throttle to the engine of the Titanic in your hand right here on the Synclavier."

Then the engine came to a two-beat "equipause," as Cameron called it, before the reversing lever is thrown and the ramp-up begins, setting up a thunderous, warbling torquing sound in the hull of the ship. In between are cuts back to the bridge, where things remain calm, underwater shots of the propeller churning, dampers being closed to cut down the fire and, always, the bow cruising toward the iceberg.

"I can't honestly say what raw elements went into the ship hitting the iceberg," Boyes admits. "Basically, I got out every powerful steel impact sound I had and came up with probably a combination of ten different sounds, explosive-type deep, echo-y impacts. Obviously, I wanted a deep cracking sound, too. I had recorded a bunch of footsteps on ice up in Yellowstone, and from that I made a very sharp, articulate ice-crack sound, which I combined with the metal impact to become the iceberg hit.

"But that's only the beginning of the

—CONTINUED ON PAGE 225



e

We've been listening to you

Handheld Vocal Microphones

by Loren Alldrin

**The
Real
Road
Warriors**

Anyone who's lived out of a duffel bag and a guitar case knows that life on the road is no picnic. But as bad as things can be for human performers, just consider what a vocal mic goes through: Show after show, someone bellows into it from point-blank range, swings it by its cable, spanks it against a cymbal or sends it crashing to the stage below. It has to deliver great sound through spit, lipstick, sweat, smoke, spilled drinks, drips, drops and the occasional downpour. Its only reward for yet another night of faithful service is being yanked off the stand, tossed in a box and bumped across the miles to the next tour stop.

Handheld vocal mics, I'd wager, are the *real* road warriors of live sound.

In the next few pages, we'll explore the cream of the crop in handheld vocal mics. These models are ready for the rigors of the road, designed from the ground up to deliver excellent sound from less-than-ideal conditions. All are low-impedance designs with balanced XLR outputs, for driving through long snake lines without a loss in sound quality. All offer a pop filter, internal





AKG C5900



Audix OM-7



Shure Beta 87



Electro-Voice N/D967



Sennheiser MD 425



Neumann KM5 150



Peavey PVM 880



Beyer Dynamic M88



CAD 95NI



Samson QMIC

shock mounting and rugged cases and grilles.

If you're in the market for a top-notch handheld vocal mic to carry your voice to the masses, you've come to the right place.

DYNAMIC MICROPHONES

The handheld dynamic has been the workhorse of live sound from the very beginning, and for good reason—there's nothing more rugged and robust than a dynamic element. Night after night, dynamic mics deliver the goods in countless venues across the world. The dynamic mic: no frills, no fuss and no worries about phantom power or humidity-caused eccentricities of condenser designs.

The D3900 (\$308) from **AKG's** Tri-Power line offers a super-high-output capsule design with rare-earth alloy magnet, Moving Magnet Suspension system for reduced handling noise and integrated hum-suppressing coil. The D3900 boasts a vocal-contoured frequency response with bass roll-off and treble boost switches.

Audio-Technica's top-of-the-line dynamic handheld mic is the ATM61HE (\$270). A Hi-Energy neodymium magnet structure, low-mass voice coil and dual-dome diaphragm deliver high sensitivity and extended frequency response. Patented floating diaphragm and double-isolated element housing reduce handling noise. The hypercar-

dioid ATM61HE offers a rising treble response for improved intelligibility.

As its competitors move toward neodymium magnet technology, the **Audix** OM-6 (\$349) and OM-7 (\$359) dynamic handheld mics employ Audix's patented Very Low Mass (VLM) diaphragm for a clear, open sound. Both mics offer hypercardioid pickup patterns for maximum gain before feedback. The OM-6 offers very high output levels, while the OM-7 uses a transformerless design with lower sensitivity for high-SPL applications.

The **Benson Audio Labs** ND90 (\$350) is a handheld dynamic mic with a hypercardioid pickup pattern. A mylar diaphragm, copper-clad aluminum voice coil and neodymium magnet structure deliver extended frequency response and high sensitivity. An internal shock-mount system minimizes handling noise, while the ND90's die-cast metal body and scratch-resistant finish help to withstand road hazards.

A classic design dating back several decades, the M88 from **Beyerdynamic** (\$399) is a handheld dynamic with a hypercardioid pickup pattern. An integral humbucking filter can cut noise from motors and lights by as much as 20 dB. Extended low-frequency response makes the M88 popular for such applications as kick drum and bass guitar, as well as vocals. The TG-X60 (\$399) is a hypercardioid dynamic with a frequency response especially tailored for vocal applications. A structure-borne noise attenuator reduces handheld noise, while a humbucking coil helps eliminate unwanted hum. The TG-X61, a switched version, is \$409.

The CAD90 (\$209) from **Conneaut Audio Devices** is a handheld dynamic mic with cardioid pickup pattern and rising treble response. Patented INR (Impact Noise Rejection) internal shock-mount system reduces mechanical noise, while the CAD90's multistage wind filter minimizes breath and wind noises. A Flex-Form grille greatly reduces dents and protects from physical damage.

The **Electro-Voice** N/D967, (formerly designated as the N/D957) is a supercardioid dynamic mic that offers high gain before feedback and a frequency response tailored for live vocal use. The N/D967's Personality switch engages a rising presence response for crisp, close-miked vocals. Patented AcoustiDYM shock-mount system controls handling and stage noise, while a two-stage pop filter reduces breath noise. A washable grille screen makes cleanup easy. List price: \$382.



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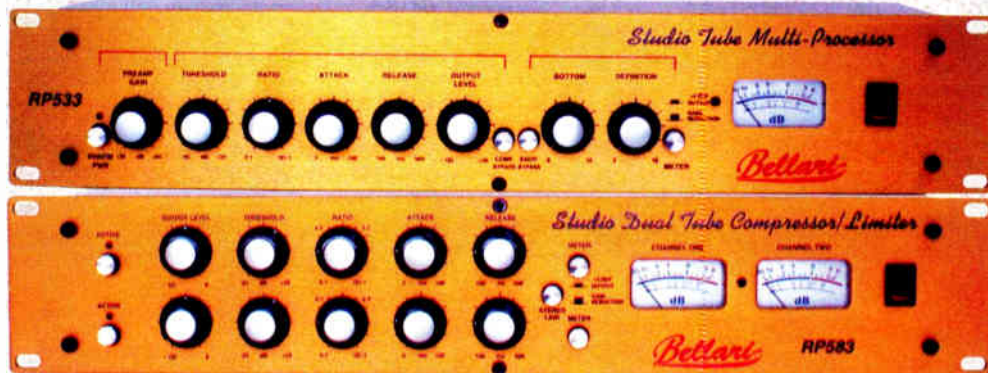
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At the top of **Peavey's** "Diamond Series" line sit the PVM 835 and PVM 880. Both dynamic mics utilize an ultra-stiff, diamond-coated diaphragm for improved high-frequency response and clarity. The 880 offers a hypercardioid pattern, while the 835 boasts a cardioid pickup pattern with minimal low-frequency emphasis due to proximity effect. The mics (both priced at \$350) use neodymium magnet assemblies, integral pop filters and electro-mechanical shock-mount system.

Samson's QMIC (\$200) offers a neodymium magnet structure, light-weight humbucking voice coil and multistage windscreen. The QMIC's shock-mounted element reduces handling noise, while its sibilance filter helps tame excessive high-frequency sibilance. The Q2 (\$175) offers similar features to the QMIC, with the addition of a switchable 10dB pad for high-SPL sources and switchable low-frequency filter to eliminate stage rumble. Both the hypercardioid QMIC and the cardioid Q2 boast gold-plated XLR connectors.

Sennheiser's MD-425 dynamic vocal mic (\$350) is a supercardioid design offering effective resistance to han-

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dling noise and feedback. The MD-425's striking blue body has a silent reed-style on/off switch that locks to prevent accidental movement. Also at the top of Sennheiser's dynamic mic line is the MD-431 II (\$495), which offers improved feedback and handling noise rejection, as well as a hum-compensating coil for reduction of low-frequency electromagnetic noises. Like the MD-425, the MD-431 II has a locking on-off switch and integral pop filter.

For decades, the **Shure** SM58 has been the most-used dynamic vocal mic in the world of live sound. Shure's Beta 58A breathes new life into this ubiquitous workhorse with a new capsule design, supercardioid pickup pattern and improved internal shock-mount. The redesigned Shure Beta 58A (\$333) offers a smoother sound and extended high-frequency response compared to the original SM58.

Sony's top-of-the-line F-780 dynamic vocal mic (\$350) is a unidirectional design with an Alnico magnet for a flux density even greater than that of neodymium. Copper-clad aluminum wire wound edgewise makes for a lightweight, rigid assembly. A urethane-coated body and internal shock-mount

reduce handling noise.

The LD50 and LD23 from **Stedman** both offer large-diaphragm dynamic elements with supercardioid pickup patterns and slightly rising presence responses. The LD50 is designed for instruments, percussion and speaker cabinets, while the LD23 is best-suited for vocal applications thanks to its internal wind filter. Both mics have a list price of \$139.

CONDENSER MICROPHONES

Once thought to be too fragile for live sound, condenser mics have begun stealing the spotlight in ever-increasing numbers. In recent years, manufacturers have found ways to make the condenser's ultrathin diaphragm more rugged and less susceptible to shocks, breath noise and environmental extremes. The result is a handheld mic that offers the clear, open sound of the studio condenser with the ruggedness of a dynamic design. As many performers are discovering, the handheld condenser can truly be the best of both worlds.

At the top of **AKG's** Tri-Power line is the C5900, a hypercardioid electret element with gold-sputtered diaphragm and internal three-point shock-mount

system. The C5900 (\$580) offers two bass roll-off settings for minimizing handling noise and controlling proximity effect. Also from AKG is the C535 EB, a handheld electret condenser with a cardioid pickup pattern and integral four-position sensitivity/bass roll-off switch. Suitable for both stage and studio use, the C535 EB's list price was recently lowered to \$322.

Audio-Technica's new (\$499) flagship hand-held true condenser mics use a capsule design based on that of its popular 40 Series studio models. Slated for unveiling at this month's NAMM show in Los Angeles, the 4055 (and 4054, a similar model with less LF response) boast a large gold-sputtered diaphragm just two microns thick, cardioid pickup pattern, internal shock-mount and two-stage pop screen. The ATM89R (\$325) is an electret condenser with hypercardioid pickup pattern, low-mass capsule design, and multilevel pop screen. The ATM89R can be fitted with cardioid, subcardioid and omnidirectional elements.

Conneaut Audio Devices' top hand-held condenser is the CAD95, a cardioid mic with electret element, transformerless electronics and broad,

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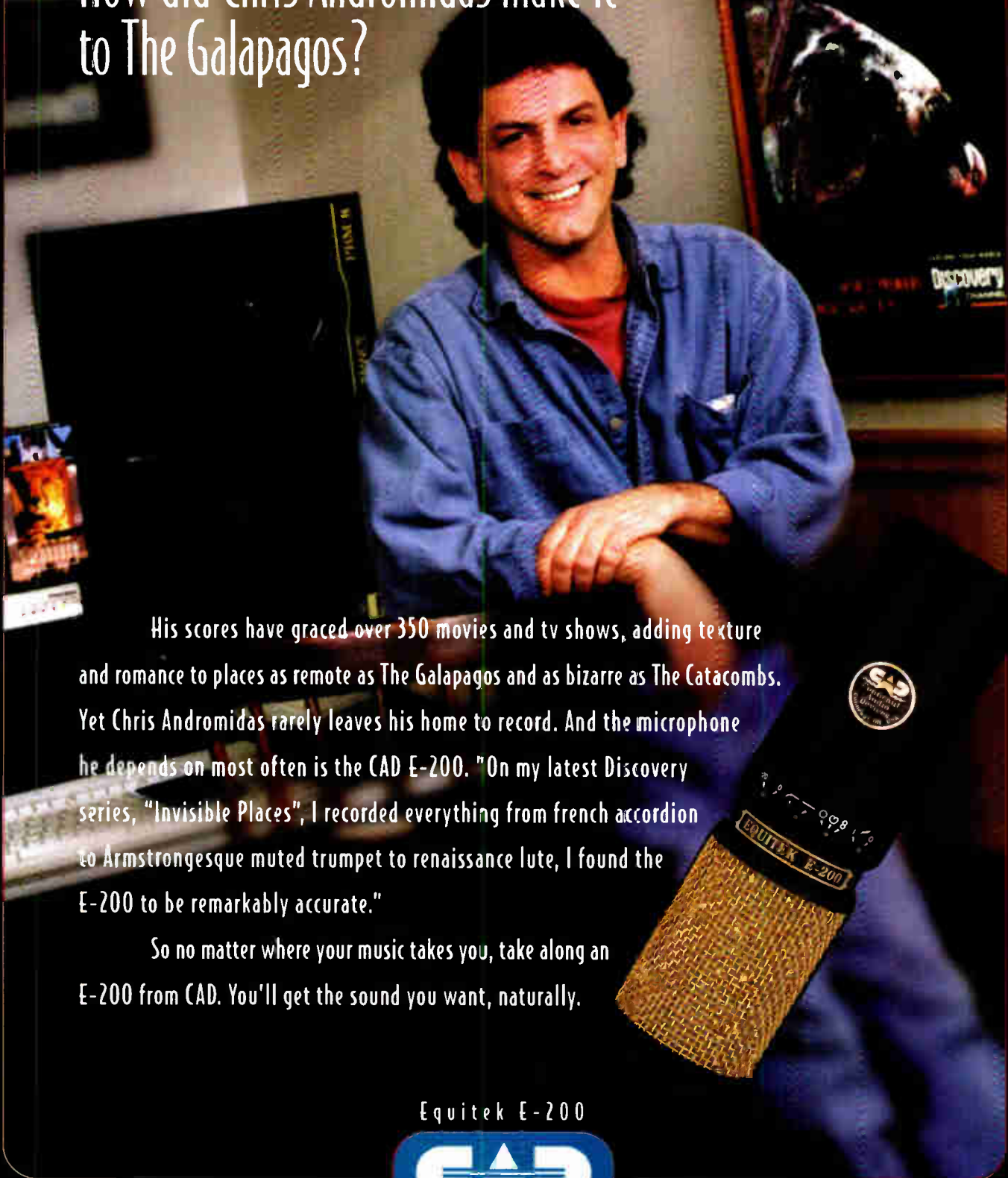
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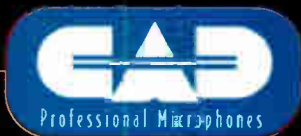
How did Chris Andromidas make it to The Galapagos?



His scores have graced over 350 movies and tv shows, adding texture and romance to places as remote as The Galapagos and as bizarre as The Catacombs. Yet Chris Andromidas rarely leaves his home to record. And the microphone he depends on most often is the CAD E-200. "On my latest Discovery series, "Invisible Places", I recorded everything from french accordion to Armstrongesque muted trumpet to renaissance lute, I found the E-200 to be remarkably accurate."

So no matter where your music takes you, take along an E-200 from CAD. You'll get the sound you want, naturally.

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extended high-frequency response. A Flex-Form hardened steel grille absorbs abuse without damage, while the patented Impact Noise Rejection (INR) system reduces mechanical noises. The CAD95 has a list price of \$239.

The CM-310a and CM-200a handheld electret condensers are proof that **Crown** makes more than just PZM and SASS microphones. The top-of-the-line CM-310a (\$269) uses Crown's patented Differoid technology to cancel sounds not originating from close to the mic. Coupled with a cardioid pickup pattern, this technology reportedly gives the CM-310a the best gain-before-feedback performance of any vocal mic. The CM-310a also offers integrated pop filter, mechanical noise suppression and switch-selectable flat or "rising" responses. The CM-200a (\$239) offers a traditional cardioid capsule, multistage pop filter and presence boost for added intelligibility.

Electro-Voice's top handheld condenser is the RE500 (\$375), boasting a gold-sputtered, true-condenser element based on that of the RE2000 studio microphone. The RE500 combines a three-stage acoustic pop filter, low-cut electronic filter and shock-mounted transducer to minimize breath and handling noises. The mic's rising presence response gives it a crisp, articulate sound, while its cardioid pattern gives performers a wide "sweet spot."

Though you may not immediately think of **Neumann** when considering live vocal mics, the German manufacturer's line offers a pair of handheld condensers well-suited to the discriminating performer. The KMS 140 and KMS 150 are based on the KM 100 small-diaphragm true condenser element; enhancements for live use include a three-stage wire mesh pop filter, mechanical vibration filter and low-frequency response tailored for up-close miking. The cardioid KMS 140 and the hypercardioid KMS 150 (both \$1,495) offer a switchable 10dB pad and bass roll-off filter.

Shure's Beta 87 is an electret condenser mic with a uniform supercardioid pickup pattern and extended high-frequency response. Internal shock-mounting reduces handling noise and stage rumble, while the hardened steel grille makes it a rugged performer. The Beta 87 has a list price of \$542. ■

Loren Alldrin is a Nashville-based producer and writer and is author of The Home Studio Guide to Microphones, a new release from MixBooks.

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We've heard what you said.



evolution

TOM LORD-ALGE

MIXER WITH THE MIDAS TOUCH

He's part of that small, elite group who have earned the title superstar engineer: a two-time Grammy winner for Best Engineered Album with a passionate nature, a rowdy sense of humor, a forthright approach and a natural instinct for radio hits. Ensnared in the studio day in and day out for almost 15 years now, he still doesn't like to take vacations. There's no two ways about it, folks, Tom Lord-Alge was born to mix. The week that we met for this interview, he was credited as mixer on the bulk of seven albums in The Billboard



Lord-Alge at the SSL 4000G in Encore's Studio A



200—in the Top 40 alone, he had triple-platinum with The Wallflowers' *Bringing Down the Horse* and Dave Matthews Band's *Crash*; and Platinum for Hanson's *Middle of Nowhere* and The Verve Pipe's *Villains*. Also on that week's Billboard 200 were the bands Korn and Third Eye Blind, for whom he'd mixed

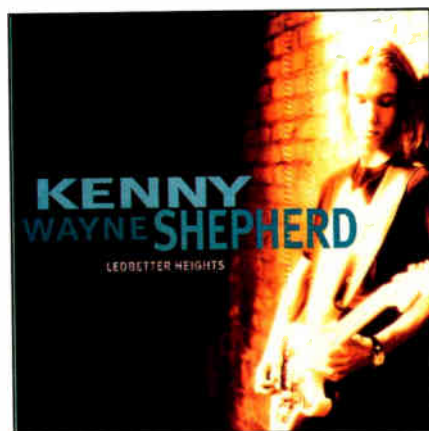
singles, and the *Batman and Robin* soundtrack, which contained several Lord-Alge-mixed tracks.

Originally a Jersey boy, these days Lord-Alge divides his time between Miami, where he works at South Beach Studios, and Los Angeles. I found him at his usual L.A. haunt, Burbank's Encore Studios, where he'd just finished some songs for the Rolling Stones and was setting up a mix for the Danny Saber-produced Black Grape project.

Let's go back to the beginning. How did you get into the business? I started in live sound when I was 16. Actually, I was working with my brother Chris' band—he was the drummer, and I did the lights. One night the sound man got sick; I knew how to run the equipment, so I filled in. The crowd kept telling the band how good it sounded, so they asked me to continue, and I did. When Chris got a job at H&L Studios in New Jersey, I continued to do live sound for the next four years. During that time, Chris' career was taking off—he left H&L and went to be a staff

engineer at Unique Recording—and he was bugging me to come and work in the studio. Finally, I got tired of mixing live, and New Year's Eve, in '83, I quit. Four days later, I started at Unique.

I assisted for a few weeks, mainly on Chris' sessions. And he



was relentless. He would throw me right in—"When you're in the room, watch what I'm doing; I might stand up and leave at any moment, and you'll have to take over." That was my first lesson: that as an assistant I had to be on top of everything. I needed to know exactly what was going on

BY MAUREEN DRONEY

It took this man a decade to find his next reference monitor.



"I've been after this type of clarity for over ten years."

—Elliot Scheiner
(producer, engineer extraordinaire)

How long will it take you?

After over a decade of commercially successful and critically acclaimed work, changing an important part of your formula wouldn't seem rational. Unless you had very good reason. And Elliot's reasoning may be familiar to you. "Although I trusted the monitors I had been using on every project, including six Grammy nominated albums, I didn't particularly like their sound. I was always looking for something I could trust but smoother- easier to listen to and especially louder."

Then he listened to his work on a pair of Exposé E8s. Now he's using them exclusively on his current projects, the next releases from Steely Dan, Fleetwood Mac, John Fogerty and Toto. "The moment I heard the first sounds come out I knew these were right." What he means is the exceptional accuracy and ultra-low distortion Exposé offers to track and mix with confidence. With the smoothness and musicality that would otherwise make long sessions difficult.

With the advances in digital recording, power and punch are no longer an option, they're a requirement. And Exposé goes louder and lower than your alternatives. As Elliot puts it, "Some of the other high-end, powered monitors sound 'pretty' but I can't use them because they won't play loud enough and they lack the low-end for most of the material I work on."

He was also impressed by the expanse and depth of the stereo image they create. Elliot says, "I don't know how they do it, only that they seem to do it better than anyone else. Very, very clear. Everything is distinctly audible and natural. It's pretty amazing how they open up a mix."

So should you go out and buy a pair of Exposés today just because Elliot Scheiner uses them exclusively? No, but you owe it to your next project to run down to the nearest KRK dealer and get a demo for many of the same reasons.

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World Radio History

MIX MASTERS

every moment of the day so that I could either help him or take over. Then, in the middle of vocals or something, he'd just leave and I'd take over. It was scary at first, but once I got the hang of it, I was ready.

It's hard to imagine you being scared. Well, the confidence comes with the amount of time I've been doing this. Starting off is very intimidating for anybody—you want to make sure that everything gets on tape okay. And you're in charge of keeping things rolling. You're the vibemaster, you have to keep everybody in good spirits. If you have a problem, if there's an equipment failure, nobody needs to know about it. You just move on and keep everybody happy because you're trying to get performances. Bad vibes are so contagious that if you have a problem it's going to affect everything. I've always believed that great sounds encourage better performance, while mediocre sounds result in mediocre performance. If you get musicians going with killer sounds, they're going to play that much better because they're so stoked.

So you didn't serve the usual assistant tenure.

No, I guess I pissed all the assistants off at Unique. But I was never hired as an assistant, and I pretty much stepped to the front of the line and started taking Chris' overflow—he'd be mixing in one room, and I'd be overdubbing in the other. Eventually, I got my own clients or the studio would book me. I sup-

**I generally start with
the drums and the bass
because,
aside from the vocal,
that's what the song
is centered on.**

pose at that time I was really riding on Chris' name, on his coattails. I was very fortunate.

You and SSL were almost synonymous at that time.

Yeah, Chris and I were SSL advocates,



really, we worked on nothing else. And it still is the case today. I use SSL because it's something that I learned on very early, and I've just gotten used to it. I love the way that it sounds, and I'm so comfortable on it that it's an extension of myself. And I'm quick on it. I've mixed on Neves; it's a wonderful sound, but I never feel as fluid on them as I do on the SSL—after all, I've been working on SSL now for 13 years. Every day. Of course, now I've incorporated a lot of other pieces of equipment—old Neve compressors and EQs, a varied array of outboard. But in the early days, I just used SSL for everything—compression, EQ...



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It Takes A Lot To Impress Martin

As Technical Director of PA Plus in Toronto, it's Martin Van Djik's responsibility to scrutinize everything. When he was finished putting the new PX Series amps through his tests, this is what he had to say:

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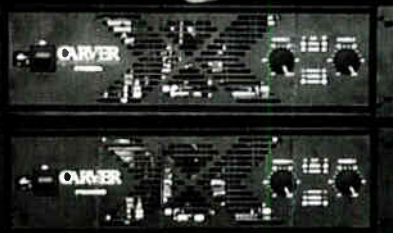
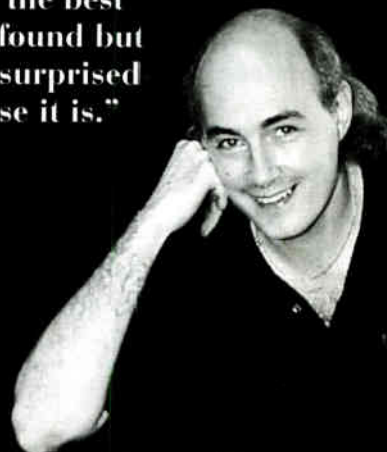
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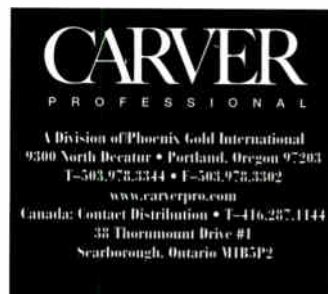
"It's not the best amp I've found but you'd be surprised how close it is."



"The tour's been great, but sometimes it's a bit of a *Power Struggle*" between two Nashville pros

Doug and Ralph were friends until Ralph stopped letting Doug play with his Carver Professional PM700. Only one solution – Doug got his own PM950.

Doug Kahan (left) bass player with David Lee Murphy and Ralph Friedrichsen (right) bass player with Jo Dee Messina backstage on last years "Brooks and Dunn" tour. Doug is currently touring with Anita Cochran. Ralph is currently touring with Jo Dee Messina on the "Fruit of the Loom" tour.



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World Radio History

MIX MASTERS

Do you have any electronics background? You seem to have an affinity for figuring boxes out; you are, you know, the only engineer I ever met who could really make a Publison work.

[Laughs] I just sit down and press all the buttons and figure it out.

You enjoy doing that.

Absolutely. For day-to-day operations, you should never have to look at a manual. I have no technical background, and my education on how this console works is limited. I know it from years and years of working on it, but when I started, I didn't know about signal path or transformers or whatever. I can't tell you how a digital tape machine works—I don't know. All I know is that it allows me to do what I want, to manipulate the audio. I know what the equipment does; I can't tell you why it works. In mixing, it's more important to be creative than to think technically. When I mix, I'm listening to the song—what suits the song, what helps the song come across.

So when you sit down to mix, what are you thinking?

[Pause] Am I going to get it to sound good? I go through a wide range of emotions, from desperation to euphoria and everything in between. I go through points of the day when it's, "Am I ever going to get this to sound the way I want it?" and I go through points where

to sound. I'm drawing a rough sketch; I want the drums, the guitars to sound a certain way, and I'll do that all in the first pass or two of just listening. The hard part is getting to that picture that I've painted in my mind. That's what takes the amount of time.

But you know where you're going.

I have a basic direction. Now, sometimes along the way I'll take a huge left turn. Whether it's for better or worse, sometimes I feel the need to explore, and a lot of times it turns out to be something really cool.

When you pull the faders back down again, what do you start with?

I generally start with the drums and the bass because, aside from the vocal, that's what the song is centered on. Everybody is playing to the drums and bass, and they need to be very strong. And as I do the mix and go through all the other instruments, I constantly go back to the drums and the bass and make appropriate changes. As I put in the guitars or other things, maybe I've made the drum set too big, and I need to go back and hone it down a little bit, or maybe just the opposite. Maybe I've made it too small and it needs to come out more.

**I don't think
the Grammy police
are going to come
and take
my Grammys away
because I used
three compressors
on a lead vocal.**

it's, "Yeah, I'm bad, I nailed it." That's a great feeling. But generally, when I begin a mix, I put the tape on and just throw the faders up. And in that first listen, I'm picturing how I want everything

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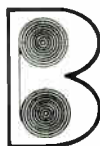


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Our customers' comments

"Ghost is Killer! Classic fat British EQ like you've always dreamed of. And the faders are awesome...the taper on them is as smooth as anything I've ever used. Incredible. Ghost has just about everything I look for in a quality console; great tone....great feel...looks...even the name! I'd swear you custom made this for me. I could not have picked a better console for sound, features and feel."

Geno Porfido, Boulevard Recording Co. New Milford, NJ

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

Johnathan Moffett, Drummer with Michael Jackson and Madonna

"After the first mix I did, I realised I was in a whole new league. This thing sounds beautiful. Very silky in the high end and full in the lows. The EQ is totally cool and the board has a quality feel to it. I know of nothing that touches it in its price range and I have been recommending Ghost for months to anybody who's looking for a console."

Garth Webber, Red Rooster Studio, Berkeley CA

"I've worked on many competing 8 bus consoles and none can compare to the Ghost in features, ergonomics and, most importantly, sound. The Ghost, simply put, sounds warm and musical - you don't have to work hard to get great sounding mixes on this board. The EQ is very flexible and we compared the mic preamps (using a Neumann U-47) to the Neve 1066s in our studio. We were very surprised at how favourably they compared to these megabuck classics."

Peter Thorn, What If? Productions.



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Do you mix fast?

Yeah, I run the tape at full varispeed. [Laughs]

Like a song a day?

We always book a song a day. Sometimes I do two songs a day, sometimes three. I've done four or five songs a day. It depends on the artist and the tapes. Nowadays, with the more band-oriented music I've been working on, I can get two songs a day if the tracks are together and clean and ready to go. Cleaning up, or making a lot of decisions during the mix, that's what takes time. If it's just drums, bass, guitar and vocals and it's all arranged, and everybody's comfortable with the performances, I can usually do two in a day. Generally, of course, the first mix is the longest—you're acclimating yourself to the band and everybody's personalities—but once you get a couple under your belt, they go rather quickly. There's no set time. I don't think anybody gets upset if I do a mix in two hours, because a mix doesn't leave my hands unless it's of the caliber that I want. So, whether its two hours or ten hours, or 20 hours...

Your mixes never sound labored over.

I don't want somebody to hear the song and listen to the mix. I want somebody to hear the song and the performance and the band. I don't want them to say, "There's Tom Lord-Alge written all over that." I want what I do to be transpar-

ent. That's part of getting a great mix—the listener just says, "Wow, that sounds really good!" They don't know who mixed it. When you start getting into production tricks and everything going through the whiz-bang box, all of a sudden it sounds like the mixer was trying to be the star. I really want the song to shine—that's the most important thing to me.

Do you re-record tracks?

Most of the tapes I get in are analog, and I'll transfer them to the Sony 3348, for two reasons. I don't want to lock up two analog tapes; it's too time consuming, it'll add hours to my mix. Second, it allows me to make a copy of their tape and to manipulate their tape—an example being if I need to move some vocals around, or if a guitar part is a little early or late. It also gives me creative freedom that I wouldn't have if I was working on analog tapes, because if I want to sample something when I'm working off analog, I've got to get the Pro Tools out, or I've got to get an H3000 or an AMS DDL to sample stuff, and I've got to get it set up for unity gain.

So you use the 3348's internal sampler.

Yes. And by transferring to the 3348, I haven't bastardized their tape—their original tape is the way they gave it to me. I don't have to worry about them going, "You know what, we liked it better the other way." I like the creative freedom to have my way, so to speak, with my clients' tapes. And I do that on

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MIX MASTERS

most every project, even if it's the simplest little thing. If I move one vocal and make the song better, it's well worth using. For example, on a song by Dave Matthews Band called "Too Much," Peter Robinson and Bruce Flohr, Dave's A&R guys from RCA, were concerned about the lack of vocals on the end of the song. They thought we should have Dave come in and sing. I said, "No problem, just leave me with the tape a little while," and I made an ending vocal section, sampling bits and pieces of the vocal from earlier in the song. Peter and Bruce heard it and loved it—they thought Dave had come in and sung it. Dave also loved it. That's a perfect example, because if I was mixing off the analog tapes, I never would have done it—it's too time-consuming and tedious, whereas with the Sony, it's just zip-clip-clip, done. The machine is very user-friendly; it's the ultimate production tool.

Do you mix alone?

It's different all the time. I always prefer to have the bands or the artist or producer with me. It's how I grow as a mixer, by getting direction from them. They may make a suggestion that I'd never think of, and a lot of times it's good and I'll use it in my next project. My mixing style is constantly changing. I steal little bits and pieces and blend them through me and bring that to my next project. That's why an album I mixed a year ago doesn't sound like an album I'm mixing today.

Do you listen to the mix at home or in the car?

No, I don't take it home, and yes, I do listen in the car. In the studio I listen on my NS-10s and my little boombox. I actually have the boombox placed in the back of the room, from a distance, as if I were sitting in an office listening to music. It's not right in front of me, because I listen to speakers that are right in front of me all day. I want that other perspective that most people have when they listen to music. When I mix on the boombox, I'm just mixing for balance. I really don't do any EQ on it. Once I've gotten all the instruments up, then I'll shut the monitors off and listen to the boombox for vocal levels and guitar cues, whatever. I do probably 40 percent of my balancing on the boombox.

How do you mix for radio?

I can't say I do anything in particular for it; my preferences just happen to work for the radio. I make the things that are important and sell the song loud, and I

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MIX MASTERS

make the stuff that distracts low, or I get rid of it. I like the "less-is-more" theory because it leaves more space for the vocal and melody lines; those are what translate well on the radio.

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What favorite compressors might you use on drums?

I have a setup I like to start with: a 2264X Neve, out of the old Neve console, on the snare drum; for the bass drum, depending on the condition of it, I'll use the SSL compressor, or I might have to get a little more creative. It all depends on the recording. On cymbal overheads, nine times out of ten I'll just use the SSL compression, but very lightly, and then, depending on if I want to make it sound spanked silly, I'll work on the room, because the rooms are something that I'll often just obliterate. It varies so much for each song, but that would generally be my starting setup.

What's in your arsenal today?

Neve 2264Xs, Neve 3226-4As, UREI LA3As, two sets of Calrec limiters, CL1170s—they work really well on drum rooms and guitars—and a set of Calrec ECL1204s, which I use on vocals, again, if I want something to be pummeled. Neve 2254s, which I like for guitars and vocals, and then I have these tube VacRac limiters that are great on vocals and guitars, as well. I love them; I had the gentleman who builds the VacRacs make me a custom, stand-alone stereo unit.

How about EQs?

I use the SSL and the Neve Prism rack, which is the V Series EQs in a little box. That's really all; occasionally I'll put a Pultec in. It's all so subjective, but my theory on equalization is that there's a reason the EQ goes to 10. There are so many engineers that are timid with EQ. It's not a bad thing. I'm not afraid to turn the EQ up all the way, and if there's not enough EQ, I'm not afraid to patch into another channel and add more. I do it all the time. If I get a drum set that's not recorded well, I'll actually patch a set of EQs from the tape machine into the line input to have a rough EQ before it even comes into the console. Because I'll need that much. There are no rules. If you have to patch a few EQs in to make it sound good, then great. I also have no problem with patching two or three compressors in—I do it all the time on vocals. I just did a project where I used

three compressors on the lead vocal.

All on separate faders?

No, I just daisy-chained them. I had one patched up from the tape output to the line input—before it even came into the console I was spankin' it. Then I had one on the insert of the console, EQ'ing into it, and the third, which was the SSL compressor that I'd use for a finishing compressor, just for a little more spank. It made that vocal just stand right up. It was unusual for me to do that, but the effect was amazing. The vocal became so prominent and pronounced, which, you must have. Now, in some recordings where I have to add a lot of EQ,

I'll get a hiss problem, so I'll spend the time to go through with the Sony machine erasing between the vocals—erasing the tape hiss. Very meticulous work.

Rather than using gates?

Yes, because I can program my punch-ins and outs on the Sony and get it exact—you don't hear any hiss, but the vocal comes right on and you don't miss any of the performance. And sometimes, if I'm doing a lot, like on the project where I used three compressors on the lead vocal, I'll take that processed sound and transfer it to another track on the Sony, just so I have it

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MIX MASTERS

on tape in case I ever have to come back and do the mix again. I'll transfer the EQ'd, compressed sound to another track of the tape, and that's what I'll use in the mix. Of course, sometimes, then I'll add even more—I might need a little more EQ or something. I don't think the Grammy police are going to come and take my Grammys away because I used three compressors on a lead vocal. I know a lot of audio purists who would frown on it, but when people heard it, the first thing everybody said was, "That vocal

sounds amazing." So I'm never afraid to experiment.

You're mixing to half-inch?

Ampex 499, 30 ips, no Dolby, plus 6 over 185, and generally it's just on the verge of being pinned. I also print my mixes to the digital multitrack and to a DAT. I print my final mix to two channels of the digital multitrack, and I also print an instrumental on two channels of the digital multitrack. The reason being, say, they love the mix but they want to add a new part. I don't have to recall the mix, I can just throw up two faders and put in the new part and we're done. Or say they want to re-sing

the song. We have an instrumental on tape, so re-sing the song, put up two tracks of the instrumental and add the vocal—it's saved me a lot of times. Recalls are fine, they come back 90 percent, but I miss the subtleties of my original mix. That's why I print it.

Might you master using the DAT instead of the half-inch for some songs?

The only time I would use the DATs would be on songs that stop hard, because of the print-through on the analog tape. And usually we would just edit in that last beat.

Some project-specific questions, if you don't mind. Was Bringing Down the Horse an easy record to mix?

It was a lot of fun; they gave me a lot of creative freedom. They had some great performances on tape, and they allowed me to pick through what I thought were the best and to create arrangements. They were very supportive, and Jakob was just fantastic to work with.

On "One Headlight" it seems like it would've been hard to get the bass part defined enough.

I probably just spanked it silly. I love "One Headlight." In my opinion, it's one of the best mixes I've done, and it was so great to have it be a single and a hit, because I have favorite mixes on every record, and generally my favorite mix doesn't become the single—it just happens that way.

I think that's one of those universal mixer experiences.

But on that album, "One Headlight" was my favorite mix. Sonically, I did everything I wanted to do. The only other time it happened was with "Lakin's Juice" on the Live album.

Awesome intro on that song; I wanted to ask you about it.

There's an interesting story on that intro. Originally, it had the full band playing. They loved it, and I thought it sounded good and I did the mix that way. We printed the mixes, and when everything was done, I said, "Let me just screw around with something for 20 minutes, because I hear something in my head." And I shut off all the instruments except for the guitar.

Was the guitar stereo on tape?

It was just mono. I put it through an effect that I really like to make it stereo.

You're not going to tell me are you?

No. I put it through an effect that I really like and it created this imaging that was amazing. It was the only guitar that played in the song, and I had a hard time with it being in the center of the mix—the center got real clogged up be-

—CONTINUED ON PAGE 235

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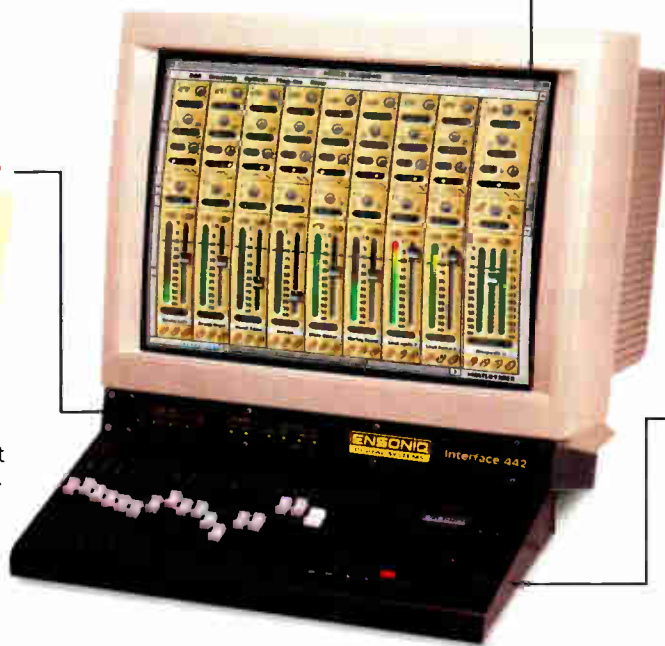
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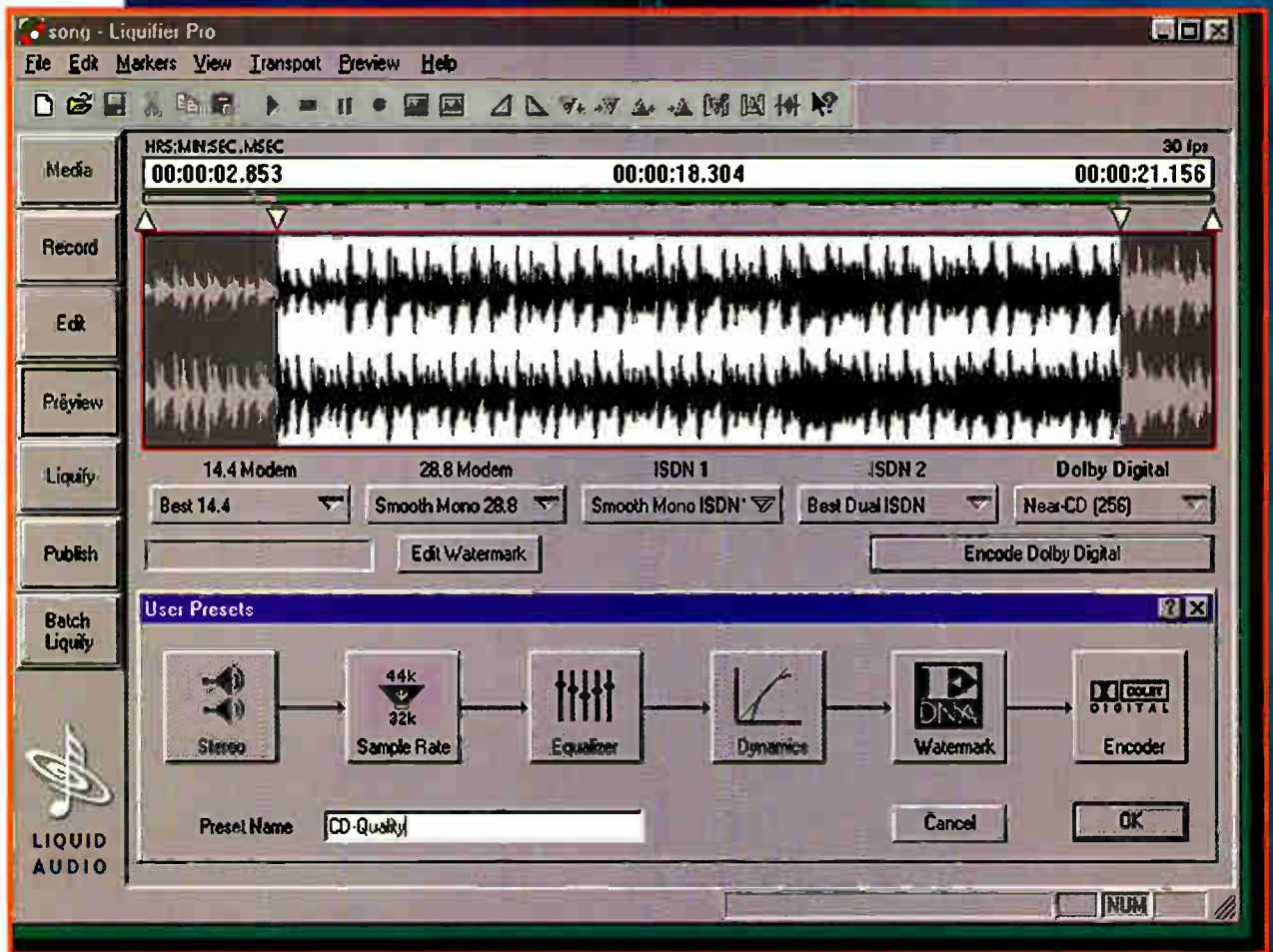
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Liquid Audio



Liquifier Pro is a professional Internet audio mastering tool, featuring powerful DSP and Dolby Digital encoding tools; shown, Preview page.

Taking Music Delivery To the Next Level

The World Wide Web has the potential to become a great marketing tool for the record industry. The Internet opens up new avenues for exposing consumers to music they might never hear on radio, and gives them the chance to track down recordings—either back-catalog or out-of-the-mainstream genres—that they cannot easily find at local record stores. But despite the industry's embrace of the Web for its promotional and sales possibilities, the basic paradigm of music delivery remains unchanged since the days of Edison: The record companies manufacture a physical object—a "sound carrier"—that is packaged, warehoused and shipped, and eventually makes its way into the hands of the consumer.

With Internet access commonplace (though by no means universal) in American homes, a real possibility now exists for alternative models of music distribution. Digital audio, after all, is just data, and music data travels down phone lines just like text and graphics. So why shouldn't consumers simply download their music over the Internet? At first glance, it all makes perfect sense: It's cheaper for the record companies and more convenient for the consumer.

Lurking just beneath the surface of Internet audio delivery, however, are potential pitfalls and obstacles that raise questions as to its practicality. For example, how will the record companies and other rights holders be sure that they will get paid, and that their music will not be pirated? Will the companies, artists and songwriters want buyers to be able to choose—and pay for—only the songs they already know and like, rather than buying whole albums? How will consumers play the music once it is downloaded to their hard drives? And perhaps most important, since full Red Book audio (16 bit/44.1 kHz) takes too long to download, how will the fidelity of the music be compromised by the data compression used to trim it to manageable size?

Of the many competing schemes for streaming sound over the Internet—RealAudio, Shockwave, Rich Music Format, etc.—only one system has been specifically designed with the delivery of final sound product in mind. Liquid Audio uses Dolby Labs' Dolby Digital (AC-3) perceptual coding to deliver what it says is "CD quality" sound without Red Book file sizes. Three software programs are used in the process: one for file preparation, one server application, and one

"player" that works with the end-user's browser. The system handles all transactions (including reporting of royalties), allows the user to see credits and lyrics, and even supports the writing of recordable CDs so that the downloaded tracks can be transferred to CD and played back on any standard CD player.

Based in Redwood City, Calif., Liquid Audio was founded in May of 1996 by Gerry Kearby. A musician by training, Kearby's background also includes operating a sound reinforcement company and founding Integrated Media Systems, which developed circuitry for the Lucasfilm Sound Droid project and created the DYAXIS Digital Audio Workstation. (The company was later acquired and operated by Studer Professional Audio under the name Studer Editech.) I interviewed Kearby (via e-mail, naturally) to find out more about how Liquid Audio plans to

by Philip De Lancie



Gerry Kearby, Liquid Audio's founder



Liquid MusicPlayer CD is a free, downloadable, multifunction music player.

change the course of music delivery.



How would you sum up the core mission of Liquid Audio?

To develop software tools and provide services that enable artists, independent labels, major labels and music retailers to use the Internet as a vehicle for secure music distribution in a way that is commercially viable and legally responsible.

What motivated you to get into this area?

We founded the company with a core group that came from the professional audio industry with specialized experience in designing and building professional computer-based audio and signal processing systems. As we were developing ideas in 1995, streaming audio was just starting to emerge on the Internet. We listened and were instantly convinced that people from the audio industry should be driving this thing. We wanted to elevate the quality of Internet audio to more professional stan-

shopping online for music is simply another alternative available to consumers and should not be perceived as a threat

to the traditional distribution channels. Consumers will continue to shop at the traditional music retailers but will also be able to use the Internet as another available resource.

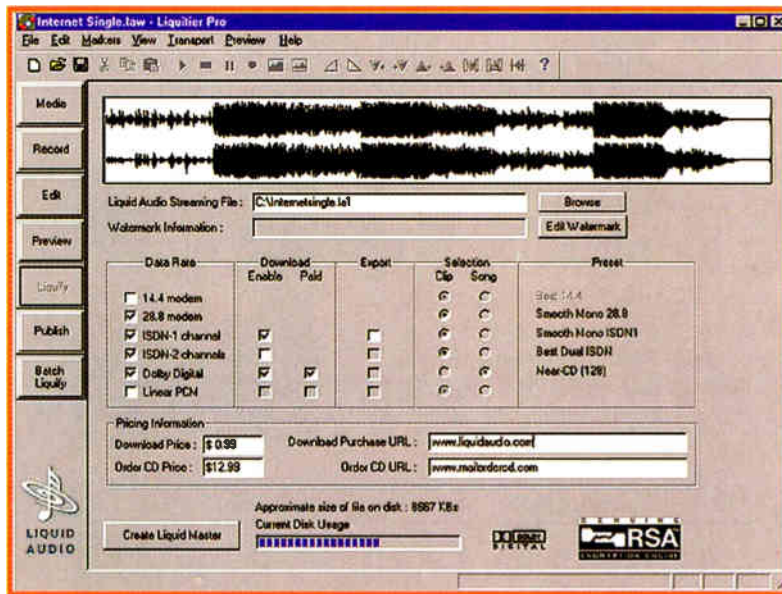
What are the advantages of delivering music product directly via the Internet as opposed to using existing distribution channels such as retail, mail order or Web-based ordering of physical CDs? How do the various parties involved, such as the consumer and the creator of the music, benefit from your approach?

First of all, the Liquid Audio system allows the content providers the option of electronic delivery. The content providers may decide to use Liquid Audio technology only to provide high-quality streaming audio previews and then simply take orders for CDs that are then shipped to the consumers.

There is nothing in the system that requires them to offer individual Liquid Tracks for purchase and download. Having said that, however, many of our clients are already offering or have announced plans to offer individual tracks for purchase and download.

For the content providers there are dramatic cost saving benefits—packaging, inventory overhead and shipping costs, for example—as well as being able to bring new musical offerings to market faster and cheaper. A good example of this is N2K's e-mod site. Stewart Copeland mastered a track in his home studio and delivered it to N2K via e-mail, and it was available for purchase and download the very next day.

Of course, there are some obvious benefits to consumers, as well. They have access to shopping online 24 hours a day, and have music-on-demand: electronic delivery in just a few minutes of the specific tracks they wish to purchase. This could be particularly beneficial, for example, to someone located in a relatively remote area where there may be a very limited selection of



Liquifier Pro's Liquify pane allows end-users to select downloadable preview files.

dards. Being musicians, we also saw the opportunity for artists to get heard in this new environment. Even more compelling was the possibility of these artists to also get paid for their efforts on the Net. That is when we started to create a secure end-to-end Internet music delivery system.

We knew that to create a viable business in Internet music commerce, we had to provide a system that worked within the current content development process. Coming from the pro audio industry, we know the work flow of the studio. We wanted engineers to master for the Web as they do for conventional CDs. The result of this knowledge is our professional mastering tool, the Liquifier. We strove to develop a complete system, rather than disconnected components. As a result, every piece of our system has secure interconnects that establish music flow from the studio directly to the consumer. *Do you envision Internet delivery as a replacement for physical music carriers or simply an additional distribution avenue?*

Rather than a replacement for existing channels of distribution, the Internet represents an alternative and supplemental method of distribution. For example, many artists, indie labels, major labels and retailers already have an Internet presence, so it is a natural evolution for online distribution to be an ever-growing portion of their overall revenue.

Much like Amazon.com has done for online book sales,

music to choose from, or in a situation where they are searching for very niche-oriented genres of music that are not widely available. Internet search engines can often help the consumer locate hard-to-find musical content. Also, it offers consumers the option to buy an individual song rather than having to purchase the entire CD just to get the one track they really like.

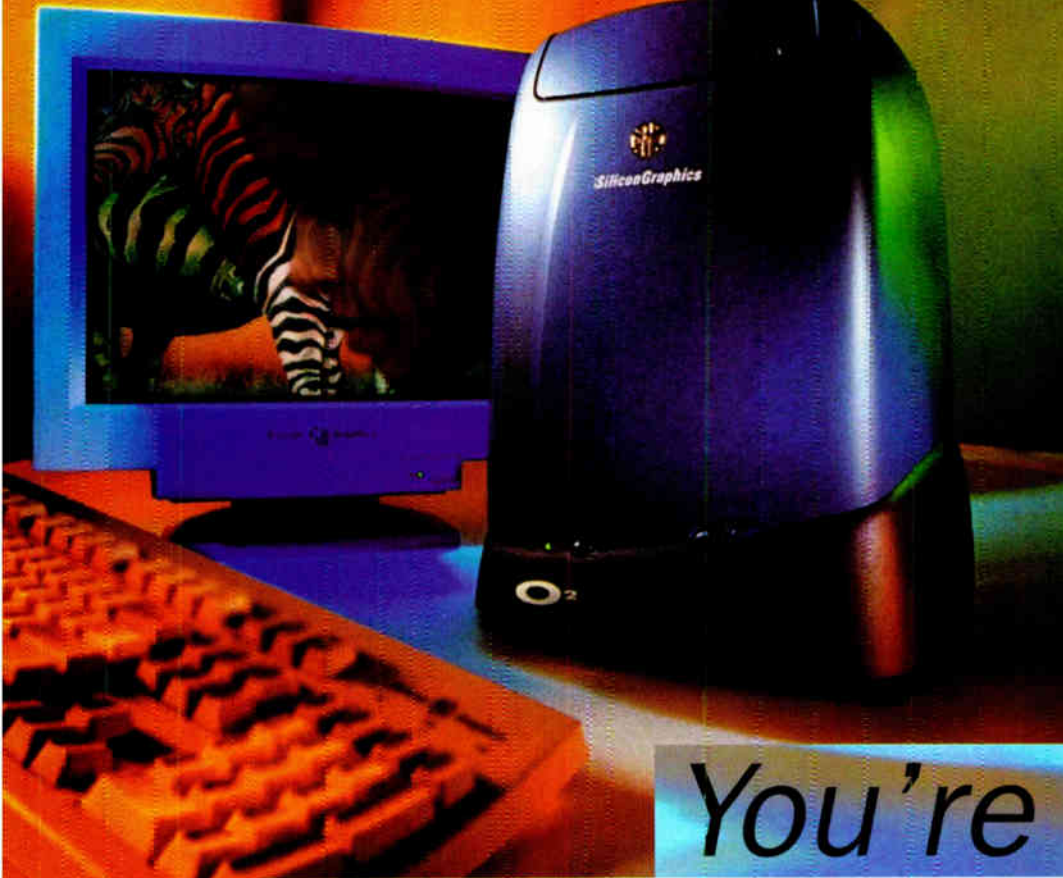
What are the disadvantages of direct Internet delivery? Are there situations in which Liquid Audio might not be the best way for a consumer to buy music?

Given the bandwidth available in the typical home it currently would not be practical for a consumer who has a 14.4 modem to attempt to download an entire CD of music. To download that much information at such a slow data rate could be a very frustrating experience for many people. But that bandwidth is growing rapidly. Breakthroughs in telecom equipment such as faster modems and the dropping price of telecom services such as ISDN should resolve most of the common objections associated with electronic distribution of large bodies of musical content.

The record industry has long been wary of technologies that allow consumers to "cherry-pick" songs rather than paying for complete albums, not only for financial reasons but because if consumers buy only the hits they are never exposed to the rest of an artist's work. How do you respond to these concerns?

This is really an issue for the content providers. Only they can

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LIQUID AUDIO

accurately assess what is best for their business. If they see a viable business in the electronic sales and delivery of singles then those vendors can make that type of shopping opportunity available to consumers. If they feel threatened in some way by this "cherry-picking" approach then they can opt not to make downloadable singles a part of their offerings. Our system is flexible enough to provide for both approaches. In the past, the market has tended to drive their business decisions and we feel this trend will continue with regards to electronic distribution.

What are you doing to win over the major labels to your point of view?

We have been in negotiations with all the major labels for some time now on a number of different levels. In fact, Capitol Records recently featured a single from Duran Duran's new album in Liquid Audio format on their Web site (www.hollywoodandvine.com), and they have committed to showcasing other artists as well in the coming months. From our discussions with them it is clear that they view the Internet as an ideal vehicle for promotion and perhaps even the direct sale of their back catalog content that is not carried by their normal retail distribution channel.

Our message to them is that we have a comprehensive system for electronic music distribution that has addressed all issues. In fact, many of our innovations have directly resulted from feedback we received from the major labels early on, and we have made significant efforts to address their concerns, and rightly so, was security. We have implemented extensive security measures, such as encryption and digital watermarking, to ensure a secure environment to engage in electronic music commerce.

Talk about some of the artists and others who are using Liquid Audio to sell music directly over the Internet. How are they using your system and what kind of response are they getting?

Several prominent online music retailers—such as Music Boulevard's e-mod site, Knitting Factory, IUMA, and others—already have Liquid Tracks by such artists as Chick Corea, Patti Austin and Pat Metheny available for purchase and download. And as I mentioned earlier, Capitol's first foray into the digital distribution arena was with Duran Duran. We are also beginning to see the major la-

bel take a more aggressive role in upgrading the quality of audio on their Web sites. Also, BMG North America is using Liquid Audio for their three genre-based Web sites, BugJuice (www.bugjuice.com), Peeps Republic (www.peeps.com), and TwangThis! (www.twangthis.com). As with all things new, the amount of available content is going through a ramp-up period. If you think back to the introduction of Compact Discs, the first offerings were sparse but once consumers saw the benefits of the new technology, the demand for more content provided the impetus for the music industry to deliver it.

In terms of response, the content providers who are using our system tell us that their sales numbers are exceeding initial expectations and that music fans genuinely enjoy this new online shopping experience.

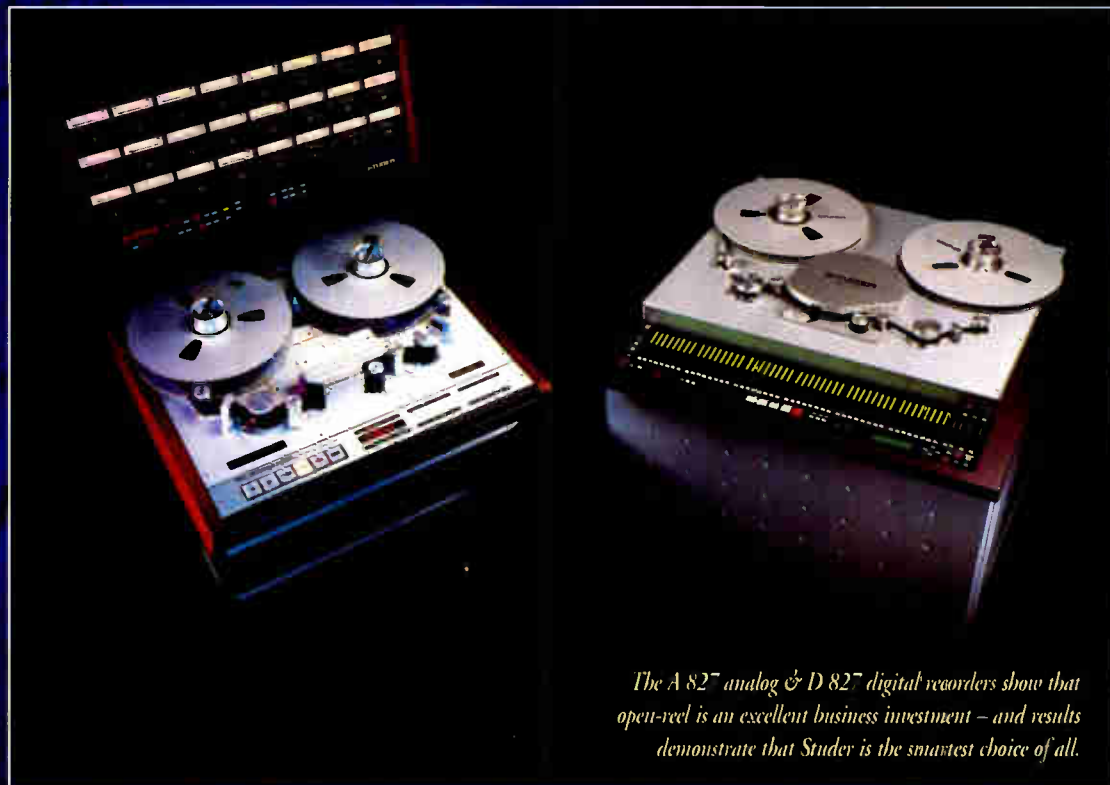
Describe the family of Liquid Audio products, and what role each plays in the chain linking the music creator with the music listener.

The Liquid Audio suite of software tools consist of three basic components. First is a professional Internet audio mastering tool known as the Liquefier. Available for both PC and Mac, the Liquefier is used to master the music for Internet delivery and also provides security functionality such as adding digital watermarking.

Once the music has been mastered, it is published to the second component, the Liquid MusicServer. The Liquid MusicServer software provides the audio streaming function for preview and also manages the secure download of Liquid Tracks. The server also tracks and logs all transactions and can even generate rights reports to the appropriate agencies such as BMI, ASCAP and the Harry Fox Agency. The Liquid MusicServer currently runs on UNIX-based server platforms such as those from Sun and SGI. And as a part of our strategic alliance with Microsoft, our server software will soon support NT-based servers as well. We will also be working with Microsoft on integrating the Server with Microsoft's Commerce Server, and on joint marketing and standards initiatives in the area of streaming media and Internet music commerce.

The final component is the Liquid MusicPlayer CD, which is the free downloadable client application that allows consumers to browse, purchase and download music from the Internet. Not only does the Liquid MusicPlayer provide CD-quality audio, but it also can display album art, liner notes, lyrics and

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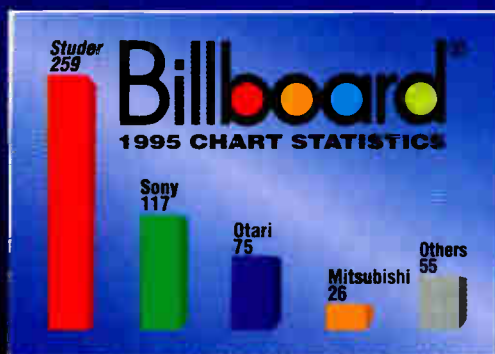


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LIQUID AUDIO

a wealth of other associated media information as well. The Liquid Music-Player CD has the added functionality to create audio CDs that are fully Red Book-compliant. By adding a CD recorder—now quite inexpensive and widely available—to their computer systems, consumers can create custom compilations on CD from the Liquid Tracks they have purchased.

How easy is the download process for the consumer, and how long does it take for a given length of program?

Web sites offering Liquid Tracks for purchase and download generally have easy-to-use, intuitive interfaces, which guide the consumer through the process with a few simple mouse clicks. The download time can vary depending on a number of different variables such as network traffic and ISP capabilities. But in general, a 3-minute track would take anywhere from 12 to 15 minutes to download using a 28.8 modem. However, keep in mind that with the emergence of cable modems that same 3-minute song could be downloaded in

30 seconds.

What do the end-users actually do with the music once it is downloaded to their hard drive? Do you expect most people to simply listen to it at their computers, or to record it to CD-R so it can be listened to in other environments?

The audio capabilities of PCs have improved dramatically over the years, and it is not uncommon to see features such as subwoofers in multimedia-ready systems. However, consumers want the flexibility to enjoy the Liquid Tracks they have purchased in the highest fidelity possible. In most homes the highest-quality music playback system is still the hi-fi system, not the PC. Hence, we included the CD-writing capability into the Liquid MusicPlayer to allow consumers to make CDs they can play in any CD player.

How easy is it for consumers to record Liquid Tracks to CD-R? Describe the process, including how the conversion from Dolby Digital to Red Book is handled and how the track IDs (PQ codes) are defined.

A user can create a CD from within the MusicPlayer either by creating a playlist first and then burning the CD from that, or by adding tracks to a CD one at a

time. Either of these operations can be performed in only a few mouse clicks, with no knowledge of mastering terminology such as track ID or PQ codes. We use the same drivers as other popular Windows CD mastering software to create our Red Book CDs.

Describe the use of Dolby Digital to encode the music.

Liquid Audio uses an enhanced version of Dolby's AC-3 encoding algorithm. Dolby Digital was designed to work in real-time consumer electronic devices, such as DVD players, where computing resources are tight. We saw that applying the algorithm to personal computers would present many opportunities that had previously been ignored. This was the genesis of Liquid Audio Dolby Digital.

In using Dolby Digital, we strive for a constant quality level across the encoded audio. This results in a more optimal bit allocation and more consistent encoding results. We have also developed pre-processing algorithms that are specifically tuned to the data rates needed for streaming and online delivery. Liquid Audio has exclusive license with Dolby Laboratories for the use of Dolby Digital in Internet audio applications.



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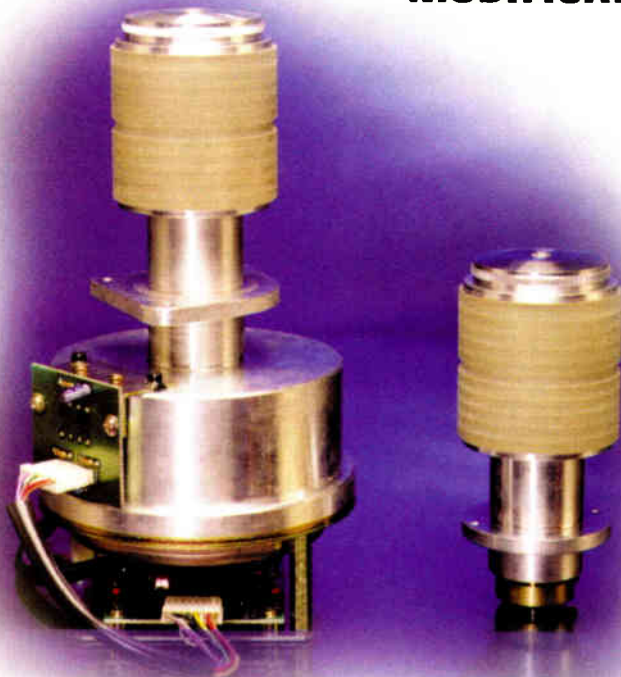
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LIQUID AUDIO

What is the data rate used for Liquid Audio?

Dolby Digital factory presets range from 96-256 Kbps, but the user can create their own preset in Liquifier with a data rate up to 640 Kbps.

What stages or steps does the signal go through in the encoding process?

The typical encoding process goes as follows: Step 1, batch extract one or more tracks from a CD. Step 2, enter the media information (song name, artist,

copyright, optional liner notes, price, etc.). Step 3, hand-pick a 30-second segment to use for the audio preview and add fades at the beginning and end of the segment. Step 4, select the encoding parameters from the presets or create your own settings. Step 5, batch encode the audio and media information into Liquid Master files. A single click creates a file with up to six data rates enclosed. Step 6, batch publish Liquid Master files to the Liquid MusicServer.

What types of signal processing does the material go through in the encoding process, and what audio pre-processing (EQ, compression, etc.) have you found

to be helpful in getting the encoded signal to sound as good as possible?

The signal processing used in encoding varies depending on the preset and connection speed. Each connection speed has different signal-processing options. At low data rates like 28.8 Kbps, a typical factory preset would have stereo-to-mono conversion, sample rate conversion, DC offset removal and Dolby Digital encoding.

A four-band parametric equalizer or dynamics module with compression, limiting and expansion can also be added to the signal chain of any preset and occur as part of the encoding process. In general, the lower the data rate of the stream, the more pre-processing is needed to maintain the sonic integrity of the audio. Some users roll off a little bottom at low data rates and boost highs slightly just before the cutoff frequency. Subtle compression can also improve sound quality at lower data rates. EQ and dynamic compression are generally not needed to get good-sounding results; in fact, we recommended that EQ and dynamic compression not be used for the Dolby Digital files that the consumer actually downloads.

What are the underlying guidelines used in AC-3 to decide which parts of an audio signal will be discarded in order to reduce bandwidth requirements?

AC-3 technology has been designed to take maximum advantage of human auditory masking. It divides the audio spectrum of each channel into narrow frequency bands of different sizes optimized with respect to the frequency selectivity of human hearing. This makes it possible to sharply filter coding noise so that it is forced to stay very close in frequency to the frequency components of the audio signal being coded.

By reducing or eliminating coding noise wherever there are no audio signals to mask it, the sound quality of the original signal can be subjectively preserved. In this key respect, a perceptual coding system like AC-3 is essentially a form of very selective and powerful noise reduction.

How would you characterize the differences commonly found in listening comparisons between an original 16-bit/44.1kHz signal and an encoded Liquid Audio version of the same program? What types of artifacts may be introduced into the program during encoding?

When done properly there should be no audible difference between the Dolby Digital Liquid Master and the original

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LIQUID AUDIO

source file. The Liquifier allows the user to A/B the encoded file with the source to find the exact data rate where sonic transparency occurs. For some program material, this may occur as low as 96 Kbps, while others may require 256 Kbps or higher. After the optimum data rate is found, the most common differences between unencoded and encoded signals are in the area of program levels. And at lower data rates high-frequency response is sacrificed to minimize phasing and distortion.

How do you see Internet music delivery developing in the future, both in terms of the technology issues (bandwidth, compression formats, etc.) and the market? Where do you see this market going?

We have designed our system in anticipation of emerging technologies both in terms of codecs and also security technologies. Currently we feel that we are implementing the best available technologies in both of these areas. But we constantly monitor the latest technical developments, and when improvements in audio and security technology become available it will be easy to integrate these into our system.

With regard to the market, we believe that online music distribution will represent substantial revenue growth potential in the music industry over the next few years. Some analysts have predicted online music sales revenues of \$1.3 billion by the year 2000. We feel that is perhaps a bit on the conservative side. The entry barriers to ramping up an online music sales site are low, which means that it is a business opportunity with relatively easy access. This, in turn, should benefit the consumers just by the sheer volume of content that will be available in Liquid Audio format. Also, if the major labels and music retailers accelerate their activity in the area of digital distribution, the percentage of revenue attributed to online sales could be much higher. And the proliferation of Internet ready devices, such as Web TV, could also work to increase the market share of music that is distributed electronically. ■

Mix's Media & Mastering editor, Philip De Lancie, is a mastering engineer, freelance writer and multimedia designer in Berkeley, Calif. He can be reached at pdcl@compuserve.com.

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1997 MUCHMUSIC VIDEO AWARDS

LIVE BROADCAST BY LIVEWIRE

As MTV is to the United States, MuchMusic is to Canada. And like MTV, MuchMusic annually airs its own awards show. LiveWire Remote Recorders has provided the audio mix for the live performances on the MuchMusic Video Awards since the show's first broadcast in 1987.

MuchMusic president and creative guru Moses Znaimer has always disliked traditional awards shows—proscenium arch, podiums, house bands and all those usual elements. Instead, he likes viewers to feel as if they are attending a big party celebrating the past year in the Canadian music industry. Over the years, the show has featured performances by k.d. lang, Alanis Morissette (when she was still a teen



Engineer/author Doug McClement inside the LiveWire truck

MuchMusic parking lot, where an invited audience of 500 would see performances by British superstars Blur and Bush, and homegrown favorites Amanda

rope and the U.S., a few international acts were added to this year's show.

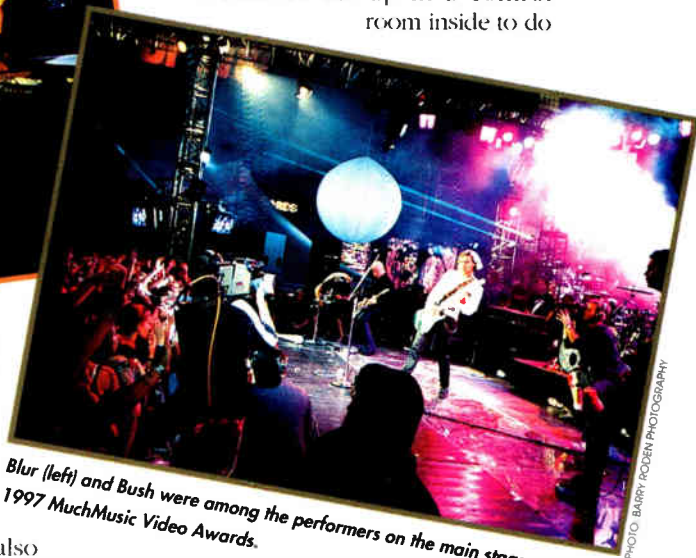
At the production meeting, it was decided that because the show would require more than 150 inputs, it would be necessary to use the following setup: The LiveWire Mobile (a five-ton truck with a 50-input Neotek console and five DA-88s) would handle the parking lot stage. The LiveWire Airpack (48-channel Mackie) would be set up in a control room inside to do



disco diva), Celine Dion, Jeff Healey, Bryan Adams and many other Canadian artists who have gone on to international stardom. This year's MMVA show was to be the most ambitious yet, with eight live bands performing on three stages spread throughout the CITY-TV/MuchMusic building, located in the heart of Toronto's trendy Queen Street West district.

Plans called for the main performance stage to be set up in the

Marshall and Our Lady Peace. Inside the Much environment, Corey Hart, Tea Party and Bran Van 3000 were scheduled, and the dance music stage (also outdoors) would feature The Rascalz, a rap act from Vancouver. In addition, because MuchMusic is now broadcast via satellite to Argentina, Finland and parts of Eu-



Blur (left) and Bush were among the performers on the main stage at the 1997 MuchMusic Video Awards.

the Much stage, and the rap area would be covered by one of MuchMusic's control rooms. A Yamaha 02R would be used only for ambient mics located

BY DOUG McCLEMENT

—CONTINUED ON PAGE 114

OLD CROW RECORDING

Whitehorse, Yukon



Left and below: The control room at Old Crow features a Trident TSM console (owner Bob Hamilton is at the desk) and outboard gear from Neve and API. Hamilton is guitarist for Jerry Alfred & the Medicine Beat, who have received two Juno Award nominations and one award.

Whitehorse, in Canada's Yukon Territory, is a happening little spot. According to resident Bob Hamilton, it's got the vibe of a remote college town: "There's a vibrant arts and music scene," he says. "Three or four theater companies, 30 or 40 bands...At any given time, there's like ten clubs hiring live music. It's amazing, because the whole population of the Yukon territories is only 30,000 people—that's a small town in Southern California."

Hamilton is the owner of Old Crow Recording, a music-tracking/mixing studio in Whitehorse—or, rather, *the* music-tracking/mixing studio in Whitehorse. Old Crow, which opened last year, is a quite attractive, very live space. It is Hamilton's third studio and, like the first two, was designed by Hamilton and architect Richard Klassen. "It's largely pine and poplar, except for the floors," Hamilton says. "I took a workshop at MusicWest [music industry conference] in Vancouver from Matt Wallace, who produced John Hiatt and Faith No More. He taught this technique he says he learned from Glyn Johns, miking drums using just two mics and phase-correcting them. It's this holistic approach to recording drums, and that's what got me on the path to create this space, to record drums in a really big live space using the ambience of the room."

The main room is 26x28 with a 15-foot ceiling and attached 6x8-foot vocal booth; the control room is 12x26x10. Three acres of wooded surroundings and lots of natural light add to the ambience. "It's a quiet place, so you can have win-



dows and you don't have to build a fortress," Hamilton says.

Hamilton is also the guitarist in a group called Jerry Alfred & the Medicine Beat, who won a Juno Award (Best Aboriginal Music) in 1995. One of his reasons for building Old Crow was to have a great room to record the band, which combines Native American singing and hand-drumming with more modern instrumentation and production values. "We've been playing together for four or five years," Hamilton says. "The music includes ancient melodies and ancient language. Jerry Alfred is a native fellow, and a storyteller also, so he does some storytelling on the albums,

BY BARBARA SCHULTZ

as well. We started recording our third album a few days ago."

Hamilton does all the engineering on projects he produces, but when he's one of the players, he hires a local engineer named Roly Mitton. Until recently, the facility has recorded mainly to DA-88s, but Hamilton recently purchased a Studer A80 MkIV machine, which he says will be his main recorder now. "These machines have come down in price to where you can buy a used Studer machine for a price comparable to, say, three DA-88s or three ADATs. What I want to do is sync up the three DA-88s to the Studer. I'll have 48 tracks—24 digital and 24 analog—and use Apogees [converters] to transfer stuff back and forth so I can work in either domain, because there's no doubt that digital is a lot better at certain things like comping vocals. You wouldn't want to just use one or the other."

Old Crow's control room is centered around a Trident TSM console and Genelec 1031A main monitors. Hamilton also has collected an assortment of outboard gear: four Neve 1073 and two Neve 2254 mic pre's and five API 550A EQs, and he has a pair each of Neumann U67 and KM56 tube mics. He says he gets about a half-dozen album projects a year, and that, combined with touring with Jerry Alfred & the Medicine Beat, is enough to get by and do it all on his own terms. "There's a uniqueness in the north and in the people who choose to live here," he says. "It's a beautiful and incredible place, and there's definitely an independent attitude that gives us a different slant on things. We're not in the industry; we're making our own industry." ■

—FROM PAGE 112, 1997 MUCHMUSIC AWARDS
in all three performance areas, and in various places around the building where the awards would be presented.

These four consoles would be routed to a Studer mixer in the master audio control room, with Peter Lederer in the hot seat, mixing those four stereo feeds, plus all the handheld RF mics used by the host/presenters, as well as all the audio tracks from the four Betacam video decks containing the pre-recorded nominee segments. The output of Lederer's console was run through a

Focusrite stereo compressor before being fed to the satellite uplink. His mix was also fed back to the four music control rooms, so those engineers could monitor the show in progress, even during band changeovers, when the stages were not online.

The key to a good production is good pre-production, and this certainly was the case at the MMVA. Constructive pre-production was made possible by the "post-production" work I've done after past MMVA shows as owner/operator of LiveWire Mobile. After any annual event-type show, I write down what I could have done to make the show sound better or run more smoothly. Over the years, I've been able to develop logical procedures for power distribution, cable routing, crew communication and stage patching for the MMVA. (You have to learn from

your mistakes. Otherwise, instead of ten years' experience, you get one year's experience ten times!)

When doing broadcast television, backup is very important. In addition to a spare mic on each stage (with enough cable to reach anywhere on that stage), we ran a stereo line-level feed from each FOH console to the main broadcast control room. That way, if any of the music control rooms went down, there would still be some audio to send out to the satellite (not great, but better than dead air). We even ran a backup to the intercom between us and the main audio control room; because awards shows begin to deviate from the script as soon as they start to run overtime (ever seen an awards show that finished early?), you have to keep in touch with the control room as plays are called from scrimmage. You may

RECORDING JAMES KEELAGHAN'S "A RECENT FUTURE"



PHOTO: VICTOR DEZSO

by Barbara Schultz

There are some familiar themes to singer/songwriter James Keelaghan's songs—driving, women and loneliness figure prominently. Fortunately, Keelaghan has the voice and talent to put them across. His most recent release, *A Recent Future* (Green Linnet), features some gritty singing, poetic lyrics, and solid playing on guitar-based arrangements that are occasionally spiced up by the odd violin, accordion or concertina.

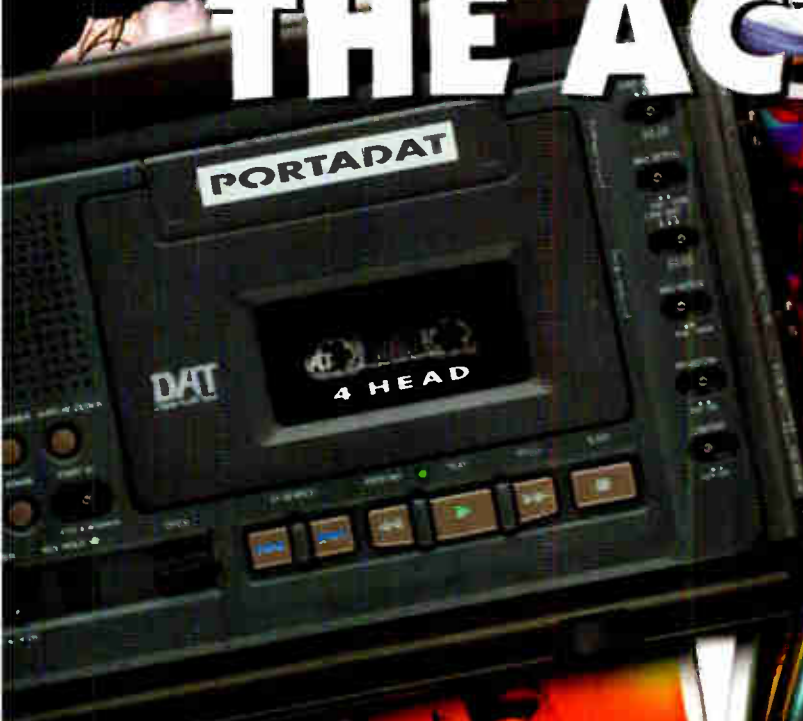
Keelaghan is originally from Calgary, Alberta, but now lives in Vancouver. He recorded *A Recent Future*

there, in Blue Wave Studios, a large tracking/mixing room equipped with a 32x24 API board. The engineer was Richard Champagne, who was moonlighting from his full-time job as a recording engineer for CBC-Radio; he became involved with this project through the producer, Don Pennington, with whom he works fairly often.

Champagne likes the rooms at Blue Wave: There's a large studio (50x50 with a 30-foot ceiling) with a good-sized drum room and vocal booth attached, and large windows

—CONTINUED ON PAGE 236

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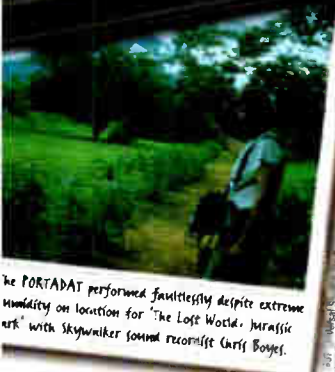


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INTERNATIONAL UPDATE

find a band onstage five minutes earlier than originally scheduled in the script, so if you lose intercom, you're dead.

We always put up at least four audience mics, so if a pair goes down during the show, there's still a working pair somewhere (unlike the stage mics, they are virtually impossible to get to once the show starts). We also run multitrack in case the band wants to remix before the show is rebroadcast.

The program was scheduled for Thursday evening, September 18. The staging and lighting rigs were assembled on Monday and Tuesday, with P.A. and audio recording set up on Wednesday. Rehearsals were to be Wednesday evening and Thursday morning, with a dress rehearsal scheduled for Thursday afternoon. Two of Canada's top SR companies, National Show Systems and Jason Sound, were contracted to supply the FOH and monitor systems, with Christie Lights providing the lighting, and Rush's legendary Howard Ungerleider in charge of lasers and pyro.

A flurry of faxes arrived a week before the gig, including stage plots and mic charts from each band. I compiled

SOUND OF ONE HAND STUDIOS



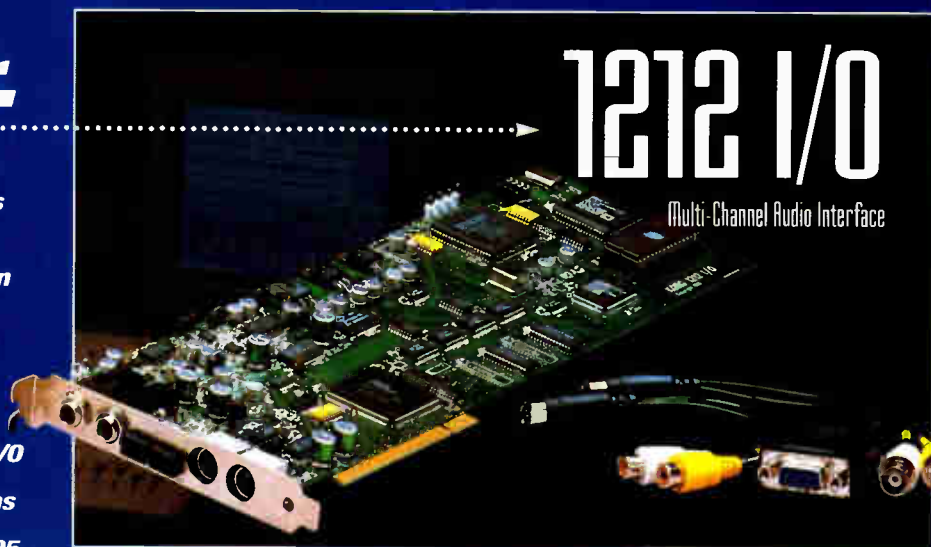
Sound of One Hand Studios in Ottawa, Ontario, opened for business this year. Run by partners Martin Jones, John Dooher and Ross Murray, this room features a Neve 8014 console, Studer and Ampex analog recorders, digital machines from Panasonic and Tascam, and monitoring via Quedest HQ210s, Genelec 1030As and Yamaha NS10M near-fields. The studio also offers a wide assortment of dynamics and effects units, along with mics from Neumann, B&K, AKG, RCA, Beyer, Sennheiser, Audio-Technica, EV and Shure. ■

a "generic" mic chart that would result in the easiest set changes. Each band was only doing one song, and the show schedule allowed for 30 minutes be-

tween acts, so we had to be organized. Most of the mic choices were similar between bands, and there were no left-handed drummers for a change! On the

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main stage, we allocated ten drum inputs, two bass inputs, six for guitars, six for keyboards and five for vocals. The bands on that stage all had fairly similar layouts (no horns, no monster drum kits), so the input list stayed fairly consistent.

After parking, leveling the mobile and hooking up to the TV station's tech AC power, we spent the early part of the day running snakes, setting up and testing mics, running intercom and checking the interface with the TV master control room for level, phase and left-right consistency.

Since the off-air video feed often did not include the parking lot stage, I set up my own video camera at the FOH position. The camera has remote pan, tilt, zoom and focus from inside my mobile, giving me excellent visual contact with the stage, totally independent of the broadcast cameras. Our talkback system is independent of the monitor system, as well. I've found over the years that you can't always count on the band's monitor engineer to have your talkback fader up on his console. Rather than annoying the band's crew, we place a battery-powered Peavey Solo

CANADIAN BITS & PIECES

New facilities designed by Group One Acoustics of Mississauga, Ontario, include two new studios for Lonesome Pine Studio (Toronto), a new post-production/jingle facility called Jungle Music (Toronto), a new Foley studio and mix room for Premium Sound (Montreal) and a large audio post/jingle facility for Great Big Music Ltd. (Toronto)...Netstar Communications (Montreal) took delivery of its 11th pair of Dynaudio Acoustics BM15 passive monitors. Netstar owns English-language sports network TSN, French-language sports channel RDS and licenses the Discovery Channel for Canada. All of the company's Dynaudio monitors were supplied by Toronto-based distributor

Sonotechnique...Post-production facility Sharpe Sound Studios (Vancouver) installed two Uptown Automation 990 systems. Sharpe provides ADR/Foley recording, sound editorial and final mixing services to American and Canadian film and TV studios. Recent film projects include work on Warner Bros.' *Free Willy 3* and MGM's *Warriors of Virtue*. Other Canadian post-production facilities with new Uptown systems include Casablanca Sound (Toronto) and Sonolab (Montreal)...Recent sessions at Turtle Recording Studios in Vancouver: Midge, Sam, Both Legs Broken, Lisa Lester and blues band Shirley U Jest, all working with staff producer/engineer Larry Anschell. ■

guitar amp behind the drummer. It has an XLR input and is small enough to fit anywhere, yet loud enough to get people's attention onstage. During soundcheck and the show, I always have an assistant on a hard-wired Clear-Com headset onstage, as well. I don't trust

wireless headphones on live TV shows.

The rehearsals were scheduled for 4 p.m. on Wednesday, but a torrential downpour soon put a damper (bad pun, sorry) on that idea. By the time it stopped raining, three hours later, we only had time for Our Lady Peace's rehearsal.

Fortunately, the weather was perfect on show day, and we were able to rehearse Bush at noon. Their front-of-house engineer, Brian Ruggles, was in the mobile to supervise the mix on their song. Ruggles has been Billy Joel's FOH mixer for more than a decade and has had lots of recording experience, so it was a pleasure to have him in the truck (he has some great road stories). The band feels so much more at ease when they hear a familiar voice out of the talkback speaker, and they know that they have a pair of ears in the control room that they can trust.

Next up was Amanda Marshall. I've been recording Marshall since she was an 8-year-old singing on children's albums. It's been great to see her go from singing in Toronto clubs as a teenager to her current status; her debut album sold 2 million copies. I've mixed her on several television specials and a live CD that was sent to radio stations for promo purposes, so I was left on my own to do her mix.

Blur chose not to do a soundcheck, so their road crew played through a song just to get levels. At 3 o'clock, we ran the show end to end to rehearse the musical numbers and all the transitions.

—CONTINUED ON PAGE 236

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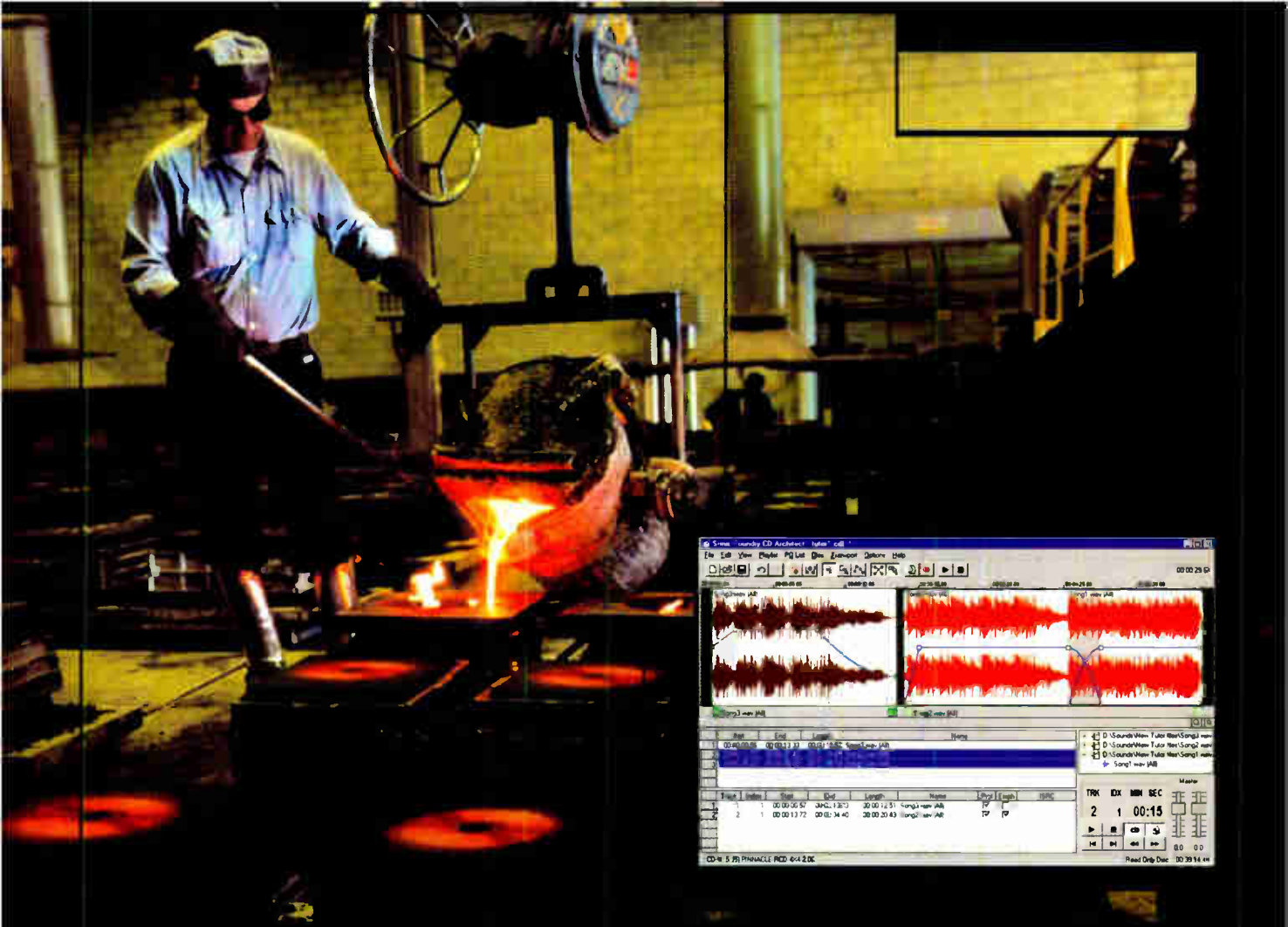
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CIRCLE #002 ON PRODUCT INFO CARD

KRISTINE AND GLEN'S HOUSE

MIXING COMFORT IN VANCOUVER

The first thing you notice about Glen Reely's project studio in Vancouver, B.C., is that it doesn't really have a studio look. It does, however, have a warm and comfortable atmosphere that reflects the owner's open, easygoing personality. Reely is known for his live sound mixing for bands such as 54-40 and the Goo Goo Dolls. Recently, though, he's been devoting more of his time to recording and mixing major-label and independent acts—tracking in commercial studios in town and then bringing the work home to mix. He has been spending a lot of time in the studio lately, hence that "lived in" look.

Natural light from several windows and a functional fireplace for late-night overdub and mixing sessions help create an ambience that more commercial studios don't usually have. Reely rarely feels rushed or pressured during a mixing session, and he puts in a lot of time on reasonably small budgets to get a product that he can "live with over time."

Although primarily a mixing studio, "Kristine and Glen's House," as Reely's facility has come to be known, can also accommodate vocal, guitar and acoustic instrument overdubs. Reely uses a Fostex G24S 24-track analog machine and two ADATs locked together for a total of 40 usable tracks.

"When I'm mixing, I'm always using both formats," he explains. "I record everything except for the vocals directly to the analog machine. I do vocals on ADAT a lot because I like doing composite tracks. I then dump the composite track onto the analog and mix from that. If I only use 23 tracks of the analog and one track for SMPTE, that opens up the ADAT tracks for printing effects and things during a mix. If I want to punch up a guitar sound in a chorus, for instance, I'll get a whole new guitar sound and print that on a separate track on the

ADAT. I don't have automation, and that's the way I've sort of helped myself out over the last few records."

Part of the reason the studio looks so casual is that nothing is nailed down or recessed in the walls. All of the gear is in road-



worthy cases for easy portability. He mixes on a 24-channel Soundcraft Spirit Studio board and uses a variety of outboard processors, including an ADL tube compressor, two dbx 160s, a Drawmer Quad gate, DS404 and DL241 compressor, a Yamaha SPX 900 and D1500 delay, Roland SDE 3000 delay and two Boss SE 50s. He monitors his mixes on Paradigm Mini Mark IIs and Yamaha NS-10Ms, powered by

a UREI 6300 power amp.

There are a lot of project studios to compete with in Vancouver, but Reely has grown more confident as artists keep coming back for his experience and his ears. "Everybody seems to have an ADAT studio now, so you have that to compete with," he says. "Studios are offering these insane rates, and I don't think anybody is happy about it. There are a lot of people claiming to be engineers and producers, and I don't think that's true. There are skills that take years to develop."

One of Reely's favorite recent projects was his work with Mercury trip-hop/spoken-word artist Kinney Starr, where he was freed from the traditional requirements of recording a "band" and allowed to try wild new techniques. "I probably had the most fun working with Kinney," he says, "because I was able to do things like put a strange Harmonizer on her voice or distort a drum loop. It's really refreshing working with somebody like that and being given some range to go out there, instead of just being safe. So often people expect the drums to sound like drums and the bass to sound like bass, and that gets boring. I don't really like smooth-sounding records, generally."

Reely admits that mixing is somewhat of a crazy profession to be in, listening to the same songs for days on end and wondering if they're any good. "One day I was sitting here, and I had the basement window open while I was doing a mix and thought I'd better close my windows before my neighbors think I'm insane. It is insane, really, when you think about listening to one song all day, and only little bits of it. I think the average person could only sit there for about ten minutes before they would tell you where to go. It's nuts." ■

Tim Moshansky is a freelance writer and musician based in Vancouver, B.C.

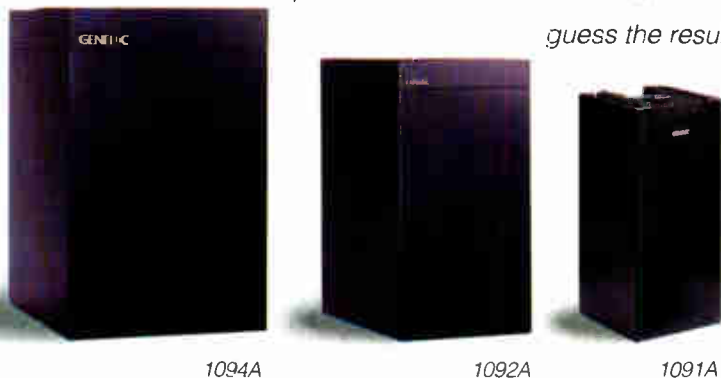
BY TIM MOSHANSKY



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CIRCLE #083 ON PRODUCT INFO CARD



World Radio History

LAS VEGAS IN HYPER SURROUND

Bally's Reinvigorates "Jubilee"

*by Gary Baldassari and Bob Webb
with Robert A. Christopher*

The Golden Age of lavish stage spectacles is alive and well, and it's gone into Hyper Surround at Bally's Las Vegas. The grand stage revue "Jubilee," which has been running continuously for 16 years, has been reworked and re-energized with the addition of many new features, not the least of which is a 6-channel soundtrack.

Donn Arden is credited with bringing the classic topless showgirl look from Paris to Las Vegas at such casinos as Stardust, Desert Inn and the original MGM Grand, which is now Bally's Las Vegas. "Jubilee" is his quintessential Vegas-style revue, with

rhinestone-and-feather-clad showgirls, 94 cast members and a crew of 72 stagehands, who perform the complex scenic, prop and costume changes; 15 elevators and lifts are repositioned for each scene. The Titanic boiler room and ship-sinking sequence are awesome events and each night are performed to perfection. An entire swimming pool full of water is dumped into the scene at the climax to solidify its reality.

A project of this scope demanded a rethinking of more traditional venue audio production techniques: For starters, a pseudo-film-style approach of pre-

a single B&K 4003 with an APE 50/Millennia Media HV-3 between each pair of players to enhance the rosin sound. The APE 50 changes the Omni 4003 to a hypercardioid above 5 kHz. On harp we selected a Milab LC 25. Above the entire string section a B&K 4040 gold tube microphone was placed for air and ambience.

The percussion was miked with two cardioid and two omni microphones. Every musical cue was considered during mic placement. A stereo premix of direct and ambient was the technique. Electric bass guitar was taken direct; upright bass viol was miked with a B&K 4021 on a violin clip mounted on the center two strings just below the bridge, and on the underside of the strings for isolation. (He was next to the drummer.) The 4021 is the ultimate acoustic bass mic.

Electric guitar was taken with (what else?) a Shure SM57. The piano was miked with a single B&K omni. Only two times did the piano take a solo, and these were overdubbed in stereo. The drum miking was not extensive. Bass drum, snare and hi-hat were tight-miked with B&Ks. The toms were not directly miked, though we did em-

ploy a technique of not using overheads from the top but rather overheads from the front. Being that cymbals and toms are bidirectional, a true drum sound can be captured by placing a pair of matched omnis above the top skin of the toms and slightly under the balance point of the cymbals. The entire drum kit can be captured with these two mics. This includes the bass drum. Adding the tight mics into the blend increases the definition. The extra dimensional effect works very well with the pit band sound—the drummer will not be in front of the band, but dynamic and tight-sounding in his natural depth. Four destination tracks were taken up by the drums: kick, hat/snare and stereo everything.

INTO THE BOARD

Now for the console. The Euphonix CS2000 with ES-108a dynamics modules made this part fun. First, we took channel 1 and set it up for tracking operation. Next, we copied it to all channels so the desk was ready for step two. On the dynamics page, we set up a soft compressor with low filter swept up to 90 Hz. Next, we copied this master setup to all channels, mak-

ing for a very fast initial setup and engaging processing with a “slight attitude” on demand. But we then had over-thinned the bass drum, bass guitar, tuba, timpani and gran cassa and had to sweep these filters lower to restore the fundamental pitch. Next we saved the snapshot with an easy-to-remember title (e.g., “Bally act 1 scene 1 orch”), so that we could later experiment from musical cue to cue.

For vocals we used the same initial concepts about processing and filtering and copied the setup across channels. The production schedule had us switching between orchestra and vocals every day, so the total console reset made this very easy and saved hours of transition time.

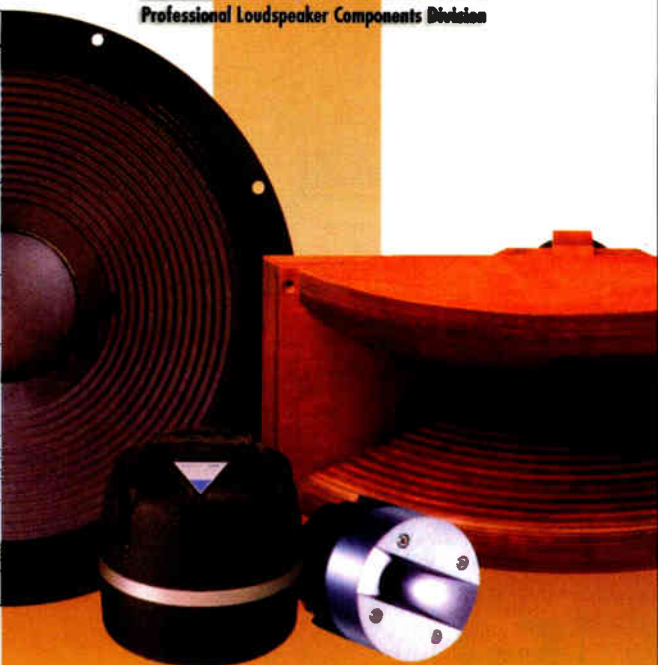
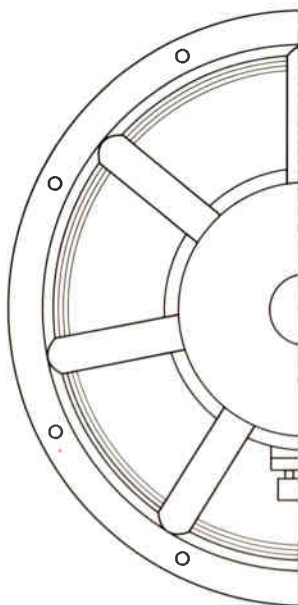
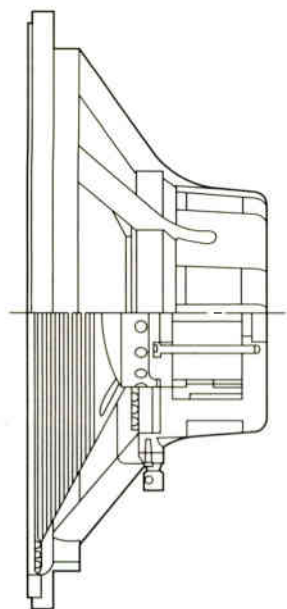
VOCAL MIKING

Aaronson had challenged us to come up with a vocal sound that would use very little obvious reverb—he wanted real depth. We settled on a tree of microphones that had different distances and characters for the singers. In the early 1980s, a *Mix* article described moving singers to pre-spiked places on the studio floor for each pass, allowing for great depth without digital

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JBL Professional's low mass titanium diaphragm provides extended high frequency for sharper transients. Lighter mass = higher efficiency = You can play louder.

New, low-distortion Bi-Radial™ horn provides smooth high frequency coverage so you'll sound as good in the cheap seats as you do up front.

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EON woofer cones are computer-designed using Finite Element Analysis techniques to develop a lightweight cone without sacrificing strength.

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JBL EON®

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About four years ago, JBL began an extensive market research project. We ventured out into the real world to spend some "quality time" with real users. What we were looking for were new opportunities, areas where current product offerings fell short of the customer's needs and expectations. What we discovered was a very

large group of people who needed a sound system to do their jobs, but don't really understand the technical details of setting up or operating a "real" system. To these people, a sound system is a necessary evil—they hate dealing with the equipment, but they can't get by without it. This becomes very evident when you attend

a performance by many of the people in this category - the sound is too loud, distorted, unintelligible, or perhaps not loud enough. For these people, we developed EON. All of JBL's technological prowess harnessed to make it easy for everybody. EON was designed by users and made easy with JBL technology.



Mobile DJ's



House of Worship



Local Pub

The ESPN Extreme Games showcased EON's adaptability for large distributed systems, putting a lot of high-quality sound where it was wanted, and very little where it wasn't.



Bowling Alley

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THE COMPLETE STORY

EON is a true plug 'n play sound system that is as easy to own as it is to operate. We've eliminated all the guesswork associated with setting up a sound system. All aspects of P.A. equipment that are "tech-intensive" have been taken care of on the inside by

JBL's innovative technologies. If you can plug in a vacuum cleaner, find the power switch on your TV, or the volume knob on a radio, you can set up and operate an EON system. All the components are perfectly matched from one end of the system to

[World Radio History](#)

the other, from microphones all the way to the speakers. Lightweight and portable, EON is ideal for small clubs and lounges, mobile DJ's, house of worship and school applications.

POWER 15



POWER 10



Performance:

Frequency Range (-10 dB): 60 Hz to 18 kHz
Frequency Response (± 3 dB): 80 Hz to 16 kHz
Enclosure Alignment: 6th Order
Long-Term Continuous SPL: 112 dB
Long-Term Peak SPL: 118 dB

Controls & Indicators:

Switches & Controls: Level Control
Mic/Line Switch
Indicators: Power LED (front panel), Signal Present LED,
Peak Level LED, Mic/Line Status LED
Power Switch: On Rear Panel

Input:

Audio Input/Connectors: One Male XLR-type, Balanced Differential for Line and
Mic. One Female XLR-type for Loop-Through to
Additional EON Powered Speaker or Subwoofer.
Input Impedance: Line: 20k Ω / Mic: 2k Ω
Sensitivity: Line: +4 dBu / Mic: -60 dBu
Maximum Input Level: Line: +28 dBu * Mic: 0 dBu

Protection:

Input Protection: RFI and Level protected
Over Excursion Protection: 2nd order high-pass filter
Low Line Voltage Shut Down: At 50% of nominal line voltage
Thermal Protection: Amp shut down and auto reset
Muting: Five seconds at turn-on

LF Transducer:

Diameter: 250 mm (10 in)
Power Handling: 125 Watts

HF Driver & Horn:

Diaphragm Diameter: 25 mm (1 in)
Power Handling: 20 Watts
Dispersion Angle (H x V): 90° x 60°

AC Line Input Voltage:

Nominal Input Voltage:
US: 120 V, 60 Hz
Europe: 230 V, 50 Hz
Japan: 100 V, 50-60 Hz
Korea: 220 V, 60 Hz
AC Input Connector: IEC Male Connector
Loop-Through to Additional
EON Powered Speaker: IEC Female Connector

LF Power Amplifier:

Rated Power: 60 Watts
Rated THD: 0.1%

HF Power Amplifier:

Rated Power: 25 Watts
Rated THD: 0.1%

General:

Baffle: Die-Cast Aluminum
Enclosure: UL 94HB Polypropylene
Dimension (H x W x D): 19.4 x 14 x 12.1
Internal Volume: 1.0 cu. ft.
Weight: 27 lb.

Performance:

Frequency Range (-10 dB): 47 Hz to 18 kHz
Frequency Response (± 3 dB): 60 Hz to 17 kHz
Enclosure Alignment: 6th Order
Long-Term Continuous SPL: 121 dB
Long-Term Peak SPL: 127 dB

Controls & Indicators:

Switches & Controls: Level Control
Mic/Line Switch
Indicators: Power LED (front panel), Signal Present LED,
Peak Level LED, Mic/Line Status LED
Power Switch: On Rear Panel

Input:

Audio Input/Connectors: One Male XLR-type, Balanced Differential for Line and
Mic. One Female XLR-type for Loop-Through to
Additional EON Powered Speaker or Subwoofer.
Input Impedance: Line: 20k Ω / Mic: 2k Ω
Sensitivity: Line: +4 dBu / Mic: -60 dBu
Maximum Input Level: Line: +28 dBu / Mic: 0 dBu

Protection:

Input Protection: RFI and Level protected
Over Excursion Protection: 2nd order high-pass filter
Low Line Voltage Shut Down: At 50% of nominal line voltage
Thermal Protection: Amp shut down and auto reset
Muting: Five seconds at turn-on

LF Transducer:

Diameter: 330 mm (15 in)
Power Handling: 250 Watts

HF Driver & Horn:

Diaphragm Diameter: 44 mm (1 3/4 in)
Power Handling: 50 Watts
Dispersion Angle (H x V): 90° x 60°

AC Line Input Voltage:

Nominal Input Voltage:
US: 120 V, 60 Hz
Europe: 230 V, 50 Hz
Japan: 100 V, 50-60 Hz
Korea: 220 V, 60 Hz
AC Input Connector: IEC Male Connector
Loop-Through to Additional
EON Powered Speaker: IEC Female Connector

LF Power Amplifier:

Rated Power: 130 Watts
Rated THD: 0.1%

HF Power Amplifier:

Rated Power: 50 Watts
Rated THD: 0.1%

General:

Baffle: Die-Cast Aluminum
Enclosure: UL 94HB Polypropylene
Dimension (H x W x D): 27 x 17 x 17.5"
Internal Volume: 1.8 cu. ft.
Weight: 42 lb.

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PowerSub™ neodymium magnets, 10 times lighter than ceramic magnets which allow for powerful, lightweight speakers. Ergonomic handles provide balance and ease in carrying. Acoustically inert, weather-resistant Polymer enclosures insure rugged durability on the road, or in any [Application History](#)

EON POWER 10 SYSTEM



EON Power 10 System consists of two EON Power 10 speakers, one EON MusicMix 10, two M50S microphones, and the necessary cables to hook everything up.

EON POWER 15 SYSTEM



EON Power 15 System consists of two EON Power 15 speakers, one EON MusicMix 10, two M50S microphones, and the necessary cables to hook everything up.

EON® POWER SYSTEMS

PLUG AND PLAY SIMPLICITY

EON is the first integrated pro sound system that's lightweight yet powerful, portable yet durable, and professional yet affordable. EON components are designed to work together, perfectly matched and ready to go where you go. Using EON couldn't be easier. Plug and play simplicity allows even a non-technical person to

have an EON system up and running in only minutes – just in time for your school assembly, workout class, meeting or choir recital. And with selectable Mic/Line inputs on the powered speakers, EON offers flexibility and convenience without hassles. To top it all off, EON systems are surprisingly

affordable. With three different systems in three different price ranges, EON has got you covered. Once you have a basic system you can add more speakers, more microphones or even a subwoofer for more bass. Mix and match all you want, or just stay with a basic system, it's all made to work together in any configuration.



EON 15



EON 10

Performance:

Frequency Range (-10 dB): 60 Hz to 18 kHz
Frequency Response (± 3 dB): 80 Hz to 16 kHz
Enclosure Alignment: 6th Order
Long-Term Continuous SPL: 122 dB
Long-Term Peak SPL: 125 dB

Input:

Input Connectors: (2) 4-pin Neutrik Speakon
1 Loop-Through/Output
Sensitivity: 99 dB SPL, 1W/1m
Nominal Impedance: 8 ohms
Power Handling: 250 Watts

Protection:

HF Transducer Protection: Crossover Network Includes
Integral HF Protection Circuit

LF Transducer:

Diameter: 330 mm (15 in)
Power Handling: 250 Watts

HF Driver & Horn:

Diaphragm Diameter: 44 mm (1 3/4 in)
Power Handling: 60 Watts
Dispersion Angle (H x V): 90 x 60

General:

Baffle: Die-Cast Aluminum
Enclosure: UL 94HB Polypropylene
Dimensions (H x W x D): 27 x 17 x 17.5"
Internal Volume: 1.8 cu. ft.
Weight: 40 lb.

Performance:

Frequency Range (-10 dB): 80 Hz to 18 kHz
Frequency Response (± 3 dB): 100 Hz to 16 kHz
Enclosure Alignment: 6th Order
Long-Term Continuous SPL: 116 dB
Long-Term Peak SPL: 122 dB

Input:

Input Connectors: (2) 4-pin Neutrik Speakon
1 Loop-Through/Output
Sensitivity: 96 dB SPL, 1W/1m
Nominal Impedance: 8 ohms
Power Handling: 125 Watts

Protection:

HF Transducer Protection: Crossover Network Includes
Integral HF Protection Circuit

LF Transducer:

Diameter: 250 mm (10 in)
Power Handling: 125 Watts

HF Driver & Horn:

Diaphragm Diameter: 25 mm (1 in)
Power Handling: 20 Watts
Dispersion Angle (H x V): 90 x 60

General:

Baffle: Die-Cast Aluminum
Enclosure: UL 94HB Polypropylene
Dimensions (H x W x D): 19.4 x 14 x 12.1"
Internal Volume: 1.0 cu. ft.
Weight: 25 lb.

JBL EON®

THE PASSIVE SPEAKERS

The EON 10 and 15 passive speaker systems feature the same advanced packaging and transducer technology used in the powered versions. Lightweight, rugged and roadworthy speaker enclosures incorporate a die-cast aluminum baffle and structural polypropylene enclosure designed for portable applications.

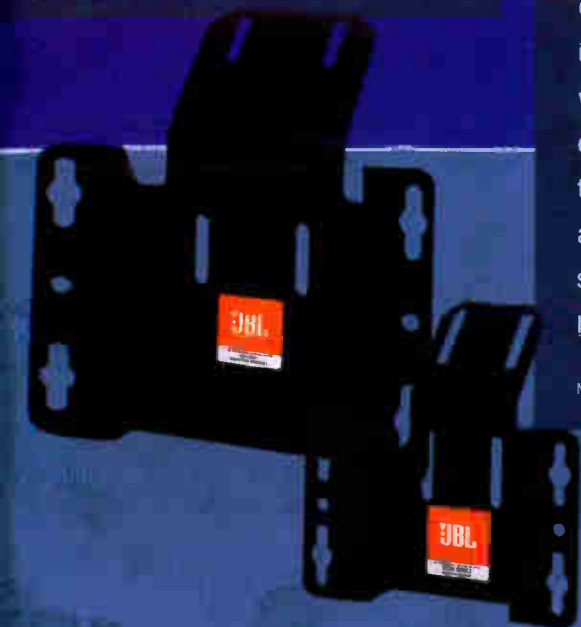
Careful attention has been paid to ensure that the overall system frequency response remains smooth and consistent both on and off axis, which is essential for good articulation and accurate reproduction of speech. Unique to all of the EON series low frequency cone transducers is a proprietary Differential Drive®

voice coil scheme which reduces the weight of the magnet structure. For the first time in the industry, it is now possible to achieve high power handling, low distortion and light weight in the same package.

BRK1, BRK2

The EON® BRK1 (for 15" product) and BRK2 (for 10" product) are fixed wall-mounted brackets. The BRK1 and BRK2 have been designed to provide cost-effective means of installing EON speakers safely and quickly. Two installation angles are possible. In an upright position, it is tilted 30° down from vertical. By inverting the loudspeaker or the bracket, the tilt angle becomes 20° down from vertical, enabling coverage of a larger listening area. Keyholes in the brackets make installation fast and easy. The instruction sheet includes a mounting hole template. Both brackets are constructed of rugged 10 gauge steel and are finished with a black powdercoat. Both include all necessary hardware to attach the bracket to the speaker.

Note: Hardware for fastening the bracket to the mounting surface is not included.



BRK4-10, BRK4-15

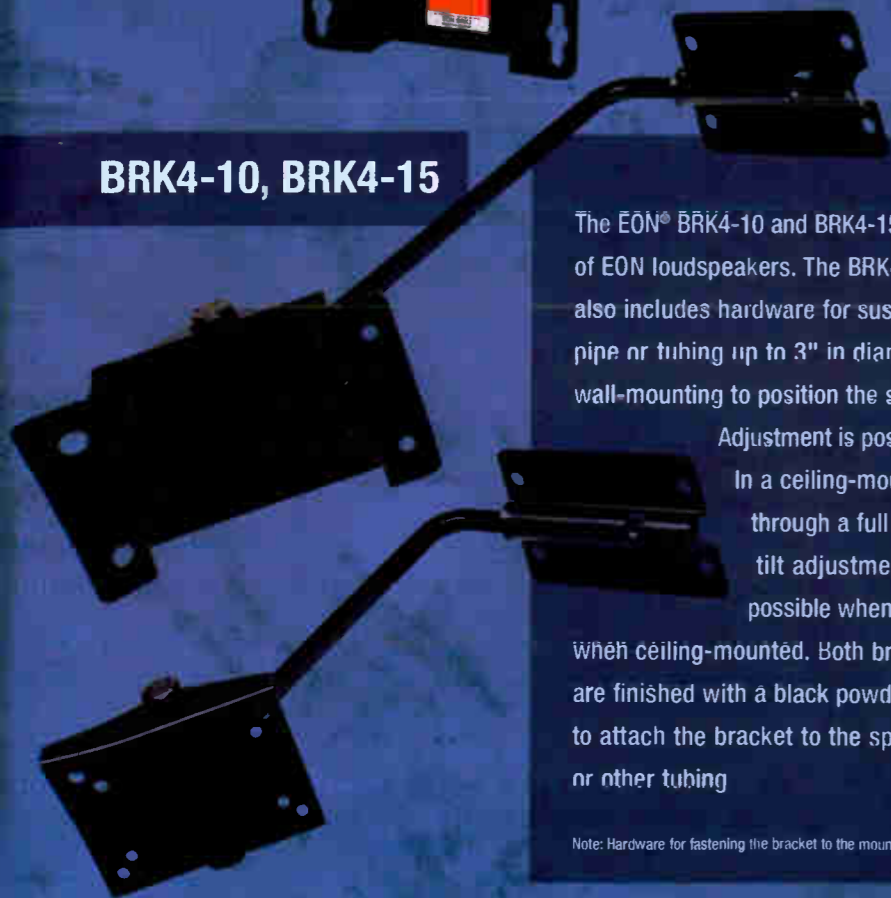
The EON® BRK4-10 and BRK4-15 provide ultimate flexibility in the installation of EON loudspeakers. The BRK4 may be attached to a ceiling or wall, and also includes hardware for suspension from a truss, lighting grid, or other pipe or tubing up to 3" in diameter. The main arm may be reversed for wall-mounting to position the speaker as close to the wall as possible.

Adjustment is possible on all three axes with minimal difficulty.

In a ceiling-mounted application, the speaker may be tilted through a full 180°. Wall-mounting allows for up to 110° of tilt adjustment. Additionally, up to 110° of rotation are possible when wall-mounted, and rotation is unlimited

when ceiling-mounted. Both brackets feature rugged steel construction and are finished with a black powdercoat. Both include all necessary hardware to attach the bracket to the speaker, and to attach the bracket to a truss or other tubing.

Note: Hardware for fastening the bracket to the mounting surface is not included.



JBL EON® BRACKETS INSTALLATION MADE EASY

M100S

Type: Dynamic pressure gradient microphone
 Polar pattern: Cardioid type
 Frequency range: 60 Hz - 10 kHz
 Magnet system: Neodymium
 Sensitivity at 1000 Hz: -76 dB, 0 dB = 1 V/Bar
 Impedance at 100 Hz: 250 ohms
 Environment: -10 °C to 55 °C, R.H. @ +40 °C 95%
 Connector: 3-pin male XLR
 Connector pinout: Pin 1 ground; pin 2 audio (+)
 Pin 3 audio (-)
 Case material: Zinc die-cast
 Finish: Matte black
 Size: 171 mm x 54 mm
 Weight: 320g
 Net/Shipping Weight: 541g

M80S

Type: Dynamic pressure gradient microphone
 Polar pattern: Cardioid type
 Frequency range: 70 Hz - 16 kHz
 Magnet system: Neodymium
 Sensitivity at 1000 Hz: -72 dB, 0 dB = 1 V/Bar
 Impedance at 100 Hz: 600 ohms
 Environment: -10 °C to 55 °C, R.H. @ ±40 °C 95%
 Connector: 3-pin male XLR
 Connector pinout: Pin 1 ground; pin 2 audio (+)
 Pin 3 audio (-)
 Case material: Zinc die cast
 Finish: Matte black
 Size: 171 mm x 54 mm
 Weight: 320g
 Net/Shipping Weight: 516g

M60S

Type: Dynamic pressure gradient microphone
 Polar pattern: Cardioid type
 Frequency range: 70 Hz - 15 kHz
 Magnet system: Ferrite
 Sensitivity at 1000 Hz: -74 dB, 0 dB = 1 V/Bar
 Impedance at 100 Hz: 500 ohms
 Environment: 10 °C to 55 °C, R.H. @ +40 °C 95%
 Connector: 3-pin male XLR
 Connector pinout: Pin 1 ground; pin 2 audio (+)
 Pin 3 audio (-)
 Case material: Zinc die-cast
 Finish: Matte black
 Size: 171 mm x 54 mm
 Weight: 320g
 Net/Shipping Weight: 442g



JBL EON® MICROPHONES HIGH QUALITY PERFORMANCE & VALUE

Each microphone is designed with features that meet the specific needs of different performers, so we've definitely got the right microphone for your set-up. All three have dynamic element cartridges and zinc bodies to make them strong enough to withstand the toughest handling and use. Each has a large washable wind/pop filter,

protective wire mesh and a rubberized shock ring that reduces bump when the mics are put down on hard surfaces. And when it comes to sound basics, you can count on high output, uniform frequency response and cardioid-type polar response. It all adds up to maximum sound efficiency and durability at an affordable

price. Perfect for karaoke users, hands and speech, the EON M60S is a superb general purpose mic. For clear, resonant vocals, the EON M80S is the ideal choice. With its refined frequency response, the EON M100S is our best mic for vocals, musical instruments, performing or recording.



EON
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EON
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Protect your EONs while you're on the road with bags made of heavy duty Cordura® nylon outer shell and plush 6mm velour interior padding. The bags have an easily identifiable two-color EON JBL logo on the front and tailored, reinforced cutouts for carry handle access.

EON BAGS

POWER SUB

Low Frequency Transducer:

Diameter: 15 inches
Sensitivity: 93 dB SPL, 1 W, 1 m
Nominal Impedance: 2 ohms
Power Handling: 400 Watts
Frequency Range: 40 Hz to 150 Hz

Power Amplifier:

Rated Power: 250 Watts
Rated Load Impedance: 2 ohms
Rated THD: 0.1%

System Specifications:

Input Type: Balanced Differential
Input Impedance: Line: 20 ohms
Speaker Input Impedance: 100 k Ω
Input Protection: HF and Level Protected
Sensitivity: Line: +4 dBu
Speaker: 20 volts
Maximum Input Level: Line: +28 dB
Speaker: 120 volts
Low-Pass Filter: 125 Hz Active 2 pole
Enclosure Alignment: 6th Order
Over Excursion Prevention: 2nd Order High-Pass Filter
Low Line Voltage Shut Down: 1/2 Nominal line
Thermal Protection: Amplifier Shut Down Auto Reset
Muting: 5 seconds at turn-on
Acoustic Frequency Response: 40 Hz to 200 Hz
Maximum SPL at 1 meter: (40 Hz to 150 Hz) 117 dB

Line Input Power:

US: 120 V, 60 Hz
Europe: 230 V, 50 Hz
Japan: 100 V, 50 Hz
Korea: 220 V, 60 Hz

Physical Properties:

Height: 27.0 inches
Width: 17.5 inches
Depth: 17 inches
Internal Volume: 1.8 cubic feet
Weight: 38 lbs.
Front Baffle: Die-cast Aluminum
Enclosure: UL 94HB Polypropylene
Enclosure Geometry: Semi-Trapezoidal with Side Flanges



The EON PowerSub is a full featured powered subwoofer designed to be an integral part of the EON powered sound system program. The unit is designed to augment the low frequency response of both 10 inch two-way and 15 inch two-way powered and unpowered speaker systems. Input to the subwoofer can be either a balanced line input which is easily daisy-chained to other powered

speakers, or the input can be a speaker level signal on a 1/4 inch phone jack to easily interface with existing products. As with the 10 inch and 15 inch two-way powered and unpowered speaker systems, the subwoofer incorporates the Thermomaster® Total Thermal Management System® and Differential Drive Woofer.

JBL EON® 15PAK

SOUND THAT CARRIES – IN ONE HAND



Master Volume Control
Mic/Line Switch
3 Input Connections:
1 Low Impedance XLR
2 Unbalanced 1/4"
Individual Input Level Controls
Effects Patch Connection
Line Out Jack
Headphone Jack
4-Band Equalization

PERFORMANCE:

Frequency Range (-10dB): 47 Hz to 18 kHz
Frequency Response (-6dB): 60 Hz to 17 kHz
Long-Term Continuous SPL: 121 dB (@1m)
Long-Term Peak SPL: 127 dB (@1m)

CONTROLS & INDICATORS:

Switches & Controls: Individual and Master Level Controls
Mic/line switch (Ch. 1 only)
EQ boost/cut controls
Power I FJ (front panel)
Signal present LED
Peak level LED
Mic/line status LED (Ch. 1 only)
On rear panel

Indicators:

Power Switch:

PROTECTION:

Input Protection: RFI and level protected
Over Excursion Prevention: 2nd order high-pass filter
Low Line Voltage Shutdown: At 50% of nominal line voltage
Thermal Protection: Amplifier shutdown and auto reset
Muting: 5 seconds at turn-on

LOW FREQUENCY POWER AMPLIFIER:

Rated Power: 130 Watts
Rated THD: 0.1%

HIGH FREQUENCY POWER AMPLIFIER:

Rated Power: 50 Watts
Rated THD: 0.1%

PHYSICAL PROPERTIES:

Materials
Front Baffle: Die-cast Aluminum
Enclosure: UL 94HB Polypropylene

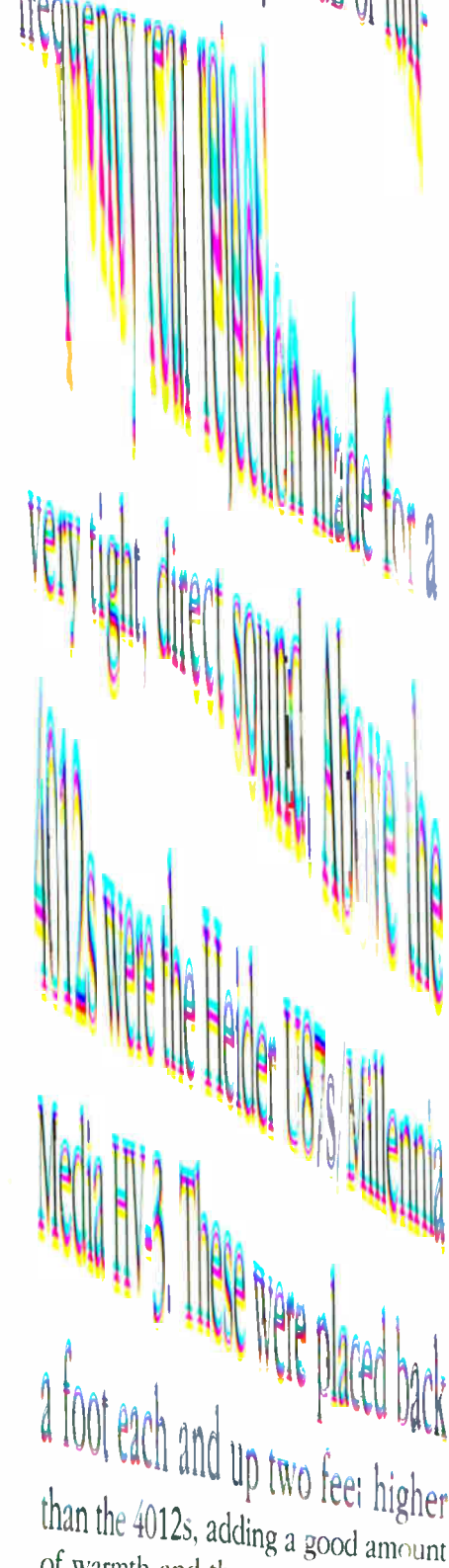
General

Enclosure Geometry: Semi-trapezoidal with side flanges.
Site upright or tilt back for monitor application.
Dimensions (H x W x D): 723 x 482 x 425 mm (27.5 x 17 x 17.5 in.)
Internal Volume: 57 liters (1.8 cubic feet)
Weight: 21 kg (47 lbs)

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pre-delay. It also makes digital pre-delay more effective later when adding reverb during the mix. This time, however, we placed two B&K 4012/2812 MkII's back-to-back for men and women. The mics were placed about three feet apart; the 4012s' nearly 50 dB of full-

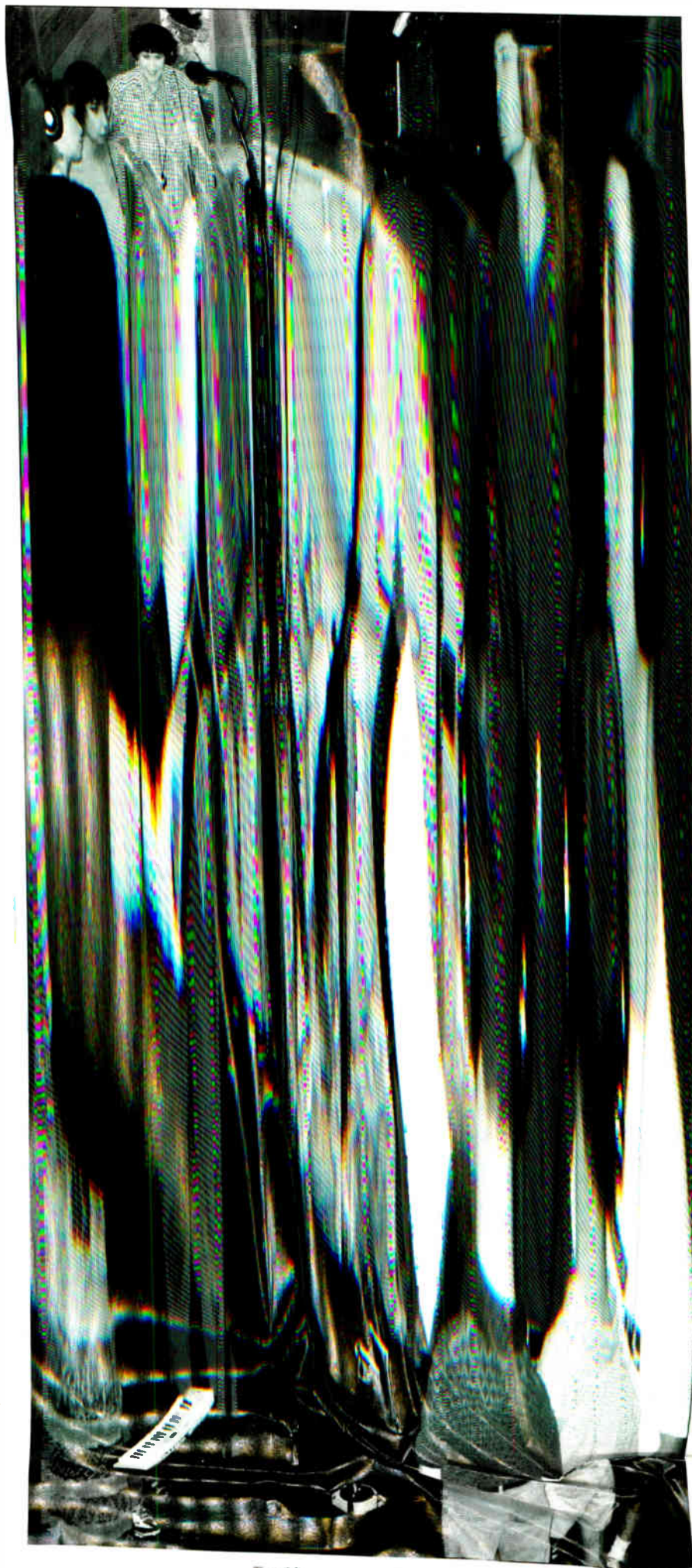


frequency response were placed back a foot each and up two feet higher than the 4012s, adding a good amount of warmth and the same kind of natural depth that occurs in choirs. These vocal passes were designed to be panned almost hard left and hard right, and two passes each were taken to give a good male/female balance. We also switched the singers around so the same person was not dead center on each pass.

The next pass was taken on a B&K 4009/2812 MkII omni, with a nose cone pointed straight up. It was placed exactly in the center between the singers at mouth level, two feet behind the primary cardioids and destined to always be panned in the center of the mix. Even if it was all guys or all girls, the tracking and panning plan remained intact for mixing consistency. The next pass was another B&K 4009 with an APE 50. For this and the next pass, we moved the singers into a semicircle around the mic, with any featured vocalist in the center. This pass was taken from 10 feet away and was also designed to be panned to the center. The final pass was a B&K 4040



One of the Wally Heider vintage U87s, #T0002.



Tracking vocals at Starke Lake

gold tube taken from 15 feet away and also panned to the center. This technique yields a "wall of vocals" sound. Once Aaronson knew the capabilities of this mic tree, the rest was almost automatic. He could combine warm sides with a brilliant center, or any combination. Wide panorama, front to back depth and an incredibly clear center were all at our fingertips.

The vocals were tracked to a Synclavier PostPro. When the 1995 vocals were tracked for the "Finale," we used an Aphex Expressor on slow attack, fast release, with a high compression ratio. The output of that was sent to a Dominator, with the ceiling almost wide open and the RCH factor all the way to the right. This shuts the 3-band limiter almost off and leaves the clipper engaged for transient trimming. If you use slow attack and fast release on the compressor side, you pull up vowel sounds, and then a fast, wide-open peak stop limiter to stabilize consonants. This makes tracking to digital zero effortless.

In the 1997 vocal sessions we used the Euphonix ES 108as. Due to its similar capabilities, we employed the same compression and limiting techniques to make the Synclavier input system very happy (digital zero without clipping or squashing). The latest software for the ES 108a now has a frequency-selective dynamic compressor. Because it can span the entire audio band, it has countless applications, one of which is as a de-esser. This improved the vocal image with a small amount of effort.

THE MIX

Fischman and Aaronson had requested that we not let the soundtrack get in the way of what was going on on-stage; rather, it should add energy to the show and engage the audience's

senses. At the same time, the soundtrack had to be BIG. We found that by not adding any reverb to the front and only adding it to the stereo sides and rears that we could effectively blow the theater's walls outward by at least 15 meters. Not adding reverb to the front made it seem as if a real band was present in the orchestra pit. We used TC Electronic M5000 dual engines for this: Program 1 was a modified GM-Hall, program 2 was a doctored Gold Foil Plate.

Having a Euphonix CS3000 full film mixing platform in the theater made the mix a pleasure. We adapted new jargon involving the Automation Viewer—the screen gives a "fader level vs. time line" that is very useful. On this page there are also aux pan and level visuals along with cue IDs and titles. Aaronson was quick to adapt into directing with a "one line up or two lines down" request to put the mix in the pocket he had foreseen. It made mixing like playing a video game: The winner gets a great mix as a prize. After working with automated features like fader write-in, write-out, panning, aux level and panning, automated equalizers and surround panning, I can see why, in the past, mixes of this size and complexity took so long.

The house EAW system was very musical. Subwoofers were used sparingly, leaving room for an incredible low-frequency impact later when the Titanic was sunk and Samson pushed down the temple. Fischman and Aaronson were adamant about not producing a mix that was just loud. During playback monitoring tests, we had a C-weighted SPL of 92 dB and still could carry on a low-tone conversation. I attribute this to the resolution of the entire audio chain,

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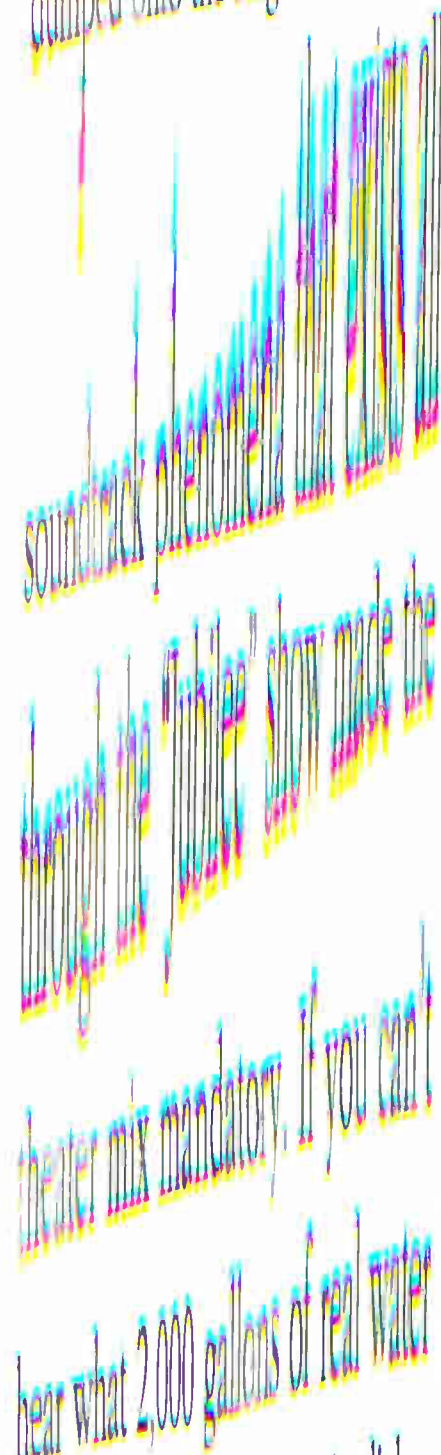
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CIRCLE #088 ON PRODUCT INFO CARD

which was re-engineered, installed and supervised by Glen Hatch from AudioWest. Hatch redesigned the entire sound system for 6.1 playback, no center channel! It works!

SOUND EFFECTS

Too often, film producers and directors have stunning orchestrations written for the most dramatic passages, but then feel compelled to bury them in sound effects. But in 6-channel Hyper Surround, there was enough room for everyone and everything. At one point in the sinking of the Titanic, almost every track moves and you can feel the urgency in the soundtrack. At that point, the scene is staged all around the theater, and the Hyper Surround panning system made this effortless. At the height of the catastrophe, 2,000 gallons of real water are dumped onto the stage. This real vs.



sounds like against your music, dialog and effects mix, how can you know how much water sound effects to place in the sides and rear?

Well, after seven 9-hour days we had mixed over one hour of soundtrack to Sony PCM-800 for archive. The final 6.1-channel mix was mastered in the theater using four TC Electronic M5000 engines. We used tool box/md-2 in the 24-bit mode and one TC Electronic DB MAX with the normalizer for the boom channel. These digital transfers were made to an IQS SAW Plus digital audio workstation, with dual Antex Studio Cards, which play the entire soundtrack live for every performance. In more than 1,200 shows the system has worked flawlessly. The need for "in the theater editing" was derived from the ongoing changes and multi-uses of "Jubilee."

When the final MD2 mastered mixes were installed into the SAW Plus system, the immediate results were that the audience response increased from applause to standing ovations. Aaronson noticed that the new soundtrack produced a new attitude in the cast, and this, coupled with the Hyper Surround, was responsible for the more enthusiastic response. It was extremely gratifying to engage this kind of sonic upgrade to a show as legendary as "Jubilee." During your next visit to Las Vegas, we highly recommend a visit to Bally's and the experience of "Jubilee" in...Hyper Surround!

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BI-AMP ▶ 1.6 ^{HVX}	300 725	450 1100	NR NR
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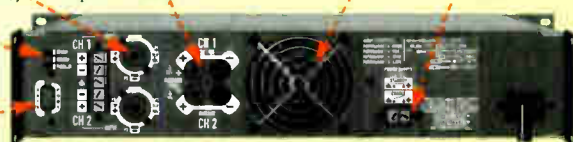
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MONITOR LESSONS

TIPS FOR THE TOURING PROFESSIONAL

I first cut my touring teeth as a monitor tech with Crystal Gayle under the tutelage of the fabulous Freddy Mueller. Since then, I have spent much of the past two decades listening to the mains and occasionally complaining about the racket coming off the stage, but I've also been lucky enough to work with and interview some of the finest monitor engineers in the business. In October, while on the bus with a major theater tour, mixing monitors, I had the good fortune of rolling through the New England countryside and passing by Woodstock, site of the festival where Hanley first turned a speaker around and pointed it at a microphone in public. [*Others, it should be pointed out, dispute this "first" claim—Eds.*] Even though monitor systems have become increasingly complex, the laws of physics and the needs of the musicians have not changed one iota. So now seems like an appropriate time to share a few simple monitor lessons.

BRING YOUR OWN MICS

It only takes a few festival situations with no soundcheck for this bit of wisdom to sink in: Carry your own set of microphones, direct boxes and even mic cables. To quote a friend, "Using other people's mics is like renting bowling shoes." A seldom-observed fact is that new cables for a 30-input show cost less than a condenser mic. Once you have pre-loomed and labeled cables for your show, you will save many hours of setup time over the course of even a short tour. Mics, DIs and cables can fit into a case small enough to carry onto an airplane. Many groups choose not to carry an entire sound system with them, leading to at least a few surprises for their engineers, but you can cut the number of variables in half by bringing these few small items to every show. Further, the technical requirements for the show can be spec'd more easily

in a minimal, straightforward fashion, and troubleshooting is easier. Remember, time wasted while you run around in front of your band trying to find a bad input can never be recovered.

A corollary to the above rule is, bring the indispensables with you. If any of the sound equipment listed on your rider is so essential to your show that you will not accept a substitute, then just carry it with you. Otherwise, list an alternate and let everyone move on to the next item. It is unrealistic to expect each local vendor to carry enough inventory to satisfy the whims of every touring engineer. Whether it's a reverb, compressor, mic preamp or even some odd keyboard with a special sound, if it's that important...And if you do end up with an unfamiliar piece of gear, don't whine about it—experiment. You may just find something that works better than what you're accustomed to.

FLAT SPEAKERS VS. "VOICE-TUNED" GRAPHICS

There are basically two approaches to equalizing a monitor speaker. A majority of sound operators follow the time-worn ritual of talking into a vocal mic and adjusting the sliders on the graphic until the speaker sounds right. Years ago, when stage monitors were typically fed from a pre-fader, pre-EQ fold-back mix created at the FOH console, most of the inputs dialed into the wedges were vocals, and the only monitor equalization available was the graphic EQ across the monitor send.

The main problem with this approach is that it places two EQ curves—the built-in vocal mic frequency response and that of the graphic EQ—across the monitor speaker mix. This may ensure that the vocals sound natural, but such a vocal mic-derived EQ curve does not necessarily work for other in-

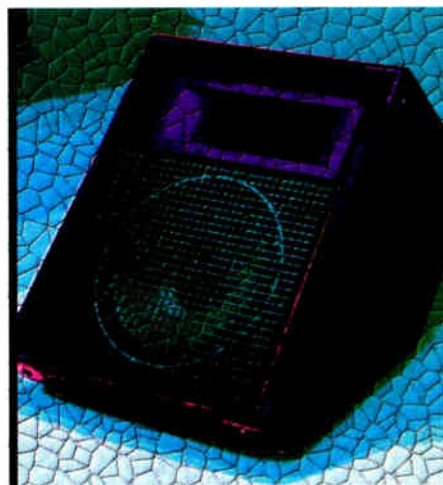


PHOTO ILLUSTRATION MIKA CHESARI

puts. Soundcheck may demonstrate the need to undo the vocal mic-derived system EQ curve by using channel EQ on each of the other inputs, and, depending on the graphic curve, even a 4-band fully parametric may not be enough.

Another more uniform approach is to make the speaker reasonably flat or neutral-sounding for all inputs and then apply channel EQ at each input (note that mics with really erratic off-axis response will feed back easily, and "bad-sounding" mics will sound bad through a flat system). One method for achieving "flat" response is to use a $\frac{1}{2}$ -octave RTA and put pink noise through the system; the response of the RTA display is then "flattened" with a graphic EQ. More sophisticated methods, such as FFT analysis, offer higher resolution and allow the engineer a glimpse of the true response of the speakers in combination with the room. With a more detailed analysis system than $\frac{1}{2}$ -octave RTA, parametric equalizers are a better choice than graphics because they can smooth out the sound system more precisely and evenly. Given enough time and patience, it is possible to achieve excellent results by ear alone, but a visual aid that shows the exact center frequency and height of the bumps on a system's response will help get the best result faster. It's hard to appreciate this fully until you've tried it both ways on the same project. Ten minutes with the right analysis tool and a parametric can be more productive than an hour with just a vocal mic, a graphic and the mantra of "check, one-two." Having said that, I don't advocate abandoning this latter method entirely.

BY MARK FRINK

—CONTINUED ON PAGE 138

THE ARTIST ON THE ROAD

Ready for Anything

Last summer, The Artist Formerly Known as Prince headed out to arenas, outdoor sheds and halls across the country. The Artist's latest high-energy show featured new grooves and plenty of old favorites, all served up in a two-hour jam that showcased a wide range of nightly guests, ranging from Chaka Khan to Graham Central Station to Carlos Santana. The tour kicked off in July and was originally scheduled as a five-week run, but it continued on through autumn and was still going strong at the end of the year.

Audio production was provided by Electrotec, of Westlake Village, Calif., whose involvement with The Artist began last summer. In an interview last October, Electrotec's Ted Leamy predicted that the tour would run into early 1998. "We don't know when it's going to end," said Leamy, who joined Electrotec in 1978 and has been part of the company's management for the past five years. "And in a way, that's kind of exciting, due to the way The Artist books dates on short notice. None of us are really sure; it could run up until 1999."

One of Electrotec's biggest challenges on the tour was to accommodate The Artist's desire for flexibility; he wished to be able to invite different musicians to be part of his show on various dates, and also to perform as stand-alone acts before his set. "Shortly after the tour began, we saw that the scope of the work every day was greater than the typical tour," recalled Leamy. "We needed a team of guys that can think on their feet, that could turn on a dime, make decisions. So the only way that we were able to do that was by putting together an extremely strong crew. So I put Electrotec veterans out there." Those veterans included Jeff "Raz" Rasmussen (front-of-house engineer), Charlie Lawson (crew chief and system engineer), George "Barney" Barnes (monitors), Bill Chrysler, who sets up the monitors and assists Barnes, and Lary Bodopivec and Mike Humble,



(L to R) Monitor engineer George "Barney" Barnes, FOH engineer Jeffrey "Raz" Rasmussen and system engineer Charlie Lawson.

who focus primarily on the speaker system setup.

Rasmussen's biggest priority at the FOH position is making sure that The Artist's voice and instrumental solos are out on top of a 69-channel mix. "Really, what I'm doing with him is just getting his [Shure Beta 87 UHF wireless] mic really hot," he explains. "It has to be able to override the whole mix, and he doesn't sing all that loud, so I have to crank it. I have a compressor on his voice, to smooth off peaks, not hitting it real hard." Other vocal effects include a TC 2290 delay, Lexicon 224 reverb and an Eventide H3000 Harmonizer for a

little bit of chorus.

On the rest of the band, Rasmussen uses few effects: "I have a lot of gear, but I just use one reverb for one snare drum, or one for the backup vocals, et cetera." He prefers to adjust reverb and delay times manually during the show, rather than use presets. "I change reverb time up and down for ballads, things like that. I do the delay times; I just tap them in. I know them to where I could just set them and scroll through them, but to me it's more fun to actively participate; plus, [I can compensate] if the tempo ever varies a little bit," he explains. And although

—CONTINUED ON PAGE 145

BY SARAH JONES

THE EMPEROR'S NEW MIX

DEBUNKING THE MYTH OF STEREO IN LIVE SOUND

Once upon a time there was an emperor who lived in a giant palace. After mixing some tracks in his private studio, the emperor was so excited about their stereo imaging that he decided to host a concert for his 5,000 closest friends. For the occasion, he bought a brand-new, state-of-the-art stereo sound reinforcement system. Before the show began, the emperor announced to the crowd what he had learned from the P.A. salesperson: "This system has magical qualities such that it creates perfect stereo imaging in every seat. Anyone who does not experience stereo imaging is obviously unsophisticated and not fit for their job."

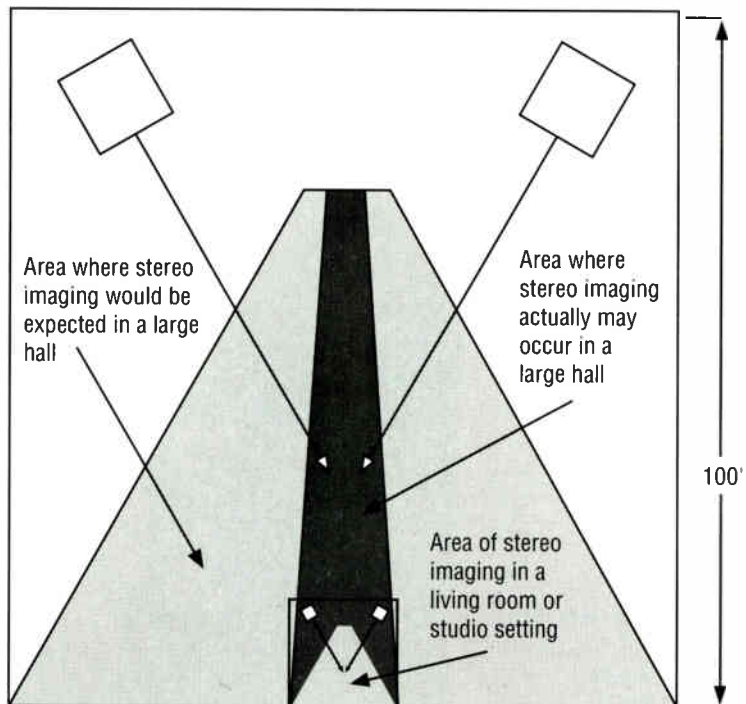
Everyone was seated to the left and right of the large center aisle. The P.A. was arrayed so that every seat was covered by both the left and right stacks. The concert commenced. The emperor sat in the center and marveled at his own sophistication. The stereo imaging was perfect! Everyone else squirmed in their seats at the realization that they were unsophisticated and in danger of losing their jobs if found out. For them, the sound appeared to come almost exclusively from the P.A. stack on their side. At the conclusion, all attendees complimented the king on the vivid stereo imaging they had experienced. Everything went along well enough until a child on house right called out, "Why did all of the music except the floor tom come out of the right speaker?"

What the child said was true, and everyone knew it.

For some reason, the stereo imaging only worked in the very center of the hall. How could this be? Was there something wrong with the sound system? The mix? The room acoustics? None of the above.

STEREO IMAGING DOES NOT SCALE

There is a simple and intractable problem: The effects of stereo do



Plan view of a living room superimposed to scale with concert hall

not scale when you move from the studio into large halls. You may indeed have stereo coverage at every seat, but that does not mean that you will experience stereo imaging once you leave the center.

Everyone agrees that stereo imaging is best experienced from the center. But in a studio or living room, you can move through a large percentage of the room and still experience very effective stereo. Try this yourself: Put on a well-mixed track at home and sit directly in front of the left speaker and close your eyes. Even off center, you can still locate instruments at various horizontal positions between the speakers. Now try it again in front of the left P.A. stack at a distance of 100 feet in a concert hall. No more gradual horizontal movement between the sides. The image stays almost entirely in the left speaker. Keep your eyes closed and work your way slowly toward the center (be careful!) until you arrive at a

place where you experience the same panoramic image as you had in your living room. Be objective! This is about actual experience, not the desired experience. Chances are that you are only a few feet farther off center than you were in your living room. The distance you can walk in your living room and maintain a stereo image is about the same as the distance you can walk in a 5,000-seat hall before the imaging is lost.

TIME AND LEVEL OFFSET

Panoramic localization between two sound sources relies on two interrelated factors: Time offset and level offset. Let's first look at level offset. Turn the panpot on the mixer gradually to the right. You have now created a level offset in favor of the right, and the image moves predictably in that direction. That is, of course, if you are seated in the center. If you are seated off-center, the image no longer tracks the panpot. Why? Here enters the

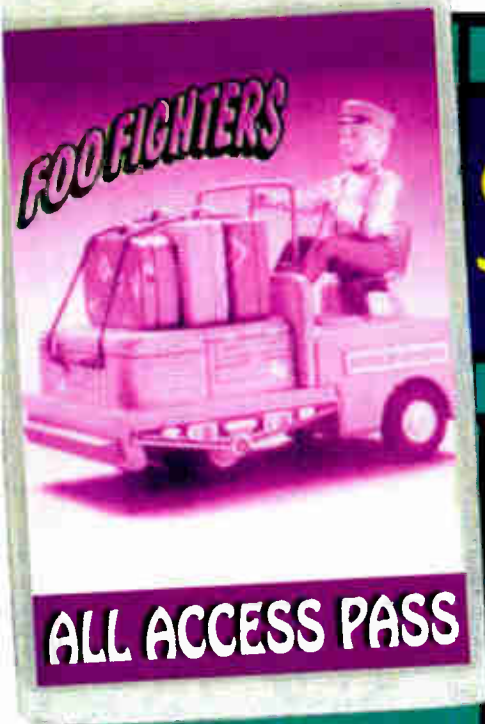
—CONTINUED ON PAGE 136

BY BOB MCCARTHY

ALL ACCESS

Foo Fighters

TEXT AND PHOTOS BY STEVE JENNINGS



Having made the move from drums in Nirvana to guitar/lead vocals for Foo Fighters, Dave Grohl always gets the crowd going. In November, Grohl put on an excellent show at Oakland, Calif.'s Henry J. Kaiser Convention Center with fellow Foos Nate Mendel (bass), Franz Stahl (guitar) and Taylor Hawkins (drums). Mix spoke with the crew, who have worked with Grohl since Nirvana.



Monitor engineer Ian Beveridge likes the Midas XLS console because of its straightforward layout. "Once I've tuned the rig and fired up the guitars, rather than EQ the guitars I stand with the guitar tech as he plays and adjust the position of the guitar mic to get the tone he feels is right for the monitors." Beveridge uses Britannia Row Flashlights instead of Floodlights for sidefills, giving a narrow dispersion: "You can make little pockets of sound where you want them. When your sidefills are 25 feet away from the center, you can create this little zone."



Craig Overbay, FOH engineer (at the Yamaha PM4000), says the tour is using gear from Britannia Row (London, UK) and Rat Sound (Sun Valley, CA). Rat Sound, he says, has always run subs on an auxiliary send. "They've made a recent modification, where all the 1-inch drivers and all the super tweets also run on an auxiliary. The great advantage is that you can assign lead vocal, hi-hat and cymbals to the 1-inch drivers and turn them up and down at will. When they play something that's really quiet, you just take the 1-inch drivers and turn them way up and it sparkles; when they go into something loud and fast you can just crank it back down and you don't get all those frequencies flying around the room." Overbay is using Red Box DIs for speaker simulators instead of actually miking the cabinets. He uses the new Audix OM-6 on Dave Grohl's vocal.



On a few numbers, Grohl (R) jumps behind a second kit, joining Hawkins in a dual drum attack. On the kits are two kick drum inputs miked with an SM91 and an Audix D-4. "One [feed] is for the drum fill and the other goes all over the stage," says Beveridge. "I can EQ them totally independently to get the right low end and not kill the other guys."



Guitar tech Earnie Bailey says the band uses a dozer different amps in the studio, so duplicating their sound live can be a challenge: "We use a Mesa/Boogie Dual Rectifier onstage and a Heartbreaker for the clean sound." Grohl's guitar arsenal includes a P-90 Goldtop, Travis Bean, Les Paul custom and White Explorer.

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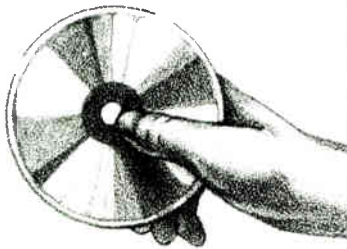
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—FROM PAGE 134, THE EMPEROR'S NEW MIX

dominant factor in localization: time offset. We localize to the first arrival even if it's only slightly ahead, unless the late arrival is much louder. The psychoacoustic relationship between these two factors is known as the "precedence effect" and was chronicled in the 1950s by, among others, the now-famous Dr. Helmut Haas. The "sweet spot" for binaural localization (stereo imaging) is within the first millisecond of time offset. If the time offset exceeds 5 ms, the image can only be moved by brute force. The later channel must be 10 dB louder than the first arrival.

Now here is where the scaling concept comes in. Level and time offset do not change together as we scale from a small to a large listening space. Level offset is a ratio between the two arrivals. The level offset relationship between left and right is the same in your living room or a stadium. If you are twice as far from one to the other, and all other factors being equal, the offset will be 6 dB. This is the case whether this is a ratio of 10 feet to 5 feet or 100 feet to 50 feet.

Time offset, however, is not a ratio. It is simply the *difference* in time arrival between the sources. While the level offset remained constant in the above example, the time offset increased by a factor of ten (10x) between the offsets of 5 feet (approx. 4.4ms) and 50 feet (44ms), respectively. Since time offset is the dominant factor in localization, you can see that the odds are stacked against achieving stereo on a large scale. Since we have only a 5ms window where we can control the image, the usable stereo area in an arena is very small in proportion to your living room. In other words, the actual horizontal area for true stereo localization is only slightly larger in a concert hall than in a living room.

No one wants to admit that there is no stereo for the masses. From the mix engineer's viewpoint, stereo is a big advantage. If you are mixing from the center, it is easier to hear individual instruments in the mix if they are panned across the horizon. Plus, it's more fun.

The diagram on page 134 shows the plan view of a concert hall and living room. The living room is shown in scale with the concert hall. The lightly shadowed area in the living room shows the area where the signals from the two systems arrive within 5 ms of each other. This is the usable stereo image area. The same shade in the concert hall plan

view denotes where you would expect stereo imaging if it were like your living room. The darkened area shows the actual area where stereo works in the concert hall.

SIDE EFFECTS

The pursuit of stereo imaging can have a negative effect on frequency response uniformity if the speakers are arrayed so that large areas of coverage overlap. Signals that are panned to the center, like your most important channels, will arrive at different times to seats that are off-center. This causes deep comb filtering and changes the frequency response for each listener.

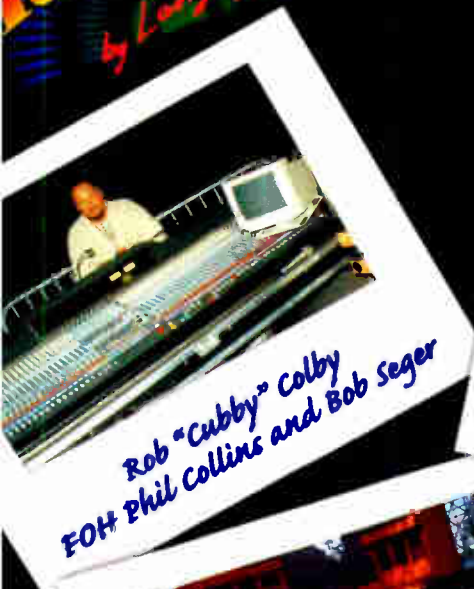
Comb filtering is one of the side effects of combining signals that are out of time. The time offset changes the phase relationship between the two channels for each frequency. At any given location, the summed frequency response depends upon the phase relationship between the two signals. Where the phase responses match, there will be maximum addition. Where they oppose, there will be maximum cancellation. At points in between, the combined signal will have neither addition nor subtraction. The result: a series of audible peaks and dips in the summed response. Each change of location presents a different time offset between left and right, hence a new phase relationship, resulting in a new set of peaks and dips in the frequency response.

The peaks and dips caused by comb filtering are most severe when you have two sources that are close in level but offset in time. The more you reach for stereo by increasing the overlap, the deeper the peaks and dips. This is not a small matter. A system with large overlap will have 30dB variations in frequency response over wide frequency ranges that change within a few seats, rendering your equalization arbitrary. A small time offset of 1 ms will create an octave-wide hole at 500 Hz and a series of narrower peaks and dips above that. An offset of 5 ms (the limit of our usable stereo imaging) will start its damage at 100 Hz and go up from there. Larger offsets degrade intelligibility and sound quality further.

If stereo is the most important thing, then you need to hard-pan your channels and overlap the P.A. for the entire hall. The only way to overcome the time offset factor is to "brute force" it with level. While this will expand the area of stereo, it cannot overcome the gross level differences between left and

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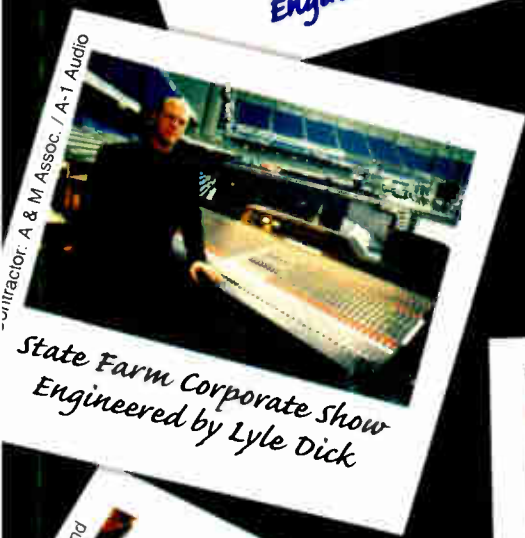
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right that accumulate on the sides of the hall. However, the channels that are panned center will have highly variable responses over the listening area, due to combing from the overlap.

This approach was used for years by an unnamed touring band, who hard-panned several of the musicians. In the central listening area, the stereo was awesome. However, fans who did not arrive early enough to get central-area seats had to choose whether to hear the left drummer and rhythm guitar or the right drummer and keyboards.

If getting the whole band to the audience is the priority (and I hope it is), then leave stereo as a special effect. Design the P.A. so that the overlap between the left and right stacks roughly coincides with the usable area inside the 5ms time offset window. Reduce the level of infill speakers so that front-center coverage can be achieved without large overlap. Don't waste your time, energy or money on stereo delays and fills.

CONCLUSION

This all may sound radical, perhaps even heretical to many readers. After all, we've put so much time and effort

into stereo reproduction in sound reinforcement. It would be wonderful if we could have stereo in every seat in the house, or even half of them. If large parts of the audience received the enhancements of stereo imaging, we could argue that it was worth the price paid in comb filtering and intelligibility loss. But it is futile and self-destructive to fight the laws of physics and psychoacoustics and pretend that we are experiencing stereo when we are not. Remember our priorities. It is unlikely that patrons are going to complain about insufficient stereo. They will, however, complain if it sounds like a telephone or is unintelligible, two of the more likely side effects of pursuing stereo in large venues. Mono sound reinforcement seems like something we should have been able to outgrow by now, but it has one distinct advantage over stereo: It works. This is not a slogan that would excite the emperor, or the band's manager, but it does have some truth: "This system has magical qualities such that it creates perfect mono imaging in every seat." ■

Bob McCarthy is an independent engineer specializing in sound reinforcement alignment and design. He teaches Meyer Sound's SIM course and has written four books related to sound system alignment and design. He can be e-mailed at hobmcc@sirius.com.

—FROM PAGE 132, MONITOR LESSONS

There are times when voice-tuning works just fine, and an operator thoroughly familiar with this approach can achieve consistent results. And, of course, FFT analyzers and quality parameters are not always available.

Here's another tip. In most monitor systems, the important inputs are the vocals and the kick drum. Because many microphone lists are made up of models containing the same capsule, with the exception of a few condensers and DIs, just about any input can sound reasonably close to ideal with the right EQ on the graphic. (Remember to use the channel EQ to roll off lows on the vocal mics to compensate for proximity effect.)

Tuning each wedge for its primary vocal mic with the graphic and then tuning the drummer's monitor(s) with the kick drum mic can be a marvelously efficient method that leaves only a couple of other inputs to be dealt with. If the drummer needs to hear vocals, it may be necessary to set up a separate dedicated vocal wedge; similarly, for those who

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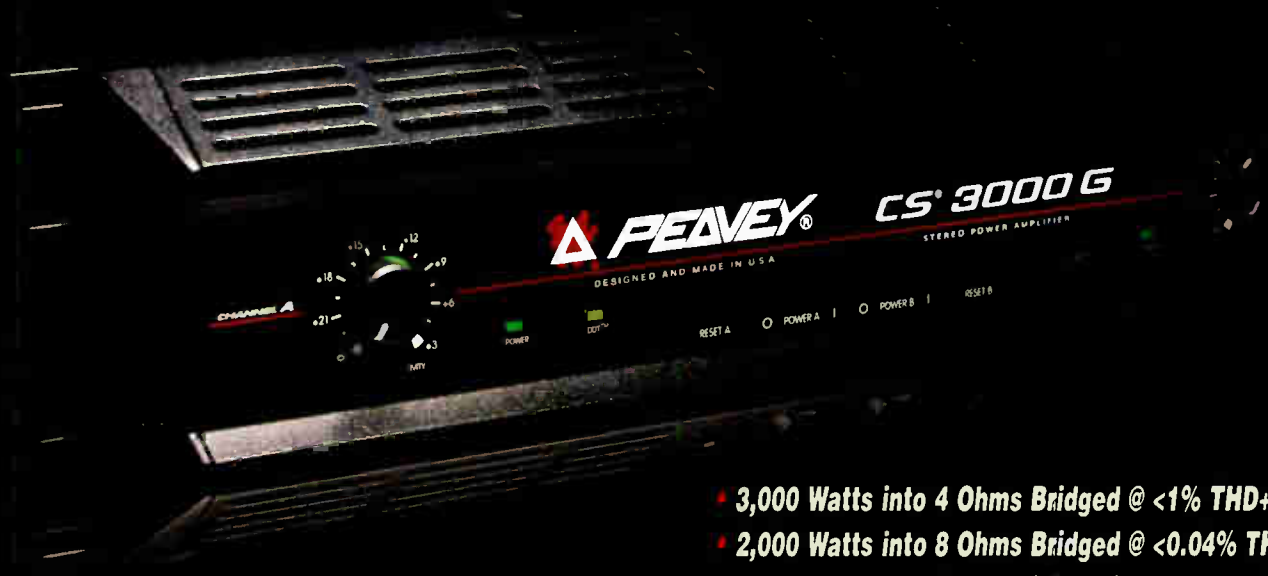
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need to hear guitar in the monitors, a second wedge dedicated to that input allows for a different curve on the graphic optimized for guitar. Of course, whichever method you choose will be dictated by the equipment at hand and your personal preferences, but know that there are workable alternatives to the way you've always done it.

SIDEFILL REFLECTIONS

How many of you set up full-range speakers at the sides of the stage as part of the monitor rig? Imagine you're at home watching television in your living room, with a coffee table between your couch and the TV. Now clear off the table and lay a mirror down, thereby doubling the TV image. Pretty crazy way to watch TV, isn't it? Well, the typical uncarpeted stage floor is just like a mirror for the sound coming from the sidefills. But, unlike the TV example, the sound reflected off the floor combines with the direct sound to produce cancellations and comb filtering throughout the frequency range. These cancellations are due to the difference in arrival time between the direct sound and the

reflection off the floor. And only a couple of milliseconds' delay will produce deep notches in frequency response. Further, these cancellations shift up and down in frequency as the singer moves around, and a change in the mic position of a few feet can change the gain radically at a critical frequency—hey, presto, instant feedback. There are several solutions to this, including carpeting the stage, getting the sidefills up on top of cases or even flying them at the height of the mains. But you cannot create a useful solution until you have recognized the problem.

DELAYING THE WEDGES

Delay systems are most commonly used in the audience area, either to augment the main speakers where coverage is poor or to cue the audience acoustically to perceive the stage as the primary sound source rather than the P.A. But delays have a place onstage, too. If an artist has a mix in both downstage-center wedges and the sidefills, he or she will not hear the sidefills unless the wedge mix is delayed. When the arrival times of the two mixes match up at the artist's position in front of the wedges, it may appear that the wedges aren't even on, but

the monitors will be twice as loud and there will be no cancellations between the two mixes. Of course, when the artist moves out of the downstage pocket toward the sidefills, the delay time will be wrong (the sidefills will lead), but that would be the case anyway as the artist moves out of the wedge coverage pattern. Conscientious engineers can simply turn down the wedge mix when the singer is not in the wedge pocket.

IEMS FOR LISTENING

In-ear monitors (IEMs) fed from the monitor desk cue bus allow the engineer to "get inside" each mix and hear it clearly without the distraction of the backside P.A. rumble. Several monitor consoles offer two cue outputs, allowing the operator to go back and forth between a wedge and IEMs. (If a second cue bus out is unavailable, simply run the IEMs off the mixer's headphone output and run the listen wedge from the cue out.) IEMs will help you identify those mixes that are on the edge of feedback before they start ringing. Equally important, in-ear monitoring can be done at lower listening levels, literally saving your ears. A variation on this method is to use an ear mold in

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off, try to call them by name and they'll return the favor. For them, the monitor system is not the boxes at their feet and the desk you're standing behind, it's YOU. Think of yourself as a waiter at a fine restaurant—serve up the sounds with a smile and a nod and you'll be on your way to making new friends. It's a well-known fact that monitors always sound better when the engineer smiles, even when hands are not on the knobs.

Don't forget that hand signals are the surest form of non-verbal communication between musicians onstage and the monitor engineer. Invest a few moments in discussing a small repertoire of signals ahead of time, and each musician will more easily get what he or she wants.

It's worth restating the obvious: Soundcheck is for the band, line check is for the techs. Make sure all the inputs are working and roughed in with gain, EQ, inserts and effects before the talent gets onstage for soundcheck. Don't waste their time and do try to make their first entrance onto the stage an enjoyable experience. Also, don't forget that they're

one ear and listen to the roar of the mains with the other, which may give you a vague idea of what your talent is hearing near the front of the stage. Custom-molded in-ear monitors with both good frequency response and high isolation are the key, but closed headphones can work almost as well. A low-cost version was shown to me ages ago by an old Clair guy named "Bear," who simply put Sennheiser open-air headphones inside a pair of Clark hearing protectors. If you haven't started mixing on "ears" yet, you can practice in your spare moments by building your own mix on a stereo bus during the gig—but don't forget to maintain eye contact with the band.

BEYOND EQUIPMENT

Life magazine photographer Eisenstadt once said, "It's more important to click with the subject than with the camera." Talk to all the musicians on your stage every day. Even if you work for the local sound company and it's a one-

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NEWSFLASHES

Concert Productions (Murfreesboro, TN) is providing an Electro-Voice P.A. for Lyle Lovett's current tour...Diana Ross' European tour is carrying an L-Acoustics V-Dosc system supplied by Westfalen Sound of Emsdetten, Germany...Colorado Sound (Boulder, CO) purchased its fifth XL200 console...The touring production of *Chicago* recently opened at Chicago's Schubert Theatre. Sennheiser reports that all of the show's performers are miked with Sennheiser MKE2 lavalier mics; each person is also equipped with an SK50 UHF transmitter that works in conjunction with rack-mounted EM1046 multichannel UHF receiver modules...Spirit by Soundcraft reports that at the Hong Kong Return Celebration in Guangzhou, China, four Spirit consoles (two Spirit 8s and two Live 4s) were used to mix performances of a 250-piece orchestra. The Spirit 8s were used to submix the orchestra and to record the performance, while the Live 4s were used to submix a massive choir and 97 grand pianos...The Stratford Theatre in Stratford, Ontario, Canada, took delivery of its second Cadac F-Type console. The board was provided by distributors Westsun (Toronto) and

was inaugurated with a production of *Camelot*...Sound company Blue World Productions (Troy, MI) provided a Bag End P.A. for use at the Birmingham Jazz Festival in Birmingham, MI, this summer. Blue World also recently ordered four additional Bag End Gem Series loudspeakers...The new sound system at the Royal Festival Hall (London) is centered around a 32-channel DDA CS8 console and signal processing from Klark Teknik...ArtDiffusor Model C diffusers and custom Sonora Panels from the Systems Development Group (Frederick, MD) have been installed in the D.A.R. Constitution Hall (Washington, D.C.). One of the first performances to take place there after the new acoustical treatments were added was the TV special "Whitney Houston, Live From Washington, D.C."...Kathy Mattea's Love Travels tour is using a variety of DigiTech signal processors, including a Studio Vocalist (five-part vocal harmony processors), VTP-1 (dual vacuum-tube preamp, EQ and converter), VCS-1 (dual vacuum-tube dynamics processor), Studio 400 (multi-effects processor) and RPM-1 (rotary speaker emulator)...Spectrum Sound (Nashville) provided gear for the Stand in the Gap event held in Washington, D.C., in October. ■

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LIVE SOUND

musicians, not machines; give them a little freedom at soundcheck to noodle around and jam. Of course, this freedom can only come if the stage is ready and everything's working before they show up. If they can just start making music without those tiresome pauses for troubleshooting, they may reward you later with a show that puts magic back into the songs.

TURN IT DOWN, NOT UP

With today's high-powered monitors and back-line gear, it's easy to keep turning up the volume. More of everything in the wedges is not the answer. If a musician asks for an instrument in the monitors that is right next to her onstage, then something is already too loud. It's tempting to just give the knob a good hard twist and know that they won't need any more attention, but it's usually a better tactic to add a little at a

time; if they need more kick drum, you can be sure they'll ask for it. Unfortunately, few musicians will ask for less of anything, and instead tend to ask for more of everything else to balance out whatever is actually too loud. And when the overall stage volume gets too loud, they will need more of everything again. Pretty soon, the FOH engineer will be coming down to have a chat with you about how he can't get his mix going on the mains over the din from the stage.

TEAMWORK

If the band is too loud onstage, it's the FOH engineer's responsibility to step in and have a talk with the musicians and possibly the monitor mixer as well. The monitor engineer has to maintain a positive relationship with the bandmembers and often lacks the perspective to know when things are getting out of hand. An acoustical approach can help

JANE'S REUNION

The return of Jane's Addiction: Perry Farrell and crew re-formed last fall, playing sold-out houses from Halloween to mid-December. A-1 Audio (Hollywood) provided equipment and supplied crew chief Jeff "Skippy" Payatt and system tech Ryan Trefethen. Front-of-house engineer Russell Fischer mixes on a 56-channel Yamaha PM4000 console, augmented by a 16-channel ProMix 01 submixer. In the racks, front-of-house, are a Klark-Teknik DN60 analyzer, two DN360 dual graphic EQs, four dbx 160A compressor/limiters and three FAW MX800 signal processors. Russell also uses a collection of effects and inserts from Lexicon, Eventide, Yamaha, TC Electronic, Roland, Summit, BSS and Drawmer.

On the monitor end, mixer Jason Alt uses a Ramsa WRS-840 40:18 console. His EQ rack is full of six Klark-Teknik DN360s, and he has an inserts rack with four BSS DPR-402 dual compressor/de-essers, four Drawmer DS201 dual gates and an Intercom Master Station.

Fischer mikes Farrell's vocal with an Audio-Technica wireless system containing an AT89R mic capsule. Guitars are via A-T mics, also: "I'm miking those with Audio-Technica 4050s," Fischer says. "There are two dirty cabinets and two clean cabinets, and I take one mic on each cabinet." Fischer says his main priority on this tour is to offer enthusiastic fans enough separation to enjoy their favorite Jane. "You have four very accomplished people up on the stage," he says, "and you have people in the audience wanting to hear *that* person, and just getting the separation and definition so everybody that came to see Flea can sit

there and hear everything Flea is doing, and still look over at Dave Navarro and hear what Dave's doing has become important. But they're a pretty straightforward rock band, and they're a really good band, which makes my life a lot easier." ■



Jane's Addiction (L-R) sound tech Ryan Trefethen, FOH Russell Fischer, monitor mixer Jason Alt, crew chief Jeff Payatt



PHOTOS: STEVE JENNINGS

to improve the onstage balance—try positioning bandmembers close to instruments they need to hear and away from sounds that are bothersome. A well-positioned packing blanket or piece of Plexiglas can also help.

There is an invisible line between the stage and the audience. Often a struggle ensues between two sound engineers, each trying to push this imaginary wall back into the other's domain. Truly successful audio teams meet each other at this boundary and make that border dissolve into a unified audio space over which they share control. Each understands the needs of the other (and of the artist), and they strike a balance. Though it may seem boring to repeatedly discuss the technical aspects of show, a running dialog between the FOH and monitor engineer will elevate the quality of production. Such dialog eventually leads to an almost psychic ability to read each other's thoughts and react to situations without having to pick up the comm line. With that in mind, I close by offering special thanks to Sun Sound Audio, Grant McAree and Jamie Anderson, my past and present road team. ■

Mark Frink is Mix's sound reinforcement editor. He is currently on tour with k.d. lang.

—FROM PAGE 133, THE ARTIST

triggers all happen onstage, there are plenty of cues to manage. "Charlie Lawson has a good hand in helping me out," Rasmussen says. "If I am working on the vocal or something and there's a cue coming up, Charlie will catch it on the VCAs."

Rasmussen finds he can clarify the mix by adjusting the zoned crossovers in the P.A. "There's so much high end in the samples and stuff that the sound system was getting kind of shrill, so I went in the crossover and rolled things back, and Ted [Leamy] helped me design a program that would take out some of the overlapping frequencies, because I was getting build-up in certain places at certain frequencies." Rasmussen notes that the crew added infrared mic sensors to act as noise gates in order to eliminate some of the bleed onstage due to hot stage levels.

The tour has hit a wide range of venues, both indoor and outdoor; Rasmussen says he has gotten used to adapting to varied environments: "Once you've been to arenas enough times, you know what they're going to do once the people are in there and how

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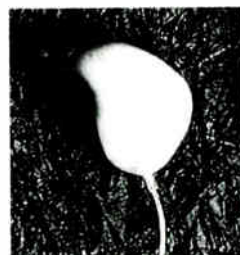
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it's going to sound, and which arena's going to sound more low-end or which one's going to have a lot of highs slapping around in there." Production has remained consistent for most of the venues, with the exception of occasionally scaling down the P.A. for the smallest halls.

Out on the road, Electrotec has been using a newly acquired Midas XL-4 (plus an XL-3 expander) at the front of house, plus two Midas XL-3s for the monitors. Onstage are two new monitor models designed in-house at Electrotec by monitor engineer George Barnes, Jim Douglas and Ted Leamy. "They were really driven by real-world knowledge, with a little technology thrown in there for good measure," says Leamy. "The SM112 is a 1x12 low-profile monitor; it contains all JBL components, DDS high-frequency horn, [and is] very small in size. The SM115 is a carbon copy of that, except it's a 1x15." The entire monitor system is driven by Crown's model 3612 amplifiers.

For the main speaker system, which is flown in a conventional left-right array, Electrotec selected its proprietary Q2 system, containing custom JBL components. Mainly configured as a two-box system, the Q2 rig includes a 2x15 box and a mid-high enclosure that has dual-12s and a 2-inch compression driver. For front-fill, the company provided an underhung box on a separate drive. "That's how we achieve very good coverage, right down to the front of the stage, without blocking any sight lines," says Leamy. This large flown array is supported underneath on the floor with Electrotec's Q2 sub-bass enclosures, outfitted with two Aurasound 1808 18-inch transducers in each cabinet. "We've had a great relationship with Aura in the development of the transducers, and they've proven to be great," says Leamy, explaining that the efficient new system allows for a 50% reduction in the number of sub-bass cabinets, compared to previous tours of this size. The entire FOH system is driven by a combination of Crest and Crown amplifiers, and the drive system is made up of BSS Omnidrive crossovers and BSS Varicurve equalizers, utilizing radial remote control, allowing fine-tuning of the system from any location.

Electrotec also assigned an entire second control system, including a Gamble console, to the tour. "We also have additional front-of-house equip-

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ment, additional monitors and monitor equipment," explains Leamy. "It's basically two full tours of control equipment and monitor equipment." The extra equipment enabled the road crew to adapt to changes in the on-stage lineup. "The tour manager called me one day and said, 'You know, George Clinton might be here tomorrow night,'" says Leamy. "It could pose a problem if you're not carrying the equipment for that."

"A couple of seconds before the show, it'll be, 'Hey, we're going to add a horn section!'" adds Rasmussen. "So we have to kind of catch that stuff on-the-fly. The Artist doesn't want any excuses from you; he just wants it to happen."

Leamy says that Electrotec chose a flexible configuration for the front-end processing elements in order to allow input from the sound engineers and to enable parameters to be tailored to suit The Artist. "The Artist is very, very involved with the day-to-day running of the production out there," says Leamy. "He often surreptitiously goes down to front of house and actually handles the system himself [during the opening act]. And does it very well, too."

"I find it exciting to have someone of that talent actually taking part in what we do every day. We're meant to be a transparent part of the show; when you don't hear anything about us, that means we're doing great. So it's very fulfilling to have someone of that stature operate our system and make suggestions, to be part of the technical collaboration."

Rasmussen concludes by saying that his main objective on the tour is "just to make The Artist happy. He comes out, stands at the console, has his input about what's going to happen. I think every day I'm getting closer and closer to his perfect picture. And that's what I'm striving for."

That sentiment echoes Leamy's philosophy on what it takes for Electrotec to be successful on the road: "Sometimes we in the sound industry get caught up in the technology. And that's very important. But we have to always keep in mind that people are onstage, and people are the ones that come to the show. So technology has to serve us. This tour is a good example of that, due to The Artist's personal input of the technology that has to be chosen and its particular implementation. It's technology being driven by an end, the end being, of course, the performance." ■

Sarah Jones is an assistant editor at Mix.

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ELECTRO-VOICE SX500

Electro-Voice (Buchanan, MD) announces the Sx500, a two-way speaker system with a 15-inch woofer and a 1-inch throat, titanium diaphragm HF driver in an injection-molded polypropylene cabinet. Designed to be stand-mounted or hung, the Sx500 is capable of handling 400 watts continuous (or 400 watts LF/25 watts HF when bi-amped) and is capable of 132dB SPL peaks at 1 meter. A self-resetting HF protection circuit prevents accidental overload, and the cabinet features integral handles and dual Neutrik Speakon connectors. Optional brackets are available for hanging the system. Price is \$832.

Circle 314 on Product Info Card



ASHLY DIGITAL EQUALIZER

Unveiling at this month's NAMM show from Ashly Audio (Webster, NY) is a 4-channel digital EQ designed for live sound applications. Built into a two-rackspace chassis, the unit offers 28 bands of equalization (programmable and storable for recall), along with high-pass filters, compressor/limiters and built-in alignment delay. The unit features simple analog-style interfacing, MIDI control, 20-bit AES/EBU digital I/O, 24-bit internal processing and balanced I/O (XLR/barrier strip/TRS) analog. Projected retail is \$2,000; options include a full-function remote control that communicates to the main rack via

standard XLR cables (up to 1,000 feet).

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GARWOOD RADIO STATION TS

The Radio Station TS from Garwood (Newtown, PA) is a wireless in-ear monitoring system offering a choice of four separate frequency packages configured for legal use in the USA, UK, EC, Japan, etc. Each Territory Specific (TS) package includes 16 UHF frequencies between 506-865 MHz, providing several frequency options within local spectra. Price is \$3,000.

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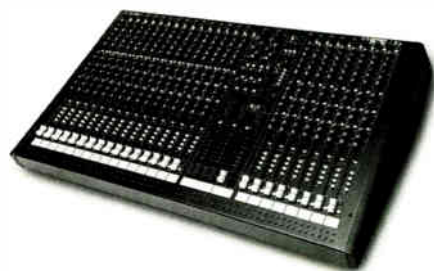
PEAVEY SRM 2410 MONITOR BOARD

Built into a durable, lightweight flight case, the SRM™ 2410 from Peavey (Meridian, MS) is a 24-channel monitor console featuring 24 "true" transformer splits, 4-band (sweep mids) EQ, eight mono subs and one dedicated stereo pair with pre/post switching. Each mono sub master has a tunable high-pass filter and two tunable notch filters with Peavey's proprietary FLS™ feedback locator circuitry. Additionally, each input channel has an FLS LED indicator to isolate problem channels. The mixer is \$2,999.99 and includes a universal 100-240VAC, 50/60Hz power supply.

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SPIRIT LX7 CONSOLE

Spirit by Soundcraft (Auburn, CA) is shipping its 4-bus LX7 console in 16-channel (\$1,900) and 24-channel (\$2,500) versions. Inputs offer UltraMic



preamps (gain range of 60 dB), 4-band (sweep mids) EQ, highpass filter, six aux sends (pre/post switchable) and 100mm faders. The output section has an additional two stereo inputs with EQ, two FX return paths and a stereo input for walk-in music. Additional features include phantom power, direct outs on the first 16 inputs, 12-segment bar graph metering, and PFL and talk-back facilities.

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AB ADDS AMPS

AB International (Roseville, CA) introduces the Model 6600 (\$2,770), a 6-channel amp in a 4U format, capable of 700 W into 2 ohms, all six channels driven. The similar Model 6300 (\$2,030) is capable of 300 W into 2 ohms, all six





channels driven. Two new 3-channel, three-rackspace amps, the SUB3600 (\$2,770) and SUB2000 (\$2,030) can be operated as stereo with mono summed sub channel, 3-channel, channels 1 and 2 bridged, etc. Maximum output is rated at 1,500 W into 4 ohms for channels 1 and 2 bridged; 2,000 W into 2 ohms for channel 3 (SUB3600) and 900 W into 4 ohms for channels 1 and 2 bridged; and 1,125 W into 2 ohms for channel 3 (SUB2000).

Circle 319 on Product Info Card

SENNHEISER IN-EAR SYSTEM

Sennheiser (Old Lyme, CT) introduces the 3050 Series wireless in-ear monitoring system, consisting of the SR3054-U single-channel and SR3056-U dual-channel transmitters (\$2,400 and \$3,800, respectively) and the EK3052-U belt-pack receiver (\$1,600). Featuring HiDyn *plus*™ compansion, the 3050 Series offers 16 switchable frequencies within a 24MHz range between 450-960 MHz. Front panel LEDs indicate power status, and an LCD shows selected frequency. A headphone jack with level control allows signal monitoring. The EK3052-U belt-pack receiver will run for eight hours on two AA batteries; LEDs indicate battery status.

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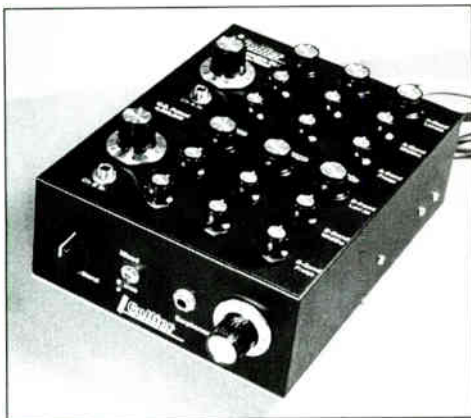
measurements more stable and easier to read, automatic delay locator and user interface enhancements. Price: \$795.



YORKVILLE TX SERIES SUB

Yorkville (Niagara Falls, NY) debuts the TX9S subwoofer, offering a frequency response of 35-130 Hz and 1,200-watt power handling. Features include two 18-inch RCF L18P300 woofers, 97dB sensitivity (1 W at 1 m), parallel Speakon connectors, 3/4-inch Baltic birch construction and two fixed wheels. The system is designed to be used with a multichannel TX processor (\$729 to \$849 each). The TX9S is \$2,149.

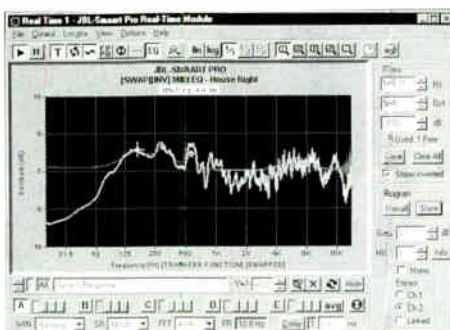
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COLLIER 2X3EQ PREAMP

Collier Electronics (Austin, TX) offers the 2x3EQ, a 2-channel instrument pre-amp with 3-band parametric EQ on each channel. Inputs may be EQ'd and output separately, or may be mixed internally via a front panel switch. Channel A and B inputs and outputs are 1/4-inch mono jacks, and the unit features an additional pair of low-level outputs for driving sensitive input stages. The AC-powered unit includes a stereo 1/4-inch jack for headphone monitoring.

Circle 320 on Product Info Card



JBL-SMAART PRO

JBL (Northridge, CA) has introduced JBL-SMAART PRO™, an improved version of the TEC Award-nominated acoustical measurement and system optimization software program. New features include native 32-bit operation in a Windows 95 or NT (V. 4.0 or higher) environment, ASCII export feature, a transfer function that makes acoustical

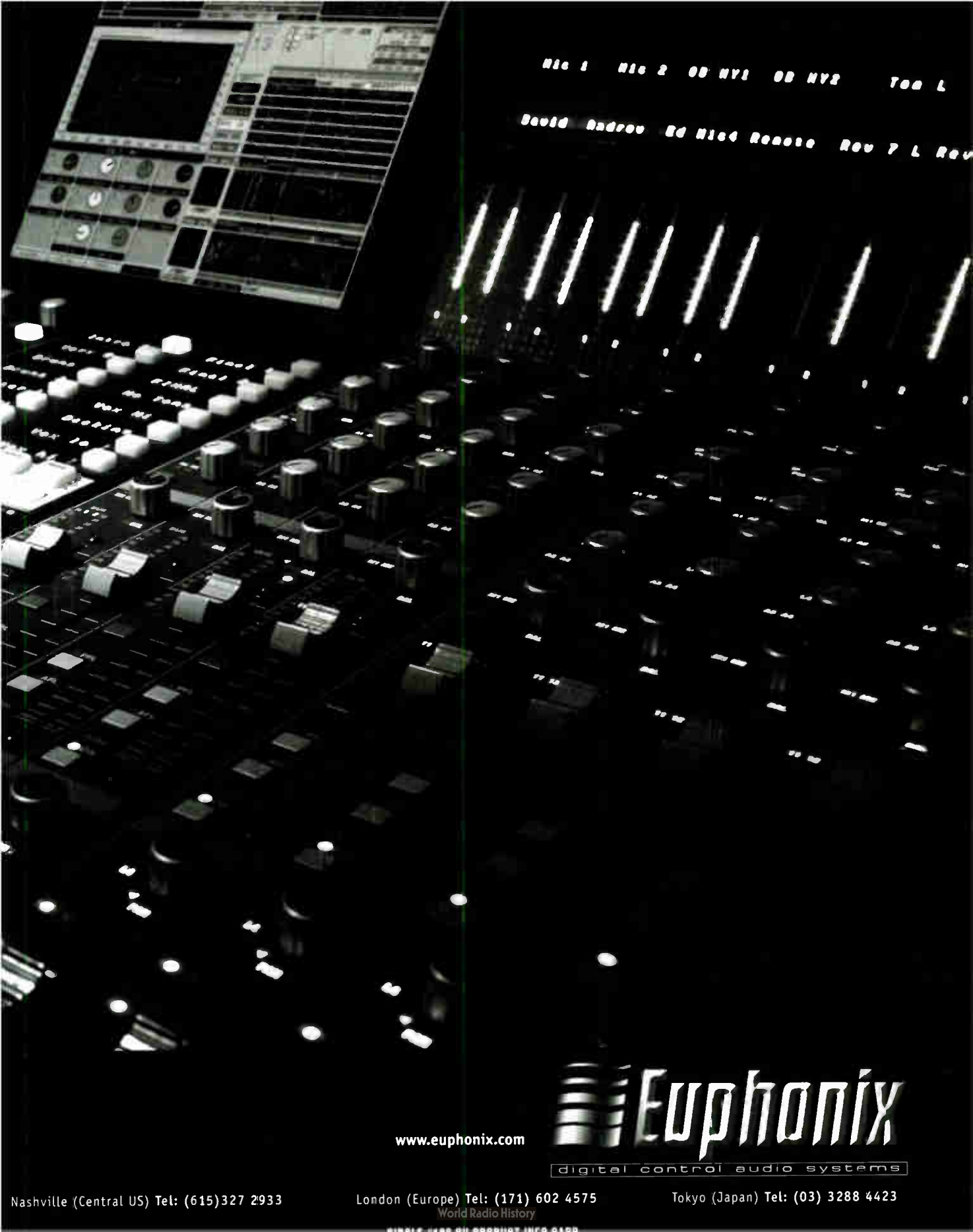


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PREVIEW

THE MINIMOOG RETURNS

Moog Music (Cincinnati) re-introduces the classic Minimoog analog synthesizer. First made more than 25 years ago, the Minimoog offers three VCOs (voltage-controlled oscillators), two envelope generators, two VCAs, a 24dB/octave low-pass filter, pink and white noise source and an external input. The 44-note keyboard features pitch and mod wheels, and all wiring is exactly to the original specification; parts no longer in production have been re-manufactured by the original suppliers. Price is \$1,495.

Circle 327 on Product Info Card



dbx 1086 MIC PRE/DYNAMICS PROCESSOR

The 1086 mic preamp and dynamics processor from dbx (Sandy, UT) is a single-channel, single-rackspace device combining a mic pre with EQ, noise gate, compressor, de-esser and limiter functions. The mic pre section offers phantom power, 20dB pad and polarity reverse, a variable highpass filter, and fixed frequency low and high "Detail" EQ controls. A backlit VU meter indicates levels. Based on dbx's new V2™ VCA, the dynamic section offers an expander/gate with variable threshold and ratio controls; a two-element meter indicates expander status.

The compressor section has variable threshold and ratio controls with selectable hard-knee or Over-Easy™ characteristics. Also included is a de-esser with variable threshold and frequency controls and a PeakStopPlus limiter.

dbx's Type IV™ digital output is optional, and dither and shape switches can tailor the output. Eight-section light-pipe meters indicate gain reduction, de-essing and I/O levels. Price is \$750.

Circle 328 on Product Info Card



XWIRE DIGITAL WIRELESS

Xwire Corporation (Sacramento, CA) debuts the X905 digital UHF wireless system. Both XT905 transmitter and XR905 receiver contain 20-bit ADCs; digitized signals are transmitted over one of five user-selectable UHF frequencies. S/N ratio is 120 dB, frequency response is 10-20k Hz, and distortion figures are below 0.2%, all without any companding circuitry. The two-rackspace receiver features Xwire's Quadiversity™, two complete diversity systems to ensure continuous operation; max range is 300 feet. Handheld mic systems start at \$995; lavalier, headset and instrument systems are also available.

Circle 329 on Product Info Card

SUNDHOLM ACOUSTICS SL6.5/S NEAR FIELDS

Unveiling at this month's NAMM show, and designed by Sunn and Biamp founder Conrad Sundholm, is the SL6.5/s monitor system from

PREVIEW



Sundholm Acoustics (Milwaukie, OR). The SL6.5/s has two subwoofers acting as speaker stands to raise the acoustic center of the two HF/MF cabinets (each with a time-corrected 6.5-inch low/mid and 1-inch silk dome tweeter) to 47-inches for optimal near-field listening. The 10-inch subwoofers are capable of ¾-inch of excursion; response is stated as 34-20k Hz (± 3 dB). A single stereo power amp is required. Price: \$2,095/pair.

Circle 330 on Product Info Card

JRF ½-INCH 2-TRACK CONVERSION KIT

JRF Magnetic Sciences (Greendell, NJ) offers a complete kit for converting ½-inch Studer A80 recorders to the ½-inch 2-track format. The JRF kit includes heads, pinch rollers, tape reel hubs and roller guide assemblies. Customers may specify either Flux Magnetics Extended Performance or JRF PLX replacement heads. JRF also offers conversion kits for the

Ampex ATR-102, Otari MTR10 and MTR12, MCI JH110 and Sony APR5000. Kits are also available for converting ½-inch 4-track machines to 2-track operation.

Circle 331 on Product Info Card

BAG END COMPACT SUBWOOFER

Bag End (Barrington, IL) has introduced the D10E-I compact subwoofer for use with Bag End's ELF (Extended Low Frequency) dual integrator. Containing two 10-inch woofers in a 13-ply birch cabinet, the D10E-I offers a frequency response of 8-95 Hz (± 3 dB) and handles 400 watts. Inputs comprise one banana and two Neutrik Speakon connectors. The system measures 13x22x13 inches and weighs 48 lbs. Price: \$688.

Circle 332 on Product Info Card

PRESONUS COMPRESSOR/LIMITER/GATE

Now shipping, the ACP-22 from PreSonus (Baton Rouge, LA) is a 2-channel

compressor/limiter/gate offering full control over compression threshold, ratio (1:1 to 20:1), attack (0.02 to 200 ms), release (0.5 to 500 ms) and output level. Similar controls tailor gating threshold, attack and release parameters. Switches provide selection of Auto or soft-knee compression, bypass and stereo link. Eight-segment LED meters show gain reduction and input/output (switchable). Sidechain

expander/gate functions. All functions are accessible with a single key press, and the unit features a large screen display and 99 programmable memories. Options include RTA, digital delay and digital I/O. Slave units may be controlled from a DIGI-Q master, and the system supports external control via MIDI, RS-232 and RS-422 ports. Price: approx. \$3,000.

Circle 334 on Product Info Card



access to both compression and gating sections is provided, and the gates are switchable between -60 dB and -6 dB of attenuation. A selectable lowpass filter prevents HF information, such as cymbals, from opening the gates unnecessarily. I/Os are XLR balanced and ½-inch unbalanced at +4dBu or -10dBV operation. Price: \$349.

Circle 333 on Product Info Card

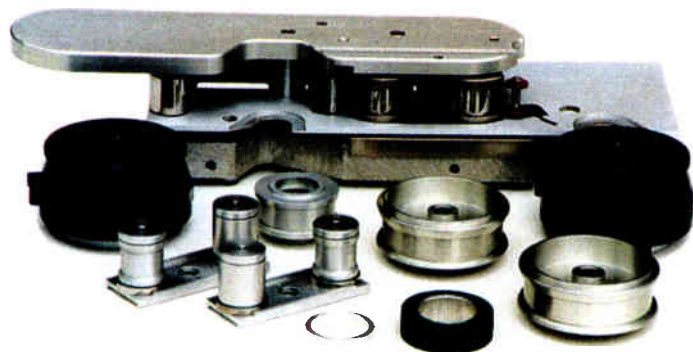
SCV ELECTRONICS DIGI-Q

SCV Electronics (London) offers the DIGI-Q, a 2-channel, DSP-based processor offering graphic, parametric and shelving EQ, with variable lowpass and highpass filters, and compressor/limiter and

PEAVEY TUBE COMPRESSOR/LIMITER

Peavey (Meridian, MS) announces the VC/L-2™ valve compressor/limiter, a 2-channel device incorporating Peavey's *OptoDynamics* system. Featuring an EL84 vacuum tube and electroluminescent panel in place of more commonly used VCAs or opto-isolator systems, the VC/L-2 reportedly offers more natural and transparent compression characteristics than solid-state designs. The all-tube audio chain includes two 12AX7s and a two-stage 12AT7 in each channel. I/Os are XLR and ½-inch. Price is \$1,300.

Circle 335 on Product Info Card



PREVIEW

TECH 21 SANSAMP ACOUSTIC DI

Designed for live or studio use, the SansAmp™ Acoustic DI from Tech 21 (New York City) incorporates tube/microphone simulation technology to provide the warmth and presence of a miked acoustic guitar. A ¼-inch jack accommodates instrument- or line-level inputs, and the unit can also be used as a conventional direct box, with or without its onboard 3-band (sweepable mid) EQ. The unit retails at \$225 and can be powered using 48V phantom, optional AC adapter or internal 9-volt battery.

Circle 336 on Product Info Card



HOT HOUSE FOUR HUNDRED

The Four Hundred High Resolution Control Room Amplifier from Hot House (Highland, NY) is a convection-cooled, high-current MOSFET design delivering 200 watts/ch. at 4 ohms (400 watts bridged mono at 8 ohms). The two-rackspace amp features a custom-built, high-current toroidal transformer with split-dual secondaries for accurate stereo

separation, and offers extreme speed, wide bandwidth and low distortion. Frequency response is 3-180k Hz (-3dB points). Input connectors are Neutrik combo XLR/TRS, outputs are five-way binding posts; it's guaranteed for three years. Price is \$1,699.

Circle 337 on Product Info Card

COLEMAN AUDIO MONITOR CONTROLLER

Coleman Audio (Westbury, NY) offers the PS 1 Monitor Controller, a switching device that eases monitor source switching for project studios and owners of mixers with limited monitor switching functionality. Four

source-select buttons are marked for mixer output and three tape machine returns (selected source feeds tape inputs 2 and 3). Three monitor-select buttons switch between source and tape outputs 2 and 3. A high-quality rotary pot controls output level to the monitor amplifier. All switching is passive, and all I/Os are balanced XLRs. Price is \$499.

Circle 338 on Product Info Card

HOT OFF THE SHELF

Middle Atlantic Products' 55-page 1997 Master Catalog includes racks and enclosures, data cabling management systems, studio furniture and rack accessories. Call 201/839-1011 for a free copy... The 300-page 1997/1998 Jensen Tools Master Catalog offers kits for electronic equipment repair/maintenance. Browse the 5,000-product online catalog at www.jensentools.com or order a free copy from 800/426-1194... Peavey Architectural Acoustics has improved the performance specs of its IA™ Series amplifiers, and added monitoring and control capabilities. Call 601/483-5365 or visit www.peavey.com... Fieldpiece's new full-function digital multimeter is less than \$50. Call 714/992-1239... For the 30th anniversary of its publication *Analog Dialogue*, Analog Devices has compiled a 60-page collection of past "Ask the Applications Engineer" features. Call 800/262-5643 or visit www.analog.com... Antique Electronic Supply has a 60-page catalog of "new old stock" and currently manufactured vacuum tubes. Call 602/820-5411 or visit www.tubesandmore.com... JRT Music announces four additions to its Image Music Library of production music: Technosphere, Celtic Spirit, Media Themes #2 and Funk in da Mix. For a free CD-ROM demo and catalog call 212/253-8908... Pacific Microsonics has published a comprehensive directory of all HDCD recordings released to date. Call 510/

644-2442... Rarefaction's Etymology was created by guitarist/multi-instrumentalist Fred Frith and cellist Tom Cora and produced by Thomas Dimuzio. The license-free CD sound library (\$100) includes string and wire manipulation effects and long solo and duet performances. A Mac/Windows 95 CD-ROM version is \$150... Manning Publications' *Maximum MIDI: Music Applications in C++* by Paul Messick, a 450-page soft-bound book with CD-ROM, costs \$49.95. Call 203/629-2028 or visit www.manning.com/Messick/index.html... The Evergreen Collection from Valentino Production Music and Sound Effects has 12 new 10-CD libraries, each in a different style. Themes include Americana, Comedy, Dance, Electronic, Industrial, Mystery, etc. Call 800/223-6278... Gefen Systems' QuickSample™ is a new file management feature to speed the transfer of audio samples from CD to DAW. Now available in M&E Pro Version 2.5, the software allows instant playback of sound effects and music tracks in either high- or low-resolution formats. Once samples are selected, QuickSample automates audio file conversion from CD in a number of formats. Call 818/884-6294 or visit www.gefen.com... Whirlwind's Qbox® (\$199) is a compact battery-powered multifunction audio line tester and contains a built-in microphone, tone generator, speaker, headphone amp and voltage present LED indicators. I/Os are XLR and ¼-inch. Call 716/663-8820. ■

THE Critical Link.

Inferior cables can sabotage the most spectacular performances, the most brilliant productions, the finest mixing consoles, and the most esoteric outboard gear.

In dozens of basic and complex ways, the wire and connectors between your pieces of gear will either let the sonic quality through or degrade it. And if you have to move that cabling for live performances, an entirely new set of parameters becomes critical for ensuring ease of repeated setup and teardown while protecting the audio performance you paid for in the first place.

For more than two decades, Whirlwind has been setting an international standard for professional audio interconnection systems. Using wire and connectors built to our own specifications and assembly techniques proven through enough cabling to reach the moon and back several times over, our job is to make sure that the Whirlwind name on a system is your assurance that the work you've done will get where it's going, just the way you want it to.

In addition to standard, off-the-shelf systems, and "semi-custom" systems made from pre-defined components, a large percentage of our business is full custom. This means that you can enjoy the benefits of a lower price for systems we've done so often they're standard, and the complete flexibility to get **exactly what you want** for systems that are truly one of a kind.

Our sales and engineering crew logs a lot of their "spare" time doing live and studio sound gigs. As a result, our cabling products are constantly evolving to better serve your needs. Good examples are our new Snakeskin® protective monofilament braid for protecting vulnerable fanouts, and the field pinnable MASS connectors we introduced last year.

Whirlwind wiring systems and electronic peripherals are standard equipment for Olympic broadcasts, major awards shows, theme parks, touring sound rigs, production facilities, entertainment complexes and project studios around the world. For not much more, these audio professionals are protecting the critical link between their work and their results.

Call toll-free today for a complete catalog.



Our new insert Snakes provide pro inter-connection for the new high-performance affordable mixing consoles that provide only a single jack for effects send and return on each channel. Available in 4 and 8 channel versions.



We try to sneak in pictures of our new, production-optimized building whenever we can. We outgrew it already this year and we're adding 50% more floor-space in 1998.

Medusa® and Concert Series snake systems deliver proven reliability and performance on the road.

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COMPUTER HARDWARE/SOFTWARE FOR AUDIO

GADGET LABS WAVE/4 PC CARD

Gadget Labs (Portland, OR) is now shipping the Wave/4 PC digital audio card. Wave/4 offers four channels of recording and playback (plus a standard MIDI I/O) and features sigma delta and 64-bit oversampling. It supports various sample rates and offers greater than 92dB dynamic range. Wave/4 features SoundCache™ architecture, with a 64KB fast static RAM buffer. System requirements: Pentium processor or 486-100+ and Windows 95. Available directly online (www.gadgetlabs.com), or through distributors and retailers.

Circle 339 on Reader Service Card

SYNCHRO ARTS TITAN

Synchro Arts Ltd. (Epsom, Surrey, UK) introduces TITAN, a stand-alone PowerPC application that offers automatic synchronization processing for Pro Tools files. TITAN offers two functions: Fix Sync automatically corrects the position of audio that is out of sync by up to 1.3 seconds to sample-level accuracy, and can generate a report showing the shift made and relative signal phase for each processed region; Flash Cutter uses EDL information to recut and rename trans-



ferred audio regions automatically in seconds. Retail: \$1,495.

Circle 340 on Reader Service Card

STEINBERG PLUG-INS

Steinberg (Chatsworth, CA) announces new plug-ins for Digidesign TDM, Cubase VST for PowerMac and Microsoft DirectX, in addition to plug-ins developed by Prosoniq and Waldorf for distribution by Steinberg. New Steinberg plug-ins include Free-ID, a real-time 3D simulation system; Pitch-Bandit, formant-pitch correction now for WaveLab and DirectX; ProEQ, a multiband parametric EQ plug-in for WaveLab; Red Valve-It, now for VST

PowerMac; DeClipper, a plug-in for VST Mac, WaveLab and soon DirectX that features removal of digital distortion/clipping; and FreeFilter, a linear-phase 3-band graphic EQ offering freely modeled filter curves. Steinberg also offers the Roomulator reverb plug-in and the Ambisone 3D audio engine for Cubase VST, both by Prosoniq, plus D-Pole, a multimode filter plug-in for Cubase VST, by Waldorf.

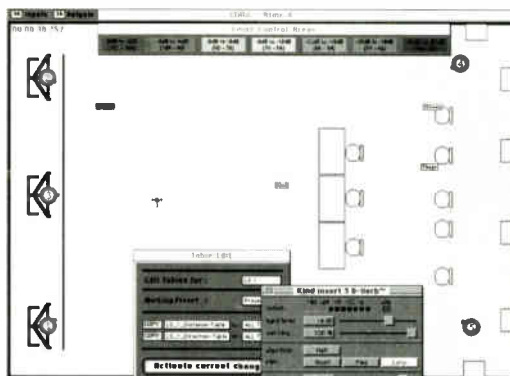
Circle 341 on Reader Service Card

SONIC FOUNDRY SOUND FORGE XP 4.0

Sonic Foundry (Madison, WI) intros Sound Forge XP, a version of the Sound Forge editing package streamlined

for multimedia/Internet applications. Retailing at \$149, Sound Forge XP allows recording and editing of mono or stereo files. It also features more than 25 processing and DSP tools, including 10-band graphic EQ, time compression/expansion, resampling, and effects such as reverb, compression, pitch bend and distortion. In addition, Sound Forge XP supports a wide range of audio file formats and includes Web development features such as encoding and data compression, plus e-mail and video integration options. Requires Windows 95/NT 3.51 or later.

Circle 342 on Reader Service Card



APB Σ1 SURROUND MIXER

APB Tools (Berlin) debuts Σ1, a surround matrix mixer for Pro Tools III hardware. Σ1 uses a specialized graphical interface for surround sound production, offering recording/playback of spatial placement/movement for up to 16 input sources to time-code. Features include 360° editing, mouse or MIDI peripheral movement control with 10ms resolution, and a scalable 16x16 TDM matrix

mixer. In addition, users can overlay a PICT room simulation for precise speaker placement information.

Circle 343 on Reader Service Card

UPGRADES AND UPDATES

Emagic announced the release of **Logic Audio Version 3.0**, for MacOS and Windows 95. New features in V.3.0 include real-time, CPU-based DSP, 8 "plug-in" style inserts and support for Adobe Premiere and Digidesign's AudioSuite formats. The update for current users is \$99. Also shipping from Emagic: **Logic Audio Discovery 2.0**, **Sound-Diver 2.0** and the **Unitor8 MIDI interface**. . . **Audio Magic Ring** (\$99) from **Merging Technologies** is an audio file conversion application for Windows 95/NT 4 featuring sample rate conversion, word length converter and normalizer, plus batch conversion. . . **Berkley Integrated Audio Software's Peak Version 1.6** is shipping. In addition, **Peak LE** is now available bundled with **Adaptec's Toast** and **Jam CD-recording software packages** and **Ensoniq's PARIS workstation**. . . **Waves** released Version 2.3 of the **Waves TDM, Multitrack** and native **Power Pack plug-in bundles**. V.2.3 is a free update and includes full support for **Pro Tools 4.0**. . . **E-mu** is shipping the **E-mu Creation Studio** (\$325), an E-mu-enhanced version of **Creative Labs' Sound Blaster AWE Gold card**. . . New from **Digigram** is the **PCXpocketAD**, a new version of its **PCXpocket type II PC card**, designed for a laptop. ■



dynamic instrument microphones



dynamic vocal microphones

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condenser microphones



premium reference monitors

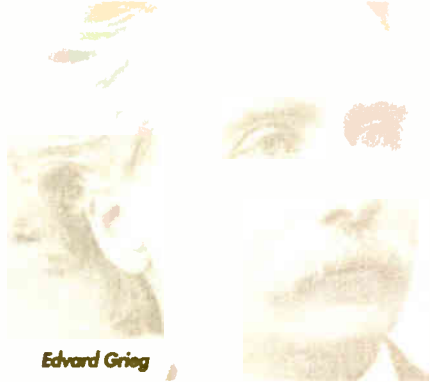
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Edvard Grieg

PHOTOS: CULVER PICTURES

THE Earwitness Project



Ignacy Jan Paderewski



Sergei Prokofiev



Pyotr Tchaikovsky

REPRODUCING PIANOS

HELP PUT THE MASTERS

AT YOUR FINGERTIPS

Over the course of a year, producer Don Fostle assembled a team of disparate experts to raise the musical dead.

In *Jurassic Park*, the fossilized DNA of ancient mosquitoes provided the key to the past. The key to Fostle's resurrection was a collection of "reproducing piano rolls" entombed in the vaults of Maryland University's International Piano Archives, the Curtis Institute of Music, and the Keystone Music Roll Company.

With funding from Madrigal Audio Labs, engineering by Jerry Bruck, mastering by Chris Rice, piano restoration by Jeffrey Morgan, and music direction from Pulitzer Prize-winning critic Harold Schonberg, participants in the "Earwitness Project" excavated some of the most significant reproducing piano rolls ever made, and digitally recorded their performance on one of the rarest and largest "reproducing pianos" ever built.

by Arthur Bloom



PHOTOS: JOHN HEERON

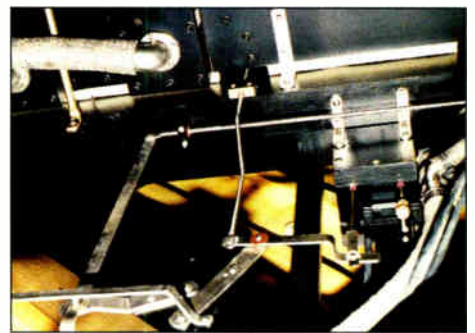
Piano technician Jeff Morgan (pictured) and tuner Ed Dryburgh restored and re-tuned this Steinway D Reproducing piano for the Earwitness Project.

Compared to regular piano rolls, which sound robotic, reproducing piano rolls, which include dynamics and pedaling, sound like real music. And compared to contemporaneous analog recordings, which had limited dynamic range, frequency response, signal to noise ratios and durability, the reproducing rolls provide pristine fidelity. Faced with the mediocre alternatives, artists of the day probably recognized that the best chance to preserve their work was through reproducing piano rolls.

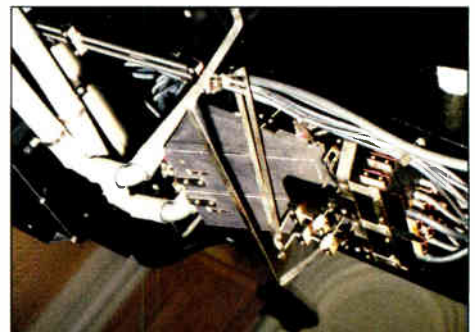
Rolls of Ravel, Stravinsky, Grieg, Prokofiev, and Saint-Saëns playing their own works complement performances by the greatest pianists who ever lived, including Hofmann, Paderewski, Busoni, and a young Horowitz and Rubinstein. The release of selections on two CD sets accompanies a series of 13 radio programs narrated by Harold Schonberg for WFMT in Chicago. As the project's resident skeptic-turned-apostle, Schonberg praised the reproductions as "the best that have been done in the history of recording." Reminiscing about concerts he attended as a young man, Henry Steinway remarked in a letter to WFMT: "By combining today's most advanced recording technology with a rare Steinway piano, a 1923 reproducing concert grand, Earwitness listeners will be brought closer than ever before to the concert experience I had long ago...For those few of us who 'remember when,' Earwitness is a chance to listen again to these great artists."

REPRODUCING PIANOS

So what are reproducing pianos? Well, as the joke goes, did you ever wonder where baby grands come from? While player pianos were



From underneath the piano, you can see some of the approximately 7,500 parts of the reproducing mechanism.



Westlake Audio



LC6.75

Hand-crafted compact monitors with the award winning sound. 1996 TEC Award Nominee for outstanding technical achievement in studio monitor technology.



BBSM-SERIES

From the bottom to the top; rock solid, high-resolution, reference monitor systems.



LC8.1

Bigger Brother to the award winning Lc 6.75; "Fatter" in the bottom with the utilization of an 8.0" woofer.

Got Muffs?



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LAFONT



stage tec



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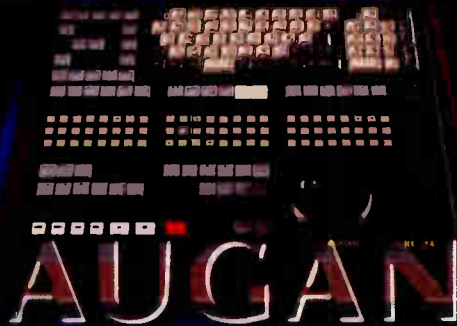
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World Radio History

AUGAN

AUGAN OMX48

The Augan OMX48 is a 48 track, 48 I/O, random access recording and editing system designed for the rigors of the professional recording studio. The OMX48 records 24 bit audio (via AES/EBU or TDIF digital, or 24 bit A-to-D converters) onto MO disk or removable hard drive. The RC48 remote offers familiar multi-track transport controls, 48 track arming/input/repro switches and a dual TFT display for sophisticated non-destructive waveform editing. Included is a suite of advanced real time DSP functions.

AUGAN OMX24 MASTER RECORDER

The Augan OMX24 MASTER RECORDER is a 24 track, 24 I/O, non destructive random access recording and editing system configured as a master recorder for film re-recording applications. Recordings are 24 bit (via AES/EBU or TDIF, digital, or 24 bit A-to-D converters) onto MO disk or removable hard drive. Numerous remote control options, serial/parallel interfacing and synchronization capabilities are available. A 24 track (playback only) configuration is available and up to 48 of these can be controlled from any number of remote controllers. *"After extensive tests and evaluations of all digital systems currently available, we found Augan to be head and shoulders above the crowd in capability and sound quality."* Lee Bartolomei - Skywalker Sound - March, 1997



STAGE TEC

NEXUS DIGITAL AUDIO ROUTING and INTERCONNECT SYSTEM



Nexus is a fully digital, 24 bit audio crosspoint & interconnect / routing system with power supply redundancy and integrated self diagnostic safety monitoring. Interconnect requirements between base units are handled via bi-directional fiber optic cable. The dynamic range of both A/D and D/A converters is 126dB. With the capability of virtually unlimited inputs and outputs, the Nexus System will accept microphone signals converted by a proprietary 28 bit A/D* and line signals with 22 bit resolution. Formats include AES/EBU, MADI, SDIF, S/PDIF and Y2 as well as others upon request. Nexus can be configured with a variety of options including powerful DSP, Multi-channel Level Display, MIDI Control, Amplifier Control, Talkback Matrix, and 1/3 Octave Equalizers all under sophisticated software control. Stage Tec showed the prototype of the Nexus Digital Audio Routing & Interconnect System at the 1993 AES in New York. Since then, the company has sold 89 Nexus systems.

CANTUS DIGITAL MIXER

Cantus Digital Console Systems are professional mixing consoles designed with reliable and intuitive operation as primary considerations. Featuring 40 bit floating point DSP, proprietary 28 bit A/D* converters, sophisticated redundancy and simultaneous processing of 184 channels, Cantus digital consoles redefine "cutting edge". Input/output connections are handled by an integral Nexus Digital Audio Routing System, capable of controlling 4096 input/outputs. This allows several Cantus consoles to be part of a common digital audio network. Console work surfaces are available for general recording, broadcast, theater, OB trucks and film/television audio post production. Since starting Cantus R & D in July of 1993, Stage Tec has sold 46 Cantus Digital Consoles. Stage Tec is the only company currently offering digital consoles with 40 bit floating point DSP and 28 bit A/D* converters in the mic inputs. * Contact Sascom for technical documentation and test reports on 28 bit A/D's.



OPS-1 OMNISOUND PANNING SYSTEM

The OPS-1 OmniSound Panning System is a **fully automated**, frame accurate, ultra low noise and low distortion audio signal panner **for any surround sound format** including Stereo, LCR, Dolby® Stereo (LCRS), Dolby® Digital, DTS®, AC-3 (5.1), SDDS® (7.1), OMNIMAX® IMAX® and IMAX PSE®. The OPS-1 records **(in SMPTE lock)** the horizontal and vertical Sound Position, Level, Intelvergence®(Intelligent Divergence) and Stereo Image Width. **Any format can be translated to any other format with one keystroke.** Theaters, multimedia designers, television post, and film post facilities such as **Disney, Sound One, Brasher Sound and Weddington Productions** have been using surround sound panners built by OmniSound Corporation since 1987. The new OPS-1 OmniSound Panning System is the most sophisticated stand alone surround panner currently on the market.



LAFONT

LAFONT PANORAMIX FILM CONSOLE



The Lafont Panoramix is an in-line, film / audio post multi-format mixing console (32 to 96 channels, up to 296 inputs), with **Discrete 5.1 Panning, 7.1 Monitoring and dynamics on each I/O module.** Each module offers 2 line inputs simultaneously routed to five 6 buss stems, plus a monitor return input routed to an 8 Channel Surround Monitoring Matrix. **A four group film/bus (Pec Direct)** monitor switching system and Uptown Moving Fader Automation are standard. An optional module with access to **four 8 bus stems for 7.1 routing** is also available. The first Panoramix console installation was completed in July/97 - an 80 chan./244 input with Flying Faders® at Medallion PFA Film & Video in Toronto.

LAFONT LCRS TRANSFER CONSOLE

The Lafont FTC84 Transfer Console is a machine room dedicated Film / Audio-Video Post Production tool. Its **high gain audio structure (+27dB) and Pec Direct Monitor Switching** make it adequate for any format transfer. The FTC84 is an "in line" design, with each module carrying 2 input strips. A 9 module (18 channel) 8 bus / 4 monitor standard frame is fitted in a 19" rackmount housing. The meter bridge is located in a separate rackmount unit with the power supply. For other applications, 24 and 36 channel table top versions are also available. Facilities using the Lafont Transfer Console include **Chicago Audio Works, Creative Café, Paramount Pictures, Skywalker Sound, Sony Pictures, Sound One, The Walt Disney Company, Todd AO and Westwind Media.**



LAFONT TELEPHONE SIMULATOR

Used for film and television post applications to simulate telephone conversations, CB radio transmissions, etc. The Lafont Telephone Simulator includes extended range High-pass and Low-pass filters, an Equalizer with variable Q, Distortion Generator, Noise Generator and Output Gain control for level matching. This enables the operator to simulate telephone sound easily, without using outboard devices. Some of the facilities using the Lafont Telephone Simulator include **20th Century Fox, American Zoetrope, AstralTech, Casablanca Sound, Cinar Films, Creative Café, EFX Systems, Magnolia Studios, Skywalker Sound, Sound One, Todd AO and Warner Brother's.**

TL AUDIO



VTC 8 BUS TUBE CONSOLE

The VTC is a modular, in-line, 8 bus mixer with **tube stages in the mic preamps, monitors, groups and master section**. It is available in configurations ranging from 16 to 48 channels, with 8, 16 & 24 channel side cars offered for additional expansion. Each channel includes 4 band EQ with **fully parametric mids**, one stereo and six mono aux sends and faders on both the channel and monitor signal paths. Options include internal or external bantam patch bay, bargraph meter bridge and VCA or moving fader automation.

**FACTORY
DIRECT
PRICING**

TL Audio offers a wide variety of **tube based rack mount processors** including Mic Preamps, D.I. Equalizers, Compressors and Voice Processors, **which are now available at factory direct prices**. Included among the thousands of TL Audio users are *Abbey Road Studios, Andy Jackson (Pink Floyd), Billy Sherwood (Yes), Boyz II Men, Chris Fogel (Alanis Morissette), Masterfonics Studios (Nashville), Roy Thomas Baker (Queen), Stephen Croes (Stevie Wonder, Fleetwood Mac, Kenny Loggins), Steve Winwood and Tom Lord Alge*

was \$1795
\$1375



C-1 Dual Tube Compressor / Mic Pre

Stereo tube compressor; balanced & unbalanced mic & line inputs; +48v phantom power; 2 AUX inputs; variable "soft knee" compression; sidechain insert points; continuously variable attack, release, ratio & gain make-up; stereo link mode.

was \$2395
\$1775



EQ-2 Stereo Tube Parametric EQ / Mic Pre

4 band parametric; variable filters; mic-amps; +48v phantom power; dual mono or stereo linked modes; balanced & unbalanced mic & line inputs; EQ bypass on each channel; insert point on each channel; 20 Hz to 40 kHz frequency response; front panel AUX inputs.

Over 20 different models available at **factory direct prices**. Visit our Web Site or call for details

OPTIFILE

Optifile offers **SMPTE based VCA console automation systems** which can be retrofitted to virtually any console. With over 600 systems in use, Optifile is the most widely used VCA automation system in the world. Features include **"Move Status"** which emulates moving fader operation, VCA bypass, 9 groups, **auto nulling, auto drop and auto record**. The system will handle up to 64 channels with up to 90 minutes of mix time in live memory. *"Operationally, the system is intuitive and straightforward. It combines the affordability of VCA technology with many of the advantages of moving faders. Optifile offers a powerful, affordable alternative to moving fader systems".* **George Petersen - Mix Magazine**



SPENDOR



Spendor offers powered nearfield monitor speakers with switchable HF and LF equalization in 1dB steps; film homopolymer cone woofers and silk diaphragm tweeters. Pairs are matched to within 0.75dB. *"Overall I found the speakers to be exceptional. I could listen to them for long periods of time without feeling fatigued, which is fortunate because I got so much pleasure from them that I returned often and usually listened very intently. The Spendor SA30 are absolutely ruthless when it comes to reproducing a recording without coloration. Highs are crisp and clear, mids tight and well defined, and the low end rich and even. I detected no dead spots or other funny business in the critical 3kHz range and the imaging was simply breathtaking".* **Barry Cleveland - Mix Magazine - August, 1997**

everywhere before radio decimated the piano industry—according to Fostle, 50% of American homes in 1925 contained pianos (more than have air conditioning today), 80% of which were player pianos—reproducing pianos were complicated, expensive and scarce. For the price of about five Ford Model Ts, reproducing pianos were the high-end hi-fi playback systems of the early twentieth century. At around \$10,000 in 1923, the piano used in the Earwitness Project could have financed a fleet of Model Ts.

Requiring as many as 20,000 parts and a large vacuum pump to operate them, reproducing pianos are an almost grotesque emblem of the industrial revolution. Of the ten 10-foot “stretch case” model D reproducing pianos Steinway

built in the 1920s, only two are known to remain. With the help of Henry Steinway, one was painstakingly rebuilt for the Earwitness Project.

Because playback requires a historically accurate response from the piano, Jeffrey Morgan's restoration and maintenance of the instrument was the soul of the entire project. Recording single rolls often required hours of repairs and tweaks. Morgan also had to avoid the use of modern lubricants. In order to satisfy the rolls' expectation of triggering the stiffer piano action of the 1920s, he could only use authentic lubricants such as beef tallow and bear fat.

The only anachronistic modification was Fostle's relocation of the power supply, a 4.5psi motorized vacuum pump, to an isolation box 25 feet away

THE SPHERE WITH EARS

The holy grail of recording has been to capture reality so that it can be accurately reproduced through loudspeakers. While conventional stereo recording methods have produced impressive results, they are not without compromise and controversy. For instance, the fine imaging of coincident X-Y arrays suffers from the off-axis and low frequency deficiencies of the cardioid and bidirectional mics on which they rely. Spaced omnis, which provide superior low-frequency performance, lack the imaging and mono compatibility of coincident arrays. As one of the various attempts to create a more perfect stereophonic illusion, the Schoeps KFM 6U Sphere attempts to combine the benefits of both coincident arrays and spaced omnis in one mic—to transfer “reality” onto tape more accurately.

The Schoeps KFM 6U works by combining the sonic benefits of two surface-mounted pressure capsules with the sophisticated imaging created by their placement on opposite sides of the sphere. Inside the sphere, the signals are amplified and EQ'd in order to correct phase shifts and boost frequencies above 10 kHz. Acoustic shadows cast by the sphere help localize the sound source in



The Schoeps KFM 6U spherical mic used by the Earwitness Project

space. At the same time, both capsules contribute to a homogeneous pickup pattern that integrates the stereo image more perfectly than panning two mono microphones to opposite extremes. Günther Theile, the microphone's inventor, wrote that while the sphere can record the three-dimensional sound field captured by dummy-head mics, in contrast to dummy-heads, which require headphone rather than loudspeaker reproduction, the sphere's frontal (and posterior) frequency response is linear. Combining its “front” with its ability to assimilate reverberation into a realistic perspective, the sphere per-

—CONTINUED ON PAGE 255



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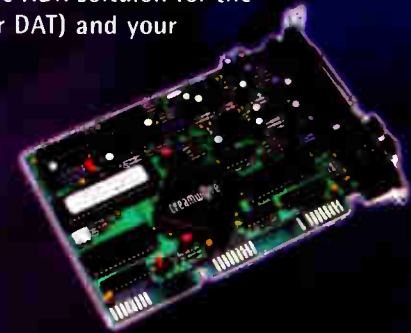
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from the piano. To ensure consistent power, he connected the pump to an air pressure reservoir, a sort-of vacuum capacitor, underneath the piano. With the vacuum itself banished from the site, Fostle reduced mechanical noise to levels significantly lower than Glenn Gould's audible moaning on his well-known piano recordings.

An important feature of the reproducing piano rolls themselves was that they were recorded in real time. Recording in real time not only added nuance, but also ensured a steady tempo. Until about 1910, player piano rolls were arranged mechanically on drafting tables, which not only yielded an inhuman performance, but also a constant acceleration: Because the playback mechanism did not include a capstan to regulate speed, the take-up spool, swelling with the accumulating roll, pulled faster and faster across the tracker bar. Recording the reproducing piano rolls in real time therefore made temporal relations between notes a function of the performers' art rather than the instruments' limitations.

One question that remains is the extent to which the rolls were edited. Since individual notes could be altered, editors were able to perfect performances with MIDI-like precision. However, at the time the rolls were made, tempos were generally faster, and the master pianists attained a level of virtuosity unparalleled in our day. "Earwitnesses" like Henry Steinway confirm that what may sound impossibly fast on these rolls was just that fast in real life. While Paderewski's pyrotechnics may seem unbelievable today, imagine how moviegoers in the 1920s might have felt watching Michael Jordan play basketball.

THE SESSIONS

Simultaneously recorded on three Nagra Ds at 24 bits for both 2- and 4-channel playback, this project spans some of the earliest and latest techniques in digital recording. With the piano commanded by holes-in-rolls, engineer Jerry Bruck used one of the Nagras for primary tracking at 44.1 kHz. The other two Nagras were used to record four tracks at 96 kHz for a potential high-fidelity surround sound release once a suitable DVD format is established. At the same time, mastering engineer Chris Rice recorded selections using his Tim de Paravicini-modified (E.A.R.) all-tube analog Studer C-37.

On the front end, the piano was recorded with a redesigned Schoeps KFM 6U spherical microphone which

was optimized for recording the piano (see sidebar). Modifying the Schoeps design, Bruck—the U.S. Schoeps representative for 25 years—shrank the diameter of the sphere from eight to seven inches and added two figure-8 microphones to its two surface-mounted omnidirectionals. In order to protect against interference during the 100-foot run to the control room, the four outputs from the sphere were brought to line level via a Millennia preamp in the vicinity of the piano. The omnis were gently EQ'd above 10 kHz through a Sontec 250 EX.

In the control room, the four signals were split into three recording chains using a Sonosax FD-M4: one to Chris Rice's custom E.A.R. tube mixer and Studer, and the other two to the digital chains. Of these, one was digitized at 44.1 kHz, 24 bits via two Prism AD-1s and recorded onto the four channels of the primary Nagra D. An ADR digital mixer connected to the Nagra was used to add a touch of the figure-8s to the sphere's basic omnis for a reference back-up mix dithered down to DAT.

The other surround sound chain involved converting the third group of four signals from the Sonosax into four 96kHz/24-bit streams via two state-of-the-art dCS A/D converters. Since the 4-track Nagra Ds are able to record at 96 kHz, 24 bits by dedicating two 48kHz tracks to each channel (like a high-end PaqRat), the four high-resolution digital outputs from the dCS converters were recorded onto eight Nagra D tracks by synching together two Nagras with timecode.

Mastering was handled by Chris Rice on a Sonic Solutions DAW. With the bipolar figure-8s added to the sphere's left and right sides, Bruck's "KFM 360" allowed Rice "to steer the image after the fact." Since even a reproducing piano can play the occasional wrong note (due to the precarious tracking of 80-year-old paper rolls), Rice performed the occasional edit. However, due to the nature of the music, the care that went into finding the ideal space to record it (the Centenary College Chapel in New Jersey), and the precision with which it was recorded, Rice did not employ any audio sweetening. Finally, Rice used Apogee's UV22 to dither the 24-bit signal to 16 bits onto Exabyte DDP for CD replication.

THE RESULTS

Josef Hofmann liked fast cars, women and whiskey, and was one of the greatest pianist who ever lived—as Fostle re-

—CONTINUED ON PAGE 255



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PRO SELF-POWERED NEARFIELD MONITORS

ATC designs and builds its pro audio and high-fidelity loudspeakers in the idyllic countryside of Gloucestershire, one of England's more pastoral regions. But ATC's new self-powered SCM20A nearfield monitors would not be out of place in *Star Wars*—the aluminum, sloped, two-way, SCM20As in Darth Vader black and Death Star gray are ruthless and indestructible little

improved dramatically. In other words, the speakers revealed a problem with my console that I had not noticed on lesser speakers. Indeed, in the weeks that followed I learned that, while they do not always tell you what you want to hear, the SCM20As tell it like it is.

In order to purify the sound chain and hear just how good the speakers really were, I connected

tortion I have become accustomed to hearing from other speakers. Orchestral instruments retained their character, rather than melding together. Hip-hop samples were as sharp as daggers. Rock was pure beef. Featured vocalists were clarified from their surrounding backups. Subtleties and flaws were laid bare.

The 20As are heavy for their size and have an attractive, if



tanks that incorporate some of the most sophisticated driver technology on this planet.

As soon as I received the SCM20As, I connected them to my Alesis X2 console's studio outs and cranked up a DAT. Frankly, at \$4,595 a pair, I expected the 20As to sound better. However, when I switched to the X2's control room output connections, the sound

them directly to a Meridian 508.20 CD player and 566 DAC, with a 518 digital processor for volume control in the digital domain at 72 bits. Reproducing pristine audio, the ATC20As were among the best-sounding speakers I have ever heard. It was as if someone had wiped away the scrim of dis-

unusual, shape. Edges are rounded to minimize diffraction, with the sides sloping in toward a gill-like heat sink in the back. The 66-pound speakers measure just under a foot-and-a-half tall, so finding a place for them requires care. My console perches provided only precarious support, and I found that Sound Anchors' rock-solid adjustable stands provided a

BY ARTHUR BLOOM

better solution (Mana Acoustics, which has built stands for ATC's larger speakers, may build one for the 20As). Omnimount fittings built into the cabinets allow them to be attached to a wall or ceiling for fixed installations. The cabinets also feature built-in handles on top.

At the heart of the 20As are the soft-dome drivers that ATC meticulously manufactures. Unusually short voice coils are hand-wound from a specially milled flat copper wire, and remain immersed in the magnetic flux at all times. Maximum excursion is 40 mm—almost an inch-and-a-half. The magnets themselves, at 20 pounds each, are massive. On the outside, the domes and cones are doped with a dampening compound ATC has devel-

Orchestral instruments retained their character. Hip-hop samples were as sharp as daggers. Rock was pure beef.

oped to help dissipate extraneous radiation. Inside, active fourth-order crossovers at 2.8 kHz are individually aligned and phase-corrected.

ATC has also developed an insulating sleeve (now included on all its drivers) in order to eliminate distortion caused by magnetic eddies. The eddies flow in minute areas of the front plate and pole piece adjacent to the voice coil, turning the soft iron into mini-transformers. Because the area is small, the concentrated current becomes strong enough to introduce distortion (at the third harmonic) into the signal flowing through the voice coil.

Since the 1930s, scientists have sought an electric insulator that features favorable magnetic properties and is not prohibitively expensive. ATC has developed a material from sintered (individually oxidized particles

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of) soft iron dust. Pressing the dust under pressure makes it stick together and act almost like a ceramic. Although not cheap, the material functions as an electric insulator while retaining the requisite magnetic properties. By adding sleeves made from this material to the pole tip and front plate, ATC says it has reduced third-harmonic distortion by 15 dB. Although all dynamic drivers are subject to the distortion caused by these eddies, in most speakers it is eclipsed by the greater degree of mechanical distortion. For all but the best

drivers, this incremental improvement would be imperceptible.

Another feature of the 20As that distinguishes them from most other active near-fields is the sealed enclosure design. With no port or passive radiator, the 20As have a linear frequency of 80 to 12k Hz (± 2 dB) and a 6dB drop at 60 Hz and 20 kHz. While a bass reflex would lower the cutoff, it would also incur a radical drop below that frequency. The 20As' air suspension design offers a more gradual roll-off and, with a Q of 0.5, practical bass response extends below 60 Hz. An EQ control knob on the back of the cabi-

net provides up to 6 dB of boost at 40 Hz. While low bass is not prominent, the sealed enclosure helps the speaker sound tight and well-defined.

Because the sealed enclosure also limits sensitivity, ATC has provided each driver with ample amplification. Each 8-ohm, 150mm mid-bass driver is driven by a conservatively-rated 250W Class A/B amplifier; each 6-ohm, 25mm tweeter is driven by a 50W Class A amplifier. Together, the 20As can deliver continuous SPLs of 108 dB at 1 m without a hint of distortion. Another 10 dB of headroom are available for transients. Numbers aside, these things can move some serious air. I had to consciously resist their seductive muscle for the sake of my hearing; my eardrums do not feature the bullet-proof protection circuitry that safeguards the drivers in the 20As.

Alan Ainslee from ATC agrees that the 20As could be used as midfields. "While conventional near-fields tend to be more directional, the 20As' midband dispersion is broad and even, with the reverberant and direct sound fields closely matching," he says. In other words, one need not stand directly in front of the 20As to enjoy their flat frequency response.

Presence Studios owner Jon Russell, who recently installed a pair of ATC's flagship SCM300A main monitors, was kind enough to allow me to compare them with the 20As. The 300As reproduce music with such phenomenal vitality, detail and depth that they share more in common with live music than with typical loudspeakers. Next to the superlative 300As, with their enormous reservoir of power and headroom, the merely outstanding 20As were less transparent.

Nonetheless, for one-fifth the price of the \$22,000 SCM300As, the 20As deliver a reality sandwich I have yet to taste from another near-field. As ATC's Ainslee points out, their exceptional accuracy, linearity and low distortion are more characteristic of an amplifier than a speaker. Thus, while \$4,595 is not exactly chump change, for monitors of this caliber, it represents a very good value. And ATC includes two black flight cases which could easily pass as Darth Vader's carry-on luggage.

Sincere thanks to Jon Russell, owner and chief engineer of Presence Studios, in Westport, CT.

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World Radio History

ELECTRO-VOICE N/D868 AND AUDIX D4

BASS DRUM MICROPHONES

Every day, microphones get more and more specialized. This month, *Mix* looks at two new kick drum mics: the Electro-Voice N/D868 (\$370) and the Audix D4 (\$329).

The N/D868 and D4 are different in design and sound, yet offer certain similarities: Intended for low frequency reproduction, both are finished with a black body/grille and feature dynamic (moving coil) capsules, large-diameter diaphragms and an ability to handle SPLs exceeding 140 dB.

The N/D868 has a 5.22x2.36-inch steel case and EV's proprietary Memraflex™ grille, which "gives" slightly to resist dents and bends. The N/D868's mic clip has a thick nylon split ring that tightens securely around the mic stem via a thumbscrew.

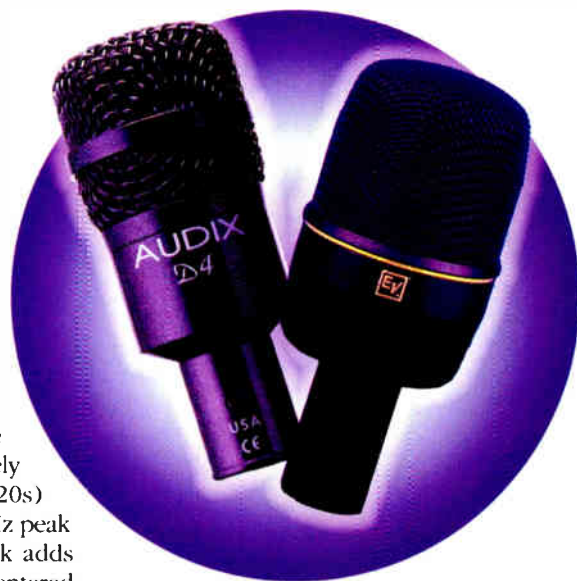
The D4 has a more compact 3.75x1.5-inch aluminum body with a stainless steel mesh grille and gold-plated XLR pins. The mic ships with a simple plastic mic clip. Optional is a mini-gooseneck mount that securely clamps onto a bass drum hoop, allowing placement near the plane of the front head, which turns out to be near the D4's sweet spot for optimum sound on kick drum.

Under the hood, the N/D868 has a cardioid capsule with a neodymium magnet assembly, but featuring a lower sensitivity than other models in the N/Dym® line, keeping the mic output level from being too hot. (Since kick drums are inherently high-SPL sources, a high sensitivity mic will often produce an output signal level capable of overloading a mixer input.) The hypercardioid D4 uses a combination of a conventional alnico magnet with a lightweight Very Low Mass (VLM™) diaphragm.

The frequency response charts of the two mics are as different as

their capsule materials. The N/D868 exhibits a classic "smile" response: +5 dB peaks at 50 and 2,000 Hz, a wideband -5dB (max) dip centered in the 400 to 600Hz region and an HF response that drops off sharply above 7,500 Hz. This is nearly identical to the EQ curve I apply to relatively flat mics (such as EV RE20s) used on kick drum. The 50Hz peak adds "boom," the mid peak adds "snap," and the wide cut centered around 500 Hz reduces the upper bass/lower mid "mush" for a solid sound. Based on this information, I knew what to expect from the N/D868, and the mic sounded nearly perfect on a rock session, for which I miked an early '70s Premier 22-inch kick inside the drum about three inches from the beater. The sound was round, tight, sharp and huge—all I had to do was add about 2 dB at 1,500 Hz for some extra snap.

The D4 has a more linear frequency response, and offers nearly flat response from 50 to 1k Hz. It then exhibits a condenser-like rising top end, starting at 1 kHz and peaking about 10 kHz. Another feature of the D4 is the mic's extremely tight cardioid pattern, which remains fairly consistent, even at low frequencies, compared to the N/D868, which is nearly omnidirectional below 100 Hz. I began by placing the D4 inside the kick, about three inches from the beater head. The beater "snap" was spot-on, but the fullness was lacking. I moved the mic about eight to ten inches back from the beater, and suddenly the sound opened up—rich and full, with plenty of attack and punch. At this point, all I did was add a touch of boost at 50 Hz



for "boom." On a later session, I miked a single-headed kick with the D4 mounted on a 5-inch desk stand, and set up directly in front of the kick without a boom. The results were superb, with excellent off-axis rejection.

So which mic wins out? Both models are road tough and—right out of the box, with no EQ—can take you 95% of the way to that elusive "killer" kick sound. And on either mic, a couple dB of tweaking (to taste) gets you even closer to that ideal. In terms of kick drum reproduction, if I had to pick between the two, I'd give the edge to the N/D868, purely on the perfection of its tight, round (almost compressed-sounding) low end. The N/D868 is clearly a kick drum-only mic. However, the D4 proved excellent in LF applications besides kick drum, such as miking guitar and bass amps (sweet!), floor toms and even horns, so anyone needing a more versatile microphone may choose the D4.

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CARDIOID TUBE MICROPHONE

At last fall's AES convention in New York, AKG unveiled Solidtube, a large-diaphragm, vacuum tube microphone at a retail list price of \$1,500. Although Solidtube's pricing is attractive, and it sounded good during a quick demo at the show, how does this mic perform in real studio conditions? *Mix* decided to find out.

Outwardly, Solidtube is hardly a "no frills" model; the mic package includes an aluminum flight case, power supply, shockmount and windscreens. But in order to meet its affordable pricing, some concessions were made. Solidtube is a single-pattern (cardioid) mic. The mic body itself is cast pot metal, rather than the brass housing featured on AKG's top-of-the-line tube C12VR, and the -20dB pad switch (for an impressive SPL handling of 145 dB!) is plastic and has an inexpensive feel. But Solidtube's A-weighted self-noise is rated at 20 dB, which is better than most tube mics.

Under the grille is a newly designed condenser capsule with a 1-inch diameter, 6-micron thin, gold-sputtered Mylar diaphragm. When powered up, the mic's transparent-red AKG logo is illuminated by the faint glow of the 12AX7a tube inside. The 12AX7a provides impressive performance (it surprised me!); it is also readily available and reasonably priced. The mic body also stays cool, even after long sessions.

Solidtube comes with a slightly too-bright, lemon-yellow foam pop filter, which you shouldn't need anyway as the fine mesh grille offers excellent protection from plosive syllables. The six-conductor cable that connects the mic and power supply is an ample 30 feet long, but the 1/8-inch-diameter cable is too thin, is highly susceptible to kinking and has generic, no-name XLR connectors. Anyone buying this mic should eventually plan on replacing the stock cable with a larger-gauge, more durable cable,



which will not only be more reliable, but will also offer improved audio performance and increased protection from outside electrical interference.

The mic snaps securely into place, and in a rare example of form and function in harmony, the raised Solidtube logo locks the mic into the mount, which is elegantly simple and highly effective against shocks, bumps and thuds. Interestingly, there are two channels in the mount for keeping cables in place: One fits the stock cable exactly, the other is designed for a larger diameter cable. Hmm...The base of the mic body also offers standard 1/8-inch threads for direct stand mounting, but the shock mount is so nice, why bother?

The power supply features a -12dB/octave bass-cut filter, ground lift switch and an LED power-on indicator. It's shipped with the voltage set for 230 VAC, but I recommend setting it for your local standard before use. AKG thoughtfully includes two removable IEC power cables (USA and Euro standard) so you jet-setting engineers won't have to use your shaver

adapter if your next tracking session is at Capri Digital.

In my first session with the Solidtube I used it on acoustic bass for a jazz trio (piano/bass/brush drums) recording. I set the mic on a short stand, about 15 inches from the "f" hole and aimed slightly toward the bridge. The results were full, rich and creamy, with even reproduction throughout the instrument's range—no bumps, peaks or dips. Oooh!

On my next date, I was tracking male and female vocals, and I had a chance to compare Solidtube with a C12VR. A couple of things became clear. In the cardioid setting, the C12VR has tight pattern control, while Solidtube's cardioid pattern gets progressively wider in the upper midrange, becoming nearly omnidirectional above 4 kHz. In this case, we were overdubbing, so rejection/bleed wasn't an issue, but it's something to keep in mind for multitrack situations. Both mics have a nice warm low end with just enough—but not too much—proximity effect. But Solidtube's upper response was smoother than the cardioid C12VR, and it was perfectly suited for female vocals, where too much top end can be edgy. Male vocals had a natural, full bottom end with Solidtube, but in this case, I preferred the C12VR's extra 5 to 10kHz top-end sizzle over Solidtube. Of course, for the \$3,000 or so price difference between the two mics, you could buy a really nice equalizer and add a couple dB here or there.

Anyone looking for an affordable, versatile studio mic may want to consider adding one—or a couple—AKG Solidtubes to their mic locker. Just budget in a couple extra bucks for a better cable and you'll have a solid performer for years to come.

AKG, 1449 Donelson Pike, Nashville, TN 37217; 615/360-0499; fax 615/360-0275. Web site: www.akg-acoustics.com. ■

BY GEORGE PETERSEN

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FIELD TEST

sure, I preferred to place them on round-based tabletop mic stands connected to the threaded holes in the base of the units. The holes are the 3/8-inch European-style, requiring adapters for use with American-style stands. Propped up on stands at ear level, the 1029As formed a 2-foot equilateral triangle with my head.

Second, the 1029As and the 1091A are naturals for surround sound. While the 1029As could be used as surrounds in an LCRS installation, combining two pairs of 1029As with the 1091A creates a reasonably priced, not-quite-5.1 system (for true 5.1 one need merely add a center speaker). Indeed, a large Hollywood film/sound studio recently bought a number of 1029A/1091A systems for dialog editing and sound effects creation in 5.1 surround sound.

Third, the 1029A/1091A system is well-suited for monitoring house and techno music in a project studio. Between the 1029As' crisp high end and the 1091A's authoritative low bass, the strengths of the system coincide with the emphases of house and techno reproduction. While I would not feel comfortable relying on the 1029A/1091A for mixing classical music, this may be just the system for the techno/house producer who does not have the budget or larger room to accommodate a more elaborate system like Genelec's own 1031A/1092A or the MM8/ELF Infrabud combo from Bag End.

Fourth, while the 1029A/1091A is a professional tool, the system has a crossover appeal to the consumer market, as well. As computers merge with home entertainment systems, and surround sound comes of age, high-fidelity computer and surround sound speakers are equally at home in the home as in the studio. The savvy folks at Genelec are undoubtedly nibbling at a new market.

Thus, while the 1029As and 1091A do not equal Genelec's other models for precision stereo mixing, anyone looking for compact Genelec-quality speakers, or a reasonably priced monitoring system for surround sound, dance-oriented music, or a small project studio, should give them a serious listen.

The 1029As are available in either black or titanium gray. The 1091A comes in black. The 1029As and 1091A are distributed by Genelec USA, 39 Union Ave., Sudbury, MA 01776. Phone 508/440-7520; fax 508/440-7521; Web site: www.Genelec.com. ■



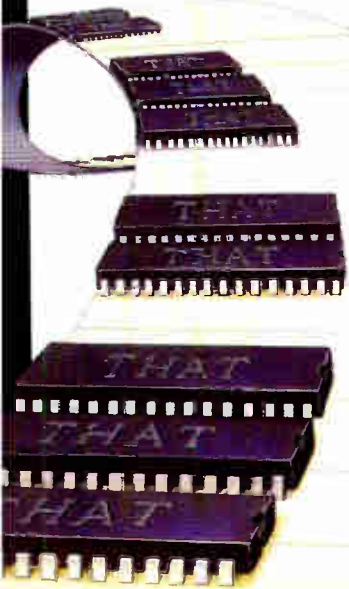
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PRESONUS BLUE MAX

SMART STEREO COMPRESSOR

Does the world really need another compressor? In my studio, I've got seven or eight compressors already, ranging from workhorse models from dbx and Symetrix to some absolutely glorious UREI and Focusrite Red units. So when a \$249 half-rack box like the PreSonus Blue Max comes along, am I supposed to be excited? Yeah, sure, absolutely, and here's why.

If, for a moment, you can look past the Blue Max's small price and

more surprises: Not only are connections provided for unbalanced 1/2-inch inputs/outputs (with a -10/+4dB operating level selector), but there is also a 1/2-inch sidechain access jack for de-essing, ducking, frequency-dependent compression or other effects (tremolo, anyone?). A detachable AC cable connects to an internal power supply—no wall wart!—switchable from 110 V to 220 via an internal jumper.

Having only a single set of controls, Blue Max is obviously de-

as much.

Operations are pretty much spin and go: You merely pick a setting that matches the application, set the input threshold and it's done. The output pot acts as a gain make-up control for restoring level to heavily compressed signals. If one setting doesn't fit exactly, just spin the knob to another setting and try again. Of course, the unit also provides a manual mode with access to a full range of controls.



diminutive package, you will see a box that does what no analog compressor has ever done before, and sounds great as well. If the same circuitry was repackaged in a two-rackspace box with a milled aluminum front panel, people would wait in line to pay \$1,000 for it.

Essentially, the Blue Max is a stereo compressor/limiter with five continuously variable front panel controls for input gain, compression ratio (1:1 to 20:1), attack time (.01 to 100 ms), release time (10 to 500 ms) and output level. Also standard are two LED ladder displays for input/output (switchable) and gain reduction, as well as a hardwire bypass. But what sets the Blue Max apart from the rest of the pack is the fact that it provides 15 presets for various tasks (three presets each for vocals, keyboards and frets), two percussion settings, eight instrument settings, two stereo program settings, two special effects presets and a manual mode.

The rear panel holds a few

signed with stereo compression in mind, though the unit can be used as a single-channel mono unit by plugging into the left input/output only.

With numerous program-dependent dynamics processors on the market, the "Smart Compressor" part of the Blue Max name is not entirely true. In audio, the name "smart" usually refers to circuitry that actively changes parameters based on the content of the input signal. So I would regard the Blue Max as more of a "clever" compressor, rather than a "smart" one.

Once you get into session with the Blue Max, you realize the amount of forethought that went into choosing the presets, which have been selected for musicality. Except in extreme settings, the dynamics action is quite smooth, and the audio quality is clean enough to challenge the performance of units that cost three times

BY GEORGE PETERSEN

Xwire announces the X905 Digital Wireless System



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CIRCLE #122 ON PRODUCT INFO CARD

World Radio History

—FROM PAGE 180, PRINT MASTERING

video-cassette and 5.1 for DVD), etc., etc. Though it's true that the chances are that what changes you do make will be simple level fixes, and thus can be easily replayed in automation, I fall back to my "in-20-years" argument.

Some might dispute my stance that your stems should play straight across for all print masters. Indeed, some level fixes, such as when you're trying to tighten the dynamic range for TV, are necessary no matter what. But I think that the all-too-frequent industry practice of doing the final mix in a discrete mode with a ridiculously wide dynamic

range, and then doing the 6-track print master straight across while containing, compressing and squashing the stereo optical master is a load of crap.

Movies are just too damn loud these days. There, I said it again.

Though I, too, dislike some aspects of the 4:2:4 stereo optical formats, I believe that an SR-encoded stereo optical print can play as loud as most movies ever need to be. Really.

Mind you, what I'm talking about here—the final mix plays straight across at a normal, listenable level—is nothing new. In the first two decades of stereo film sound (mid-'50s to mid-'70s) there

was no such item as a print master. The final mix of a film was *it*. Dialog, music and sound effects were combined onto one piece of 4- or 6-track mag film. There were some slight variations on this: Sometimes two first-generation mixes were recorded simultaneously, one to go in the vault, and the second to be used to make the mag-striped prints, thus functioning as the print master.

Sometimes a minus-dialog mix was recorded simultaneously to assist in the creation of the foreign music and effects ("M&E") mix. I say "assist" because the formula for M&Es is not just music-plus-effects-minus-dialog. There has to be additional Foley (including one track of just cloth movement), plus the odd steal from the original dialog stem. The correct proportions of all the above cannot and should not be done at the time of the original domestic stereo mix, regardless of what some facilities or console manufacturers might claim. But I digress.

It was not until the early days of Dolby Stereo that the problems with combining everything onto one composite master became evident to the whole industry. Any small change to the dialog/music/sound effects balance required everybody matching levels to punch in on one piece of film—this during the early days of console automation. The idea of recording dialog, music and effects on separate pieces of mag took hold in the early '80s and gave mixers the chance to make slight (or sometimes—gasp!—serious) balance changes while making the print master.

The concept of the print master itself started at the very beginning of Dolby Stereo with the introduction of the stereo optical process. This requires a special setup that's altogether different from the average bear: four console buses go into an external encoder, which matrixes center and surround information onto two tracks.

As I said earlier, in the original days of stereo film, print mastering involved a mag-to-mag transfer, either 35mm 4-track in the "CinemaScope" format or 70mm 6-track in the "Todd-AO" format. Thus, even with a composite 4-track master, a separate print master was almost always required in the early days of Dolby because the two masters that were required were 2-track (stereo optical) and 6-track (70mm).

Until the early '90s, almost all print masters were recorded on 35mm mag film, a format that will undoubtedly hold the all-time record for mastering longevity for sound recording in any



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World Radio History

medium—40 years, to 1990, as undisputed champ, and retaining a large part of the market during this last decade of the millennium. I do think that mag will be virtually extinct by the next century, and from that point on I give each format (whatever they may be) ten years of prosperity, tops.

The only true challenges to mag's dominance in recording stems and print masters have been either 2-inch 24-track with Dolby SR or the Sony 24- or 48-track DASH format. I have stated many times my preference for working with digital multitracks, and nowhere is their flexibility more useful than in print mas-

tering. (I should also hasten to add that since the editing of print masters is a very rare event, the biggest problem with multitracks in film post—editing—is really a nonissue.)

A word about the DASH format: I have used pre-emphasis as a way of tweaking out an extra bit of signal-to-noise ratio, most of the time in addition to raising the record levels to -16. Be aware that while these techniques do indeed help when going multiple A-D/D-A generations with analog consoles, pre-emphasis can be a problem if you go straight into a digital console, which would be unable to de-emphasize

the high frequencies. Certainly, there's no need for pre-emphasis if you're using a digital console to mix with today.

Whereas in the original days of stereo you only had a 6-track and a 4-track master, today there are endless variations possible, and the more versions you can print together, on one tape, with clear notes, the better off the film is. This implies that you are doing these versions at the same time as your standard print masters. Let us list the possibilities:

First, I think it's important to have two separate M&E mixes—a 4-track designed to create a 2-track print master, and a 6-track version for digital theatrical and home video presentation. With both of them, remember to make any changes that were made during your original domestic print masters. This would frequently be limiting for the stereo optical master, which requires some head-scratching because said limiter was probably of the 2-track variety, as opposed to the 4-track M&E that you will be making.

A 6-track M&E is distinguished not only by its stereo surrounds but also by the need to delay the surrounds approximately 50 ms in the case of DTS and SDDS. (This delay allows material that is both in the screen and surround speakers to arrive at the listener's ears at the same time.) Dolby Digital contains a delay in the cinema processor, and thus a delay should not be added when making the print master. (Then again, I should add that many mixers today don't add it for DTS and SDDS, either.)

DTS handles surround information in yet another manner: The subwoofer information is bandwidth-encoded onto the low-frequency part of the surround tracks. Thus, subwoofer information, and information below 100 Hz from left and right surround tracks, are combined and then recorded on both surround tracks. During playback, this sub information is extracted from the surround tracks; nothing above 100 Hz is sent to the surround speakers. You should always separately record full-frequency stereo surround information, plus the subwoofer track, when making a DTS print master.

A separate 6-track M&E also allows you to do what you probably should also have done for your 6-track domestic print master: create center-channel (and maybe even surround) information for 2-track stereo music that sounded fine when played through 2:4 matrix decoding. This assumes that your primary monitoring format during the final mix was with the matrix in. If you monitored discrete, and put center-channel information (either a simple L+R sum

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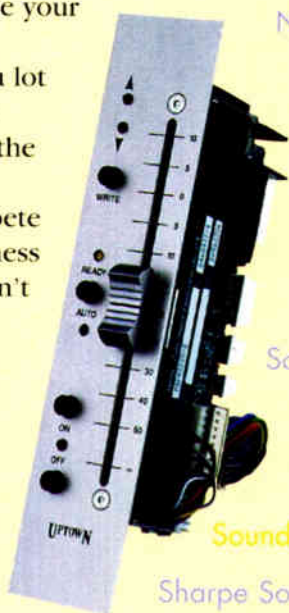
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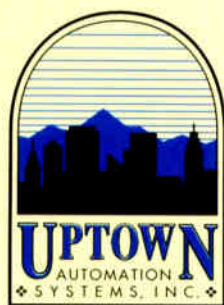
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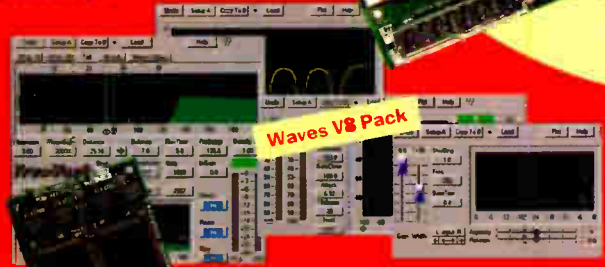
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or, preferably, the center output of a Dolby SDU-4 decoder) on the stems, then you will have to lower the center track of the music stem when making the 2-track print master.

Subwoofers are another part of 5.1 digital mixes that have some variance between formats, both in terms of sub alignment level (vis-a-vis the full-frequency front channels) and in terms of the exact frequency response. Note carefully the standards that you mixed to, because no one will be able to assume those figures 20 years from now.

There's going to soon be a new curve ball thrown at us in post-production: DVD. Actually, it's already here, but studios are transferring pre-existing masters. Just as the telecine transfer will eventually be followed by video compression, so will the track be subject to certain issues of downmixing. (Notice that I'm not saying anything about the audio compression algorithm itself, because God help us all if we have to redo our mixes to allow for *that*.) To whatever extent there is control during the DVD mastering process as to how the mix will sound in various formats, it will always be better if the original sound team make a special, prefab mix that takes all of this into account.

In the old days, the same facility that mixed the film also had optical negative transfer abilities. Nowadays, it's common to shoot negatives at facilities that specialize in track negatives. This, of course, puts greater importance on communication. Documentation, documentation, documentation. There are certain technical factors that we take for granted, whether we realize we're taking them for granted or not. They are reference fluxivity, EQ curve and its time constant, reel version number, reel lengths (in film and timecode, to the frame) location of complete tones and record pad, pull-ups...Your print masters should always be accompanied by a crib sheet stating all of these issues in clear terms for the transfer person.

Please send your print mastering stories to P.O. Box 24609, New Orleans, LA 70184, fax 504/488-5139, or via the Internet: swelltone@aol.com. ■

Larry Blake is a sound editor/re-recording mixer who lives in New Orleans for reasons too numerous to mention, although one of them would have to be that on her birthday he can drive over to his momma's house and bring her Popeye's fried chicken and red beans and rice, plus a cannoli from Brocato's.

PREPPING MICS THE ALLEY WAY (courtesy of Joe Pino)

1. Power up the pack.
 2. Quick vocal check ("One, two, testing").
 3. PFL in cans, work the entire length of the cable, looking for continuity faults, especially at the connector.
 4. Second vocal check.
 5. Repeat for next mic.
- Note: Once mics are turned on at the console by the engineer, they should never be turned off. If you try to save batteries by leaving them off for a late power-up, you're courting disaster.
6. After check, which should be as late as possible (keep the batteries fresh), the mics should go straight to the performers.
 7. In long shows, it's not a bad idea to change batteries at intermission.

Pino claims that, thanks to these procedures, he has mics over seven years old that are still in fine condition!

—FROM PAGE 181, LAVALIER MICROPHONES

throat area. Often, a vampire clip to hold the mic inside the shirt, touching the skin, is all you need. Layers of clothes and physical action can spoil this setup fast, but if you place the mic to favor the head turn (if there is one in the shot), this placement often does the job.

Warning! When using a metal-bodied mic next to the skin, be sure that your power source is grounded

properly (especially if it's a generator) and that all cables are wired correctly. A wet field, leather-soled shoes and a truck generator in combination with a hard-wire lav can make your star anchor do the "You're fired!" dance.

To hide a mic in or under clothes, choose a mic with a recessed grille, rounded edges and an LF roll-off characteristic. "On collars and ties, I like to hide the lav in the tie knot," says Pete

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Verrando, C.A.S., a freelance production sound mixer in Dallas for the past 12 years. "The perspective is pretty forced, but the clothing noise is really minimized. Suits make tons of clothing noise. I usually tape the tie to the shirt, as well. I wrap the lav in toupee tape before concealing it in the tie knot."

Once the mic is hung and dressed, the next few inches of mic cable should be loosely looped into an overhand knot, then strain-relieved at the nearest belt or collar. This is the little-known 9dB knot, so called because the nature of the loop and knot allegedly reduces noise by 9 dB. Hey, it works.

Successfully positioning a lav mic often necessitates a rather intimate relationship between the sound engineer and the performer. Sometimes actors and models are asked to work in cold environments, yet are costumed as if for a heat wave. A cold-metal sound component against the back can be just the thing to trigger very unphotogenic goose bumps; so, after you battery-up your transmitters and preamps, store them in your pocket for a while.

When your job involves shoving your arm under somebody's clothes, tact and consideration are extremely important. "I don't get much hassle from actors when futzing with their clothes," says Verrando. "I tell them what I'm going to do first, and then get them to help me string the wire through the clothing. It helps to kind of narrate the process as it's happening." This goes double for high-power CEOs. These days, most are pretty media savvy, but if you're on their turf, watch out! Confidence and politeness in these situations are essential, and don't forget those breath mints!

Make friends on the set or backstage. Wardrobe and hair people can help you immensely or, intentionally or not, make your life miserable. They can make useful accessories like mic belts, which can help hide a radio transmitter when a dress has no pockets. Hairdressers can help you with a good head mount that positions the mic in a hat, wig, glasses, mask or hair. A good head mount is hard to beat; the proximity can be excellent, the skull resonates nicely, breath pops are eliminated, and head turns are not a problem. Make sure you have proper strain relief, and keep the wire invisible at the neck. In the case of a dancing performer, take extra care with strain relief.

Wardrobe can also provide you with integral mounting as part of a costume and quick solutions to clothes that rustle. Everyone has an opinion on which fabrics make the most noise, but most

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CIRCLE #138 ON PRODUCT INFO CARD

problems seem to come from layers of different types of clothing rubbing over each other. Starched or stiff clothes tightly worn are also noisy, as is contact with the windscreen, body or cable of the microphone. A few quick passes with needle and thread can often eliminate such problems.

Nevertheless, some wardrobe choices are bad news for the sound person. Jewelry, running suits, corduroy and plastic fabrics can all cause problems and should be tested for sound in an air-conditioned trailer, rather than on the set. Better yet, convince the director that you should attend wardrobe pre-production meetings.

"The main thing about body mics is letting the [assistant director] or whoever is in charge know that sound needs some time to wire actors," says Verrando. "On crazy shoots, when in doubt, wire 'em and it'll be there if you need it. But it's good form to let all involved know what I'm doing. It also trains the crew chiefs to occasionally expect a little sound setup time."

TOOLBOX TRICKS

Every sound pro carries a comprehensive spares kit and toolbox, but you will need a few more items for lav mics (see "Tool Kit" sidebar). It's extra stuff to carry, but if you hang up the production while you fabricate and perfect an improvisation, you may not be hired again.

A few thoughts about adhesives. Gaffer's tape, toupee tape and moleskin should be chosen carefully and used wisely. Residues can fill in microphone windscreens and may gunk up the diaphragm. Never store mics with tape still on them. Camera tape and paper-based tapes are bad choices. Try waterproof adhesives like surgical tape; good, fresh gaffer's tape is always hard to beat. Most of the rest of the kit resembles items from the hairdresser's kit, but have the items on hand anyway.

SMOOTH OPERATION

Lavaliers require maintenance, just like any other piece of pro audio gear. In normal use, there is very little that can go wrong with a lav mic, but heavy use and wet conditions should inspire cautious preventative maintenance. Molded connectors should be visually and operationally inspected, especially after a good yank on the cord. Don't lose your chance to identify the problem before the mic is stored with its twins. Fastener-assembled connectors are notorious for coming unscrewed, so make sure you have the right screwdrivers on set.

Make sure all your fasteners are well-seated, but not too tight. Watch for corrosion build-up or dirt in the contacts.

Moisture is the enemy, sweat is the worst. Joe Pino, resident sound designer at the Tony Award-winning Alley Theatre in Houston since 1990, recommends the following for sweat-outs: "There's nothing you can do after it happens, as far as I know. Let them dry out and see if they start working again—after a few days, Pow!, there they are like nothing ever happened." In desperate situations, try storing the mic in a zip lock with some form of sealed desiccant. As a preventative step, Pino recommends spray-

ing or dipping new mic windscreens in Scotch Guard and then immediately blowing the mesh out with canned air.

Windscreens are often necessary outside, but they are not "rain screens." "Lately we've been leaving the windscreens off—the windscreen seems to actually wick the moisture into the capsule," says Pino. "We still use moleskin or Elastoplast occasionally as a cover and moisture barrier, especially if the mic needs to be colored to match the performer and the application."

A particularly important point to consider is battery power, including electret



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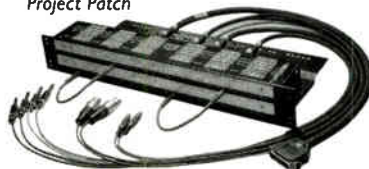
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batteries, battery-driven phantom supplies and transmitter packs. Pino recommends checking the latest *Consumer Reports* battery tests to see how the various manufacturers' models stack up. Such articles usually include an informative treatise on different battery compositions. The major point to note is that as voltage goes down, the noise floor seems to rise, the output is reduced and gain before feedback is reduced. The preferred type of battery starts with a high sustaining voltage that drops off sharply, rather than gradually. Never compromise on batteries, and properly dispose of them immediately to prevent reuse. No matter how much the producer whines about budget, just remind him that cameras need light and sound needs batteries. Never accept rechargeables.

EQUALIZATION

And when you've wired the actors and are set to record, please remember: Critical EQ decisions are often better left to post-production! The watch word is consistency. In live situations, radical EQ settings chosen to favor one voice can leave other actors' voices too thin. Further, radical EQs will not cross-cut well

against the "average" EQ setting. Make sure to record some ambient room tone while you still have everyone wired.

In order to reduce noise from handling, clothes, ambience and breath pops, a low-cut (bass rolloff) EQ is allowable. High-frequency EQ should only be added in cases where intelligibility is being lost, such as when the mic is obscured by thick clothes. Unnecessary use of HF EQ can result in too much sibilance, especially in a wireless/Nagra combination. In such situations, another mic placement or another type of mic, such as a shotgun, will often yield better results.

Properly used, lavs can provide an elegant solution to many modern sound design problems, and they can often be used in conjunction with other mics to improve overall sound quality. "I often use a lav to help clarify a line in a boomed scene," says Verrando. "When a scene is great on the boom except for a line or two, I'll sneak the lav in the mix to perk up those lines. A scene doesn't have to be all boom or all lav." Don't be afraid to experiment, and give yourself time to use the best test equipment in your rig: your ears!

LAVALIER TOOL KIT ESSENTIALS

- Small rolls of gaffer's tape, toupee tape, medical/surgical tape
- Vampire clips, tie-tack clips, button-hole clips
- Extra batteries
- Foam windscreens, cheesecloth windscreens
- Velcro body-pack holders
- Zip-lock bags and a sealed desiccant package
- Battery-powered shaver (used to prevent "five o'clock shadow" noise on the collar)
- Breath mints (self-explanatory)

•••

The author would like to thank Texas sound veterans Pete Verrando, C.A.S., and Joe Pino for their assistance in the preparation of this article. ■


Douglas Robertson is a freelance sound designer and owner of Citizen Doug Productions in Houston, which offers turnkey sound design, location and post sound services. Reach him at citizen-doug@worldnet.att.net.

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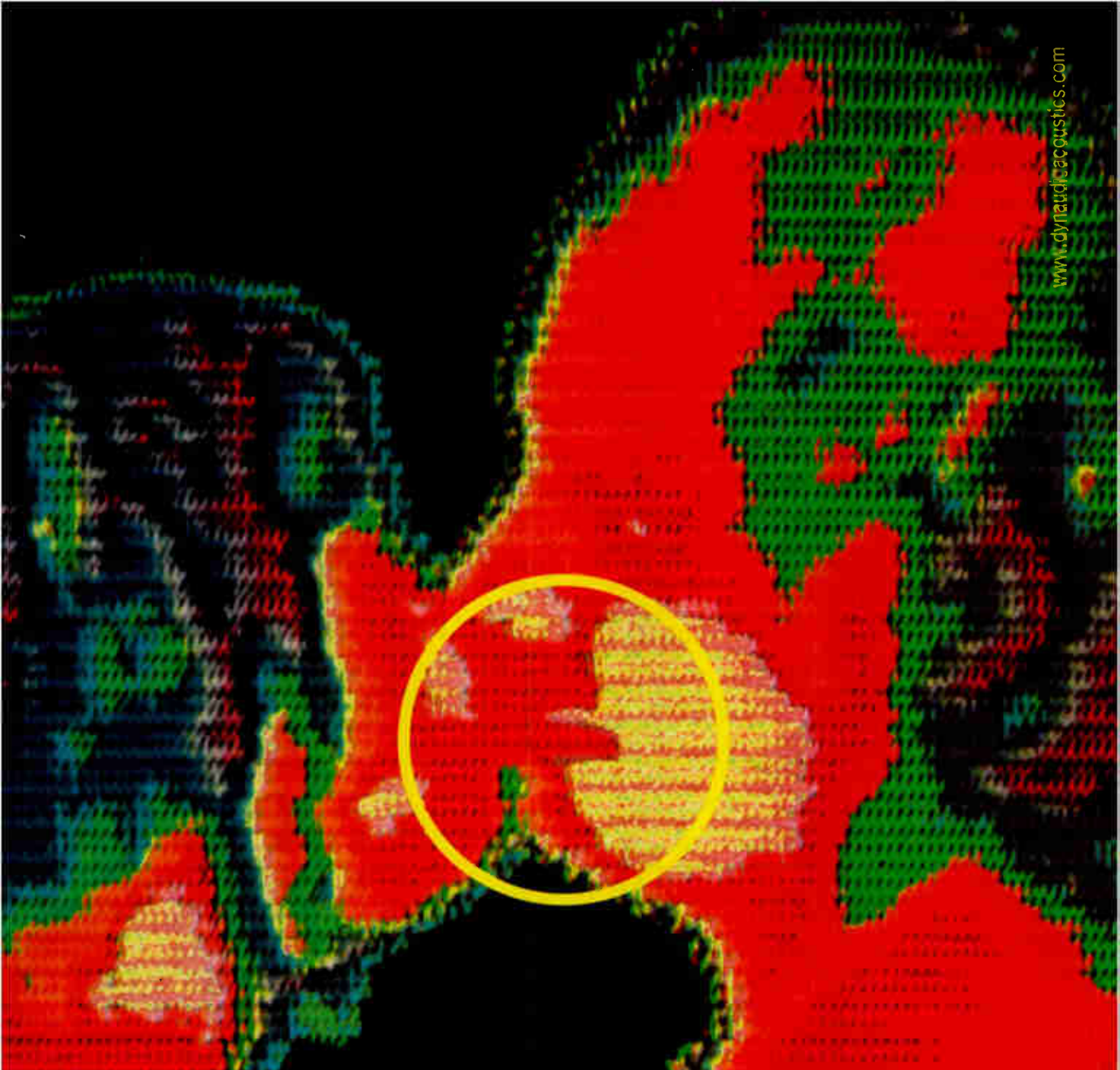


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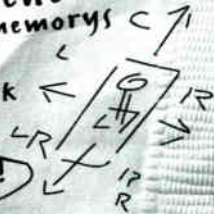
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32-bit internal processing combined with 24 bit A to D and D to A converters, yield an incredible 110 db dynamic range, putting the DA7's sonic quality in a class by itself.

MAXIMUM FLEXIBILITY

Packed into the DA7 are sixteen analog mic/line inputs and individual access to channels 17-32 through channel flip buttons located above each fader. Twenty faders do triple-duty as level controls for channels 1-16, 17-32, or Aux sends 1-6, Aux returns 1-6, and buses 1-8. We've even added an additional fourth layer, which includes MIDI faders.

EASY-TO-USE

The DA7 features automated, logical layout and intelligent design. Access a channel by pushing its select button, and all parameters for the channel: EQ, bus and aux assignments, and dynamic/delay settings come up on the large backlit LCD screen. To access individual parameters, just touch the appropriate knob in the console's master section. This calls up the sub-menu on the LCD screen and zooms in on the appropriate function. No digging through menus or getting lost in functions; just select... and you're there.

THE POWER TO CONTROL

The EQ section offers four true parametric bands active on every channel, with the top and bottom bands selectable from peaking or shelving, or they can be high and low pass filters, respectively. The frequency bands are overlapping, with the top two bands ranging from 50Hz to 20kHz, and the bottom two bands ranging from 20Hz to 20kHz. Boost or cut for these bands are adjustable in 1/2 dB steps to + or - 15 dB. The bandwidth is adjustable from 0.1 octave to 10 octaves. This DA7 is so fully featured, even the Aux returns feature a 2 band parametric equalizer. The dynamics section offers you a choice of a Gate/Compressor/Limiter or an Expander on every channel with variable attack and release times and levels for threshold and ratio. A Delay of up to 300ms is available on every channel. In addition, 50 EQ and 50 Dynamics memories can store your favorite settings for instant recall.

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The DA7 is equipped to mix 5.1 channel surround through its buses, so you don't have to tie up auxes, controllable by three modes for any channel or combination of channels. All modes provide full dynamic control of panning, and can be copied, stored, and transferred to any other channel. An optional MIDI joystick gives yet a fourth method.

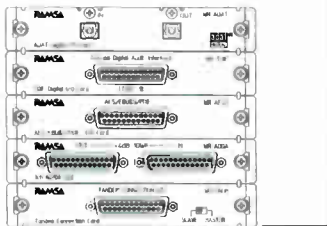
MORE FEATURES THAN WE HAVE ROOM TO TELL YOU ABOUT

The DA7 features four up/down/left/right cursor keys that are switchable to output MIDI Machine Control commands to MDMs, sequencers, or workstations. Data entry is done through the parameter dial or alphanumeric keypad. There's an undo/redo button, solo-mode set, and built-in talkback mic. Honestly, the DA7 is so feature rich, (but still easy to use) that we don't have room to describe it all here. You'll have to test drive it in person!



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Panasonic DA7



Optional Slots

TAKE ON THE WORLD

The rear panel has 16 analog mic/line inputs (8 XLR with individual software-switched phantom power, and 8 with TRS); 16 channel inserts (preA/D); and 6 auxiliary send/return jacks (1,2 use S/PDIF; the rest, +4dB 1/4inch connectors). Analog outputs include +4dB balanced master outs with XLRs; +4dB balanced record outs on TRS 1/4inch jacks and two +4dB monitor outs on TRS balanced jacks. Digital I/O, via XLR connectors is switchable between AES/EBU and S/PDIF. The rear panel also offers MIDI In and Out, word clock I/Os, plus both a 9-pin RS-422/485 serial port and PC port for Mac/Windows with software support for both, a 1/4 inch footswitch jack for controlling talkback on/off or automatic punch in/out for automation, and a D-15 subconnector for the optional meter bridge.

TAKE IT EVEN FURTHER

3 expansion-card slots allow connection of recorders with ADAT Lightpipe, TASCAM TDIF, and AES/EBU (switchable to S/PDIF) interfaces, with any of the audio cards fitting into any slot. A fourth card provides 8 more analog inputs/outputs via a D-25 subconnector. The third expansion-card slot can be used 3 ways:

- Connect 2 DA7's together with true bi-directionality
- Replace analog inputs 9-16 with digital inputs
- Digital inserts across the 8 buses, six Auxes, and L/R stereo out. An option card provides SMPTE and Video Sync input.

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E.I.N.	-92dB Typical
Residual noise	84dB BUS OUT
Maximum voltage gain	84dB MASTER OUT 84dB AUX OUT
C.M.R.R.	More than 80dB (1kHz)
Crosstalk	:90dB Typical (1kHz)
Dynamic Range (WCK=48kHz)	114dB AD Converter (analog in through digital output) typical, A-weighted 110dB DA Converter (digital in through analog output) typical, A-weighted 110dB AD+DA (analog in through analog output) typical, A-weighted
AD converter	24 bit* 128times oversampling (INPUT 1 ~ 16) 20 bit* 64times oversampling (AUX RETURN 3-5)
DA converter	24bit* 64times oversampling (MASTER, MONITOR A) 24bit* 128times oversampling(MONITOR B) 20bit* 128times oversampling (AUX SEND 3-6)
Internal signal processing	32 bit(Dynamic range 192dB)
Sampling Frequency	INT:44.1/48 EXT:44.1kHz±3% 48kHz±3%
Signal Delay	Less than 2.5ms (MIC/LINE input to MASTER output)
Compressor + Gate	-40dB~0dB(1dB step)
Threshold	1, 1, 1, 1, 3, 5, 1, 7, 2, 2, 5, 3, 3, 5, 4, 5, 6, 8, 10, 20, ∞ (16points)
Ratio	
Attack Time	0ms ~ 32ms(1 ms step)
Release Time	50ms ~ 2000ms:5ms step
Gain	-0dB ~ +12dB(0.5dB step)
Gate Threshold	-80dB ~ -40dB(1dB step)
Gate Release time	50ms~2000ms:5ms step
Expander/Gate	
Threshold	-80dB~-40dB(1dB step)
Ratio	1, 2, 3, 4, 5, 6, ∞
Attack time	0ms ~ 32ms(1ms step)
Release time	50ms ~ 2000ms: 5ms step
Range	0dB ~ +40dB(0.5dB step)

Equalizer

LOW:PEQ	Q 0.5 ~ 50(41 step) F 20Hz ~20kHz(1/12oct step) G + 15dB(0.5dB step)
LOW: SHL	F 20Hz ~ 1.6kHz(1/12oct step) G ± 15dB step) (0.5dB step)
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HIGH: PEQ	Q 0.5 ~ 50(41 step) F 50Hz ~ 20kHz(1/12oct step) G + 15dB(0.5dB step)
HIGH: SHL	F 1kHz ~ 20kHz(1/12oct step) G ±15dB(0.5dB step)
HIGH: LPF	F 1kHz ~ 20kHz(1/12oct step)
Delay	0~14,400sample/0~300ms (fs: 48kHz), 0~326ms(fs:44.1kHz)
Phase	NORMAL / REVERSE
Gain Trim	+ 12dB ~ -24dB (0 5dB step)
Stereo Meter	20point x 2LEDbar graph (VU/PPM selectable, Peakhold on/off)
Fader	100mm motor fader x 21 +10 ~-90dB,-∞dB (128step / 100mm)
Display	320 x 240dot graphic LCD (with backlight)
Memory	Scene memory(snapshot) 50 Channel library 50 EQ library 50 Dynamics library 50 Automation 4event
Ambient operation temp.	0°C~+40°C
DIMENSIONS	698W X 244H X 549 MM 27.48 X 9.606 X 21.614 INCHES
Weight	Approx 51lbs (23Kg) (include Meter bridge)
Finish	Front panel: ABS, Color blue/black Rear & Enclosure: Steel, Color black
Power requirement	AC120V,60Hz
Power consumption	105W(with options)

Weight and dimensions shown are approximate. Specifications subject to change without notice.

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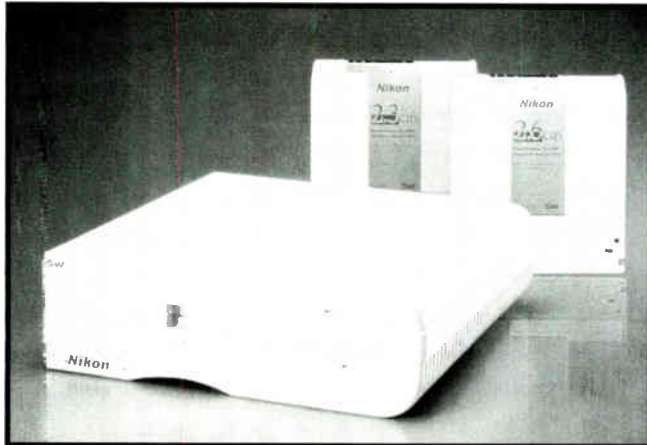
Rolls (Salt Lake City, UT) offers the MX442 Field Mixer, a 4x2 portable mic mixer running on two 9V batteries. Controls include level and pan for each mic input, master volume and headphone level. Two VU meters monitor input, output and battery condition. Additional features include -20dB pads, phantom power, limiters and highpass filters on the inputs; 400Hz setup oscillator; and slate mic/tone. Price is \$999.

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SANKEN CS-3 SHORT SHOTGUN

Sanken's CS-3 Short Shotgun mic (distributed by Audio

Intervisual Design, West Hollywood, CA) measures only 10.6 inches, yet offers a highly directional pickup pattern through the use of an array of three directional condenser elements. The combination of second gradient and line microphone designs offers improved low-frequency directivity. Polyphenylene sulfide capsules provide humidity and tem-



perature stability. The CS-3 includes a LF roll-off switch, and its 19mm diameter accommodates all standard accessories. Retail: \$1,350.

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The Beluga AV™ magneto-optical drive from Nikon Optical Storage (Belmont, CA) provides data transfer rates of up to 4 MB/sec. and burst transfer rates of 10 MB/sec. Designed for audio/video post-production applications, Beluga AV provides 2.6 GB of storage on a 5.5-inch removable cartridge and has 4 MB of cache memory, ensuring uninterrupted data flow. Nikon's LIMDOW® (Light Intensity Modulation, Direct-Overwrite) technology eliminates the need to erase before writing for exceptional write data transfer rates. The Beluga AV is compliant with ISO standards for 650MB and 1.3GB MO media, enabling users to simply read and write to legacy media without converting formats. Price

is \$2,295; 2.6GB LIMDOW cartridges are \$99.

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Dolby Laboratories (San Francisco, CA) debuts a new 2-channel Dolby Digital audio encoder, the DP567. Designed for digital TV, digital cable and DVD applications, the unit accepts both analog and digital inputs and can encode any mono or stereo source signal. Already encoded audio bit streams may be passed through the unit unaffected, and the DP567 preserves Dolby Surround matrix encoding. Controls include switches for selecting configuration parameters (shown on a two-line, 16-character LCD) and channel activity LEDs. Front and rear serial interfaces ease integration with PCs and other remote

control devices. The unit can be referenced to an AES/EBU signal, and multiple encoded audio signals can be processed. Price: \$3,000.

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RECORDING NOTES



Warren Cuccurullo (L) and Simon LeBon

DURAN DURAN

WELCOME TO MEDAZZALAND

by Bryan Reesman

What, you might ask, is "Medazzaland," the title of Duran Duran's latest album? The group's lead vocalist, Simon LeBon, claims to have discovered it during dental surgery after being given an intravenous drug called medacilin, which he says removed all memory traces of the experience despite his being conscious during it. Upon LeBon's return to the studio, his bandmates listened to his tale and, observing his groggy state, remarked, "You're still in Medazzaland, buddy."

Medazzaland retains the British group's well-known pop sensibilities while building on them with some contemporary ideas and electronic influences. It's highly textural music, which keyboardist and band founder Nick

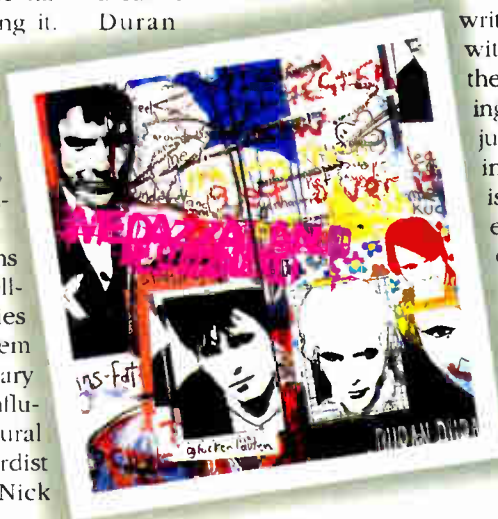
Rhodes believes is tailor-made for the current musical climate. While Rhodes felt that in the early '90s there was considerable media resistance to their music, particularly with grunge and hip hop dominating the charts, he's seen the musical tide reversing since 1994's release *The Wedding Album*. "That's when I think things started to change again, and people were moving back more toward electronic music and toward beautiful, melodic songs," he says. "Those two areas are where Duran Duran

feels very comfortable, and so making this album it was as if we could go right back to our roots."

Initially, the band wrote songs for this record in the fall of 1994, then took a hiatus to record and tour behind their covers album, *Thank You*. They returned to the studio in the summer of 1995 to cut 16 tracks with a live drummer. Afterward guitarist Warren Cuccurullo and Rhodes went into the former's home studio to begin keyboard overdubs, while LeBon struggled with writer's block to come up with suitable lyrics. "And then [we were] reevaluating what we had even on just a musical level, saying, 'A year's gone by is this one still good enough?'" remarks Cuccurullo.

As they were stripping down material and focusing their efforts, longtime bassist John Taylor left the band. (Cuccurullo took over bass

—CONTINUED ON PAGE 200



THE DOORS' BOX SET

RARE AND RUDE

by Eric Rudolph

"You're all a buncha slaves! Lettin' everybody push you around! What are you gonna do about it? What are you gonna do?!" screams a drunk-



en Jim Morrison, over and over again.

It is March 1, 1969, at the Dinner Key auditorium in Miami. The song is "Five to One," and the fallout from the evening's performance would come close to ending the Doors' successful career.

Taped on a cassette from the audience, the recording is telephone call-thin, and the noise floor is up to the

ceiling. Despite the howling, chaotic, nearly out-of-control singer, the Doors' backline imaginatively holds the fort. Drummer John Densmore lays down a solid, lively beat as keyboardist Ray Manzarek and guitarist Robby Krieger valiantly try to inject some musicality and maintain coherence amid the madness.

It's a helluva way to open

—CONTINUED ON PAGE 202

"ALL THE KING'S MEN"

**A NEW DAY FOR ELVIS'
OLD BAND**

by Robyn Flans

All the King's Men is a record that defines the phrase "labor of love." The project was spearheaded by the two remaining members of Elvis Presley's original backing trio—guitarist Scotty Moore and drummer D.J. Fontana (bassist Bill Black died in 1965)—and includes an impressive roster of musical greats who also happen to be Elvis fans.

"We didn't want to do another tribute album," explains Moore. "I told [executive producer] Dan Griffen that I'd like to find some



Scotty Moore (left) and Keith Richards in Levon Helm's studio in Woodstock, N.Y.

artists who were influenced by the music—not by Elvis' hip shaking. He came back a week later with six people already committed to the project. It ended up another

half-dozen wanted to be involved, but we couldn't get to them. I hope we do well enough with this one so we can do another one."

Among those contributing

to Moore's and Fontana's effort were Keith Richards working with The Band, The Mavericks, The Bodeans, Cheap Trick, Tracy Nelson,

—CONTINUED ON PAGE 206

YES' "ROUNDAABOUT"

by Tim Morse

Anyone who has listened to "classic rock" radio will be familiar with the dramatic backward piano chord that opens the FM staple "Roundabout." The song introduced the masses to the British band Yes and their singular brand of progressive rock. Progressive rock was spearheaded in the early 1970s by such

able to find the groove. Steve Howe (guitars) would play his bold and inventive guitar passages over this unique backing. He was known for his ability to perform in many different styles of music (classical, jazz, country, ragtime, rock), as well as being able to synthesize these different elements into a cohesive whole. Keyboardist Rick Wakeman was from the Royal Academy of Music and brought his classical influence to Yes. His classical technique came through in his elegant piano lines and Mellotron string harmonies, yet he could also play a burning

and Squire. They discovered they had a mutual vision for a rock band that would be strong both vocally and instrumentally, and set about putting the first lineup of Yes together. Peter Banks (guitar), Tony Kaye (keyboards) and Bruford were enlisted to join them playing some truly



Yes, circa 1972 (clockwise from bottom left): Rick Wakeman, Bill Bruford, Chris Squire, Steve Howe and Jon Anderson

bands as Emerson, Lake & Palmer, Jethro Tull, Genesis and Yes, all of whom proved that a band could be different from the mainstream and still enjoy commercial success. "Roundabout" was not only a hit single for the band, but it also brilliantly captured Yes without compromising their artistic integrity (a rare thing indeed).

Although the band was made up of genuine virtuosos, they never played just for the sake of technique. Every member of the group performed an important role in the construction of their music. The rhythm section of Bill Bruford (drums) and Chris Squire (bass) were hardly content to just slip in to 4/4 groove and coast. Instead they would utilize different time signatures, emphasize precise off-beats and still be

Hammond organ solo, as he does in "Roundabout." Then over this tapestry of sound, vocalist Jon Anderson would add his high-pitched vocals, usually on relatively simple melodies. This was important because it was the hook that the average listener could grab onto, not the complex musicianship that surrounded it. Anderson's abstract, non-specific lyrics were another reason for the band's popularity, because they invited listeners to interpret them however they pleased, thereby making them seem more personal to the audience. "Roundabout" showcases Yes in their prime with all of these elements on display in a sprawling eight-minute odyssey.

Yes was born in 1968 in London by a chance meeting between Anderson

that continues to this day) and was replaced by the multitalented Howe.

The first record with Howe, *The Yes Album*, changed the group's fortunes completely. The success of that album led to their being invited to tour America as an opening act for Jethro Tull. They returned from the U.S. enthusiastic and energized, realizing that indeed there was a large audience for their style of music. But before they entered the studio again, they dismissed Tony Kaye and recruited ex-Strawbs member Wakeman as their new keyboardist.

The song "Roundabout" began its life as a guitar instrumental suite that Howe had written during a tour of Scotland in 1970. He showed the structure of the song to Anderson, and they came up with the majority of the

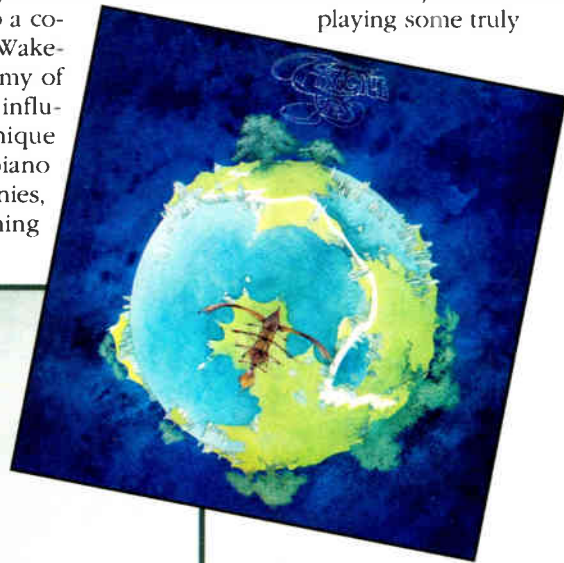


PHOTO: MICHAEL OCHS ARCHIVES/VERICE, CA

awful gigs in the hopes that something would materialize from it all. The hard work did finally pay off—they slowly built a faithful audience and, on the strength of some good press notices, were able to secure a contract with Atlantic Records. Their first two albums, *Yes* and *Time and a Word* revealed a group that was still searching for its sound, and neither was very successful commercially. Banks was fired (beginning a trend of constant personnel changes



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lyrics and melodies to it on their long bus ride back to London—many of the sights from that bus ride, such as Loch Ness, are included in the words. Even at the time, they felt that they might have written a timeless rock song, and when they brought it to rehearsals for the next album sessions, the other bandmembers gave their own input into the complex arrangement. When they were finished with rehearsals, Yes moved into London's Advision Studios with producer Eddy Offord for what would prove to be an intense month of recording. Advision was so named because it was primarily used

for recording commercials and jingles, but rock bands such as Emerson, Lake & Palmer (whom Offord also produced) were known to record there as well. It had the distinction of being one of the first independent studios in London.

Although Yes had extensively rehearsed "Roundabout," it was in some ways unfinished when the studio sessions began. Offord explains, "The band would write skeletons of songs in rehearsal and they were just skeletons. When we got into the studio, we would record every song in minute or a minute-and-a-half sections with just

drums, bass and maybe a scratch guitar. On the 24-track tape there was a splice every minute or so, and when you rewound it to the beginning of a song you'd hear the edits go by—swish...swish. We'd be in a song a little bit and someone would say, 'Let's try to put an acoustic section here, let's try this here...' It was all very experimental, but we kind of built it up as we went along."

Bruford recalls, "We were well-served in all of this by having the ability to tape-edit—and having Eddy Offord, who would slash a 2-inch master tape without thinking about it and just glue another bit onto it. Tape editing was fundamental to this band creating this music at all. Because we couldn't play any of it through until we'd learned it." The 24-track and 2-track mastering deck were both Scullys. The console in the studio was custom-made by Advision, as were the monitor speakers (though they were created from JBL components). Offord reports that the speakers weren't very accurate in reproducing the music's low end, so this had to be taken into account as the track was recorded and mixed.

One of the most distinctive elements on "Roundabout" is Squire's dynamic bass guitar sound. Squire played his Rickenbacker 4001 through a Marshall bass amplifier on the basic track and then doubled his parts with one of Howe's big hollow-body jazz guitars (miked acoustically) to give the bass such a bright presence. Bruford played his Ludwig kit (with Paiste cymbals), and his famous snare sound was achieved by hitting rim shots on his metal snare drum miked with a Neumann U64. He also remembers playing milk bottles during the heavy bass ostinato portion of the song to create a different percussive effect. Howe used his beloved Martin 00-18 for the dramatic intro (his use of harmonics is said to have inspired The Edge of U2), and for all of the electric guitar parts he played a Gibson ES5 Switchmaster through a Fender Dual Showman amplifier. The guitars were recorded with an old AKG C28. Wakeman created his original Hammond organ sound by using a phaser and flanger simultaneously. Wakeman describes the settings for the flanger as "just slightly bubbling—set on the verge of getting the non-tonal type of sounds. The phasing had a really heavy sweep to it, and the Leslie was being turned on and off constantly." He also used his then-new Mini-

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moog synthesizer for fills (in harmony of course) and a Mellotron for the flute sound in the interlude.

Offord recalls that recording the vocals was quite a painstaking process. He tracked Anderson and Squire individually and had them each sing the song line by line, using the U64. Anderson has revealed that in the final three-part vocal passage (before Howe's acoustic guitar coda) that another vocal melody is introduced—from the children's nursery rhyme "Three Blind Mice." "It was a very, very creative time," remembers Offord. "There was fighting, but it was all towards a common purpose. Everyone was just enthusiastic and wanted everything their way! But it was positive, it was great."

"Roundabout" was an enormously successful song for Yes. A severely edited single reached Number 13 on the American charts, and the album cut has been played on FM radio ever since, becoming a true classic rock song. On the basis of that song, the album *Fragile* rose to Number Four in just four short weeks and is still considered to be one of Yes' definitive records.

The group continued to have incredible success throughout the '70s, but that lineup splintered apart in 1979 for a variety of reasons. Anderson and Wakeman left the group and were replaced by Trevor Horn and Geoff Downes of The Buggles (who had a hit single with "Video Killed the Radio Star"). The resulting album, *Drama*, and supporting tour did disappointing business, and the group was put on ice for a while. Yes was reformed in 1984 (with guitarist Trevor Rabin) for the album *90125*, and the single "Owner of a Lonely Heart" was a huge hit all over the world. *90125* was the most successful album Yes has ever made (selling more than 6 million copies), and it gave them the momentum to continue on through the '80s. More recently, Rabin has left the band to score movies, and Howe and keyboardist Igor "Ivan" Khoroshev have joined Yes. In the fall of '97 they released a double live album entitled *Keys to Ascension II*, and a new studio album called *Open Your Eyes* is forthcoming. The band continues to tour regularly. And, of course, they still perform "Roundabout," as they have on every tour since 1972. ■

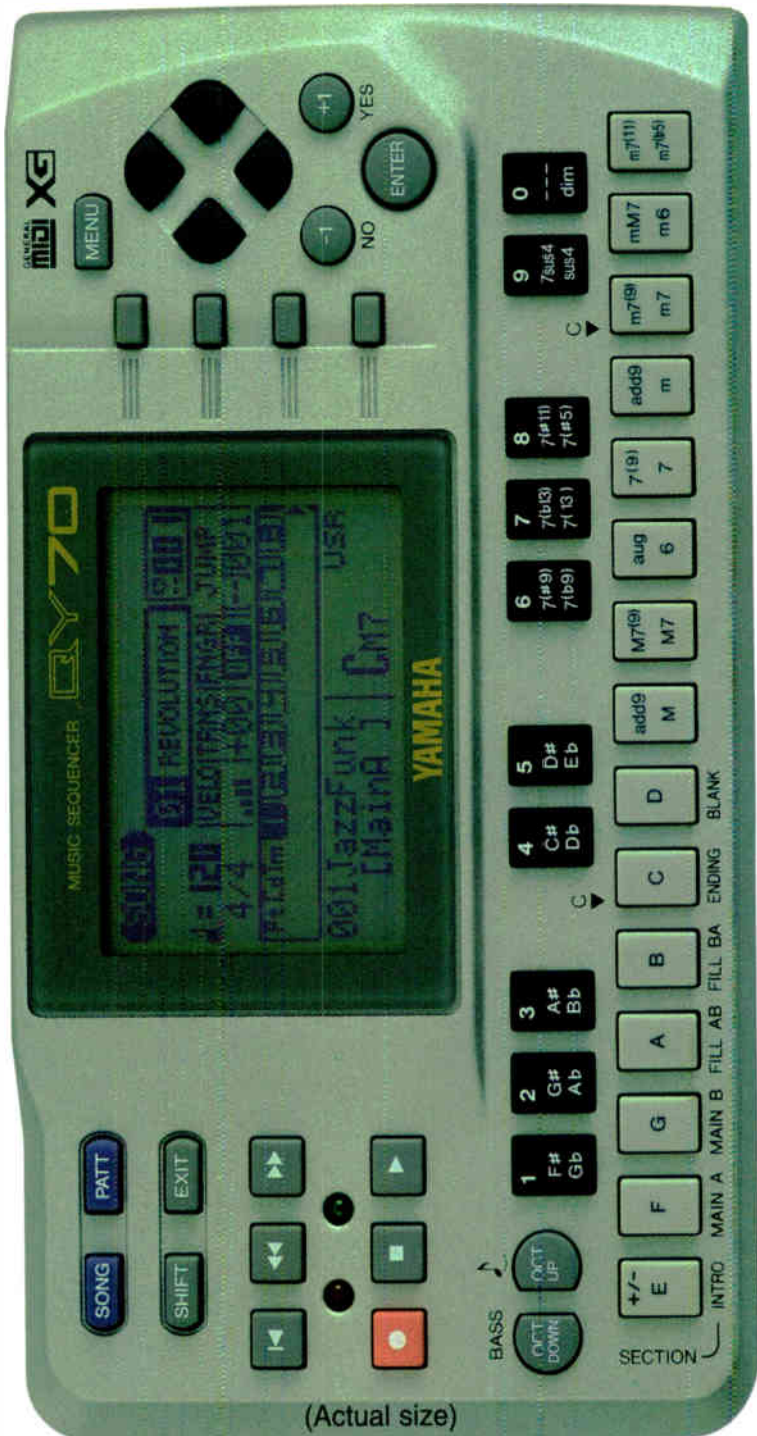
Tim Morse has written a book on Yes titled Yesstories. He has a new book on classic rock music coming out next year.

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—FROM PAGE 194, DURAN DURAN

chores on the post-Taylor tunes.) While waiting for lyrics and vocal melodies, Rhodes and Cuccurullo started a new band and production company called TV Mania. They wrote and produced two songs for Blondie ("Pop Trash Movie" and "Studio 54") and began their own "cyber-soap-rock opera" called *Bored With Prozac and the Internet?* Working intensely in close quarters, they produced an average of one or two pieces of new music a week. "It was very rewarding," says Cuccurullo. "We were exploring many different avenues of our creativity through this TV Mania project because we could be humorous with it lyrically and musically. We could be very adventurous with it musically."

It also helped to provide an impetus for finishing the new Duran Duran album. "When Simon came in and heard what we had been doing and saw the way we were working, it was like we had this burst of creativity, and we wrote six new songs very quickly, between December of 1996 and March of 1997. So this record is the most current thing we've ever put out."

The band recorded at their private Battersea Studio, which takes up the expansive living room in Cuccurullo's London residence, with engineer and programmer Mark Tinley behind the board. Tinley previously had worked with Adamski and various London DJs before hooking up with Duran Duran in 1995. *Medazzaland* was cut on a 24-bus DDA DMR12 desk and recorded to Tascam DA-88s, using E-Magic's Logic Audio editing and sequencing software and a basic 4-track version of Pro Tools. They used a variety of signal processors, including an AMS reverb and delay, Boss SE-70, various Digi-Tech, Eventide, Ibanez and Lexicon units, an EMS Synthi-AKS, Roland 501 space echo and TOMY voice changer.

The fresh electronic milieu of *Medazzaland* comes from a union of analog and digital gear. Rhodes says he was dissatisfied with the thinner sound of his digital synths, which he began using in the mid-'80s, and wanted to get back to warmer analog sounds. So he went out and bought some of his old favorites to use in conjunction with modern samplers. These older models included a Roland Jupiter-4 and Jupiter-8, Sequential Circuits Prophet 5, EDP Wasp and a Roland System 100, which he describes as "a big analog modular system which I'd used on the first and second albums. I got back to using that together with a lot of analog and digital effects.

"I played a lot of parts manually that I can probably never repeat without just sampling them and playing the samples, because it involved a lot of twiddling of knobs at the same time," he continues. "I very much looked at this album as I did with our earlier stuff, in the way that synthesizers are there to create atmosphere and soundscapes. I tend to play a lot of melodies on very simple harmonic sounds and things like strings and orchestration." He and Cuccurullo worked together to fill out the musical spectrum; if the guitarist played some higher parts, then Rhodes tried to create sounds in lower frequencies, often meshing their sounds. "Some of the things you may think are guitars are probably keyboards, and vice versa," Rhodes notes.

"The keyboard parts by themselves for any one of the songs would make a really interesting ambient album," remarks Tinley. "The way the textures weave in and out and then simply change timbre completely from section to section is one of the things that makes Nick so interesting to work with."

Cuccurullo's dense sonic tapestries are also intriguing. The guitarist, who wields a Strat-shaped Steinberger GR, confesses to having nearly six feet of pedals on the floor in front of him at any given time, and he isn't shy about using a wide array of effects. "I use Lexicon Jam Mans as my main writing assistant," he explains. "I could just play a riff in there and then have it loop forward or backward perfectly in time with the rhythm machine. Usually, I'll just find different harmonic climates that will work around that riff and play a couple of different top-line things. I use it to assemble a track, basically. Usually, once I have that going, I save it to DAT." Then he works out different overdub ideas, with the option to go back and forth from an acoustic guitar to see how the song sounds in a more naked form.

"Be My Icon" was the first song Cuccurullo wrote with the Jam Man. He had it reverse a riff he wrote, then found a progression that worked over that. The tune, originally called "Butt Naked," featured spoken vocals by Taylor. "We loved that track," remarks Cuccurullo, "and we thought, 'Well, John's left the band, we're not going to have his singing on the album.'" So after Rhodes wrote new lyrics, Cuccurullo improvised a new vocal melody to the year-and-a-half-old song, something he had never done.

Another way Cuccurullo used the Jam Man was to make loops that Rhodes would sample onto a keyboard,

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reprocess "and actually play different tunes with it," Rhodes explains. "A song where Warren used the Jam Man loops a lot is 'Big Bang Generation.' The little motif thing that comes up at the choruses is the Jam Man loops with harmonies on them. He plays into one Jam Man and then plays the harmony into the other one and then fires them both off at the same time."

Because of the experimentation, *Medazzaland* is one of the more unusual Duran Duran projects. Listen to the eerie "Be My Icon," filled with gritty guitar and keyboard textures, which echo its ominous theme of stalking. Even LeBon's normally pretty voice is given a sinister edge. "It's one of my personal favorites," says Rhodes, "because I think it's achieved something that is quite difficult to do now, which is to sound totally unlike anything else while using elements of many things. It is definitely a different side of the record. But I am very pleased with the way the vocal sounds, the lyrics, the melody. And the sounds on the track all mesh to make a wall of sound that is different for us."

Although Tinley generally recorded bandmembers separately, he intermittently captured them teaming up, as on the delicate ballad "Michael (You've Got A Lot to Answer for)." "I managed to get Simon to sing and Warren to play at the same time, and we DI'd an acoustic guitar. That's actually a live performance between the two of them, and we built everything up around that. It really does have a nice vibe."

Following work at Battersea, the group recorded live drum tracks in London's Metropolis Studios with Steve Alexander, who will be their drummer on tour. The album was mixed by Anthony J. Resta and Bob St. John. Rhodes praises them, as well. "It's essential in making this kind of record to have a really great team. The actual sound of this album we wanted to be very cutting-edge and contemporary, and I think we've achieved that." ■

—FROM PAGE 195, THE DOORS

a premium-priced box set in this sober age of crystal-clear, perfectly sterile and safe digital recordings. But then, The Doors, whatever fans or detractors might say about them, were always, thankfully, different.

The smokin', drinkin', druggin', swaggerin' and swearin' dirty Doors have put together four CDs filled with

demos, alternate versions and unreleased live recordings, as well as an off-beat selection of bandmembers' favorites, called *The Doors Box Set*. Having kept somewhat of a low profile officially since Oliver Stone's flawed biopic, one might expect a slick, commercial set designed to help ensure a steady stream of residuals into the next century.

However, The Doors were one of the only bands from the '60s that actually had a solid business setup almost from the start, and by all reports they have been doing quite well for the past 26-plus years since their singer's death—which may be one reason why they were comfortable making this set such a raw and, in many ways uncomfortable, experience. It's as if The Doors are reminding us that beneath all the catchy Top 10 singles, they really were a pretty subversive bunch.

What we're actually offered is a fairly complete picture of Morrison, as far as recorded history will allow. We get the drunken, dissolute, tortured soul on the opening track and on some loose boozy jams. But we're also treated to Jim the Elvis fan (the swinging, fun "Black Train Song"), the jazzy balladeer (a lounge-Lizard King alternate take of "Queen of

the Highway"), the counter-culture's worst nightmare ("Someday Soon," in which he informs us "you're all gonna die") and the fading, overweight hit-maker who can still deliver the goods like a pro (a sizzling live "Break on Through," recorded at the Isle of Wight

**It's as if The Doors
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Festival not long before Morrison's death). And we also get lots of Jim the clown, reportedly one of his favorite roles, and for many of his fans one of his most endearing and enduring.

With Morrison and longtime producer Paul Rothchild both deceased, the task of producing the set fell to the band and Bruce Botnick, who engi-

neered every Doors album and who co-produced their last studio album, *L.A. Woman*, with the band. To hear Botnick tell it, making the box set was simply a matter of picking up, more or less, where they left off.

"Working on this set with the band was really like an extension of the *L.A. Woman* sessions, where we were rebelling against some of the things we'd done before and not trying to make award-winning sound, but rather focusing on putting the material across with energy and telling the story," Botnick explains.

Thus, the shockingly low-fi Miami tape was a natural opening track. "Initially you say, 'This sounds really awful.' But as you listen to the performance and what Jim's saying, all of a sudden the bad sound doesn't mean anything," Botnick says. "I thought the performance was so extraordinary, such a piece of history, that it didn't matter. All I did was use some NoNoise to get rid of tape hiss and clean it up, and EQ it so it wasn't overly harsh, and let it speak for itself.

"Another good example of leaving a song alone is the studio jam 'Rock Is Dead.' We were doing something else, and I was in a mix mode, so the inputs

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are all wrong for tracking. Jim's vocal is locked with the drums; then halfway through, the drums move to a different track. There were, obviously, not too many options to fix it. So I left the mix as it was, just making it a little more left-center/right-center. Again, it was a matter of there being something funky and real about the performance."

Other tracks had sonic imperfections that didn't add anything to their ultimate effect, and so received some significant reworking, Botnick notes.

"I had a DA-88 tape copy of 'Break on Through' from the Isle of Wight Festival that is a very hot performance, but which was badly recorded and lacking life. And 'Who Scared You,' from *The Soft Parade* sessions, for some reason I didn't record as well as I would've liked. I don't recall why, but I figured that I should be able to tune it up a bit and give it more life in the remix.

"In both cases, I re-recorded, playing the tracks into Ocean Way Studios' Studio B over loudspeakers and also into their acoustical echo chambers, picking it up on Neumann M50 mics and using different digital reverberation and delay tools to create depth and a more three-dimensional soundscape. I did that not

so much to trick people as to provide a sense of immediacy and three-dimensionality to the sound. The original tracks were flat and had no life. When we were done, they had new life."

These tracks were mixed on a vintage analog Neve console from a 20-bit Sony digital 24-track using Nvision 24-bit D/As. The recording format was an HHB Genex optical disc recorder fed by dB Technologies DB 122 24-bit high-resolution A/Ds.

One entire CD consists of previously unreleased live material from a January 1970 New York City show. "Those were all 8-track masters," Botnick says. "The entire time the Doors worked in the studio and made live recordings, we never got to record above eight tracks. These were cut with no Dolby, on BASF tape, recorded at +10—very hot levels, the way we did it then, and there's no tape hiss. However, time makes the oxide fall off, and I had to bake certain reels before we transferred them 20-bit to 24-track digital."

The box set was assembled with a combination of digital and analog processing. The live material from New York was transferred and mixed digital on the AMS Logic 2 at Pacific Ocean

Post. Monitoring was through Quested monitors powered by McIntosh tube amplifiers. The rest of the material was mixed analog on an old Neve at Ocean Way, "because we needed their acoustical environment to make this material work," Botnick says.

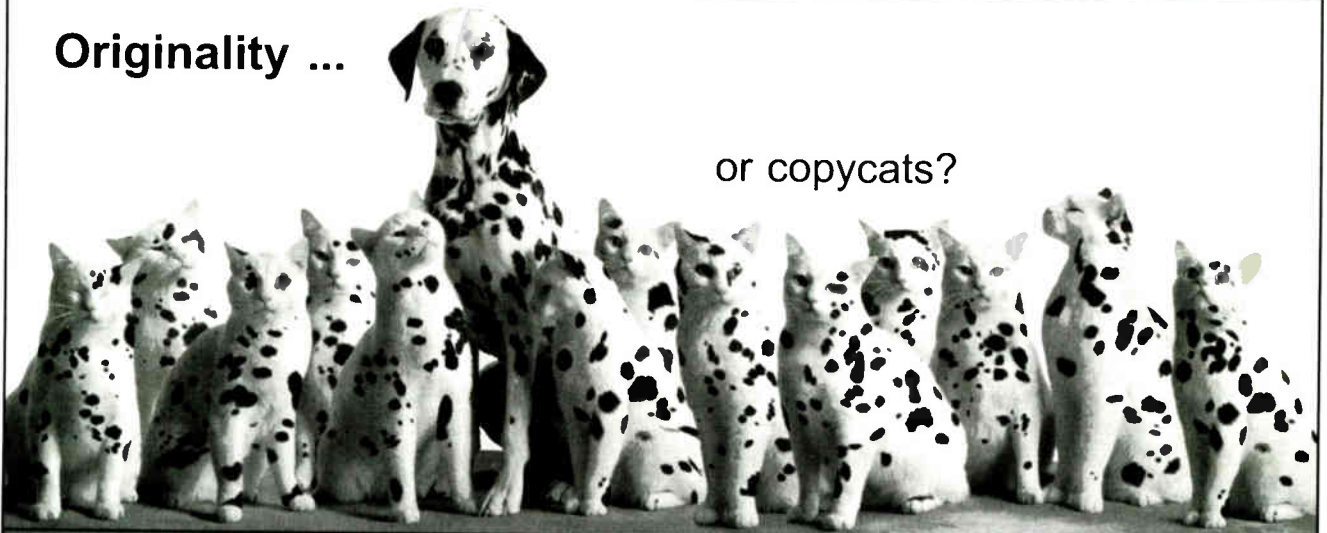
The *Band Favorites* CD, culled from original album cuts, took very little work. "I used the 1630s that Paul Rothchild and I made about six years ago and did a little EQ work," Botnick says. "We could've gone back to the multitracks and redone them all in 20-bit, but these versions were really quite wonderful. We had used pure 16-bit A/Ds, some of which were handmade. The original 2-track album masters, as well as the multis, are in good shape for the next time we approach them for the next format. We can very easily take them to 20- or 24-bit at 96k topology, and they'll sound even better!"

The decision to simply tweak the six-year-old digital masters came not out of haste or economy but rather from Botnick's preference for maintaining a sense of the era.

"I'm not a believer in remixing something unless you have to; I want to maintain the moment in time. Some of

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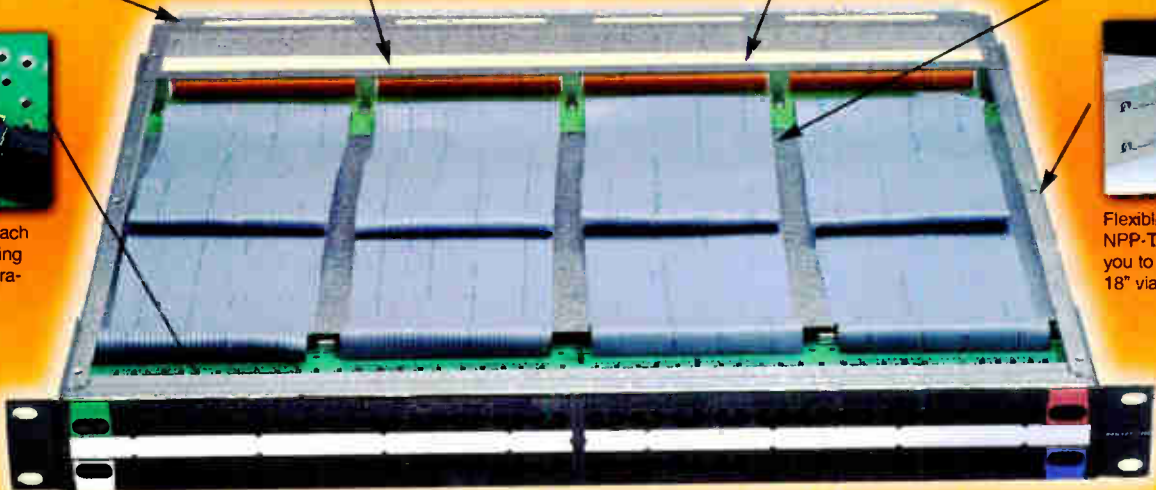
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the songs were mixed in 1967 and 1968. I'm not drinking the same wine or eating the same food, I'm not thinking the same as I did back then. Whatever was influencing me then would be hard to replicate now. The Beatles felt the need to remix; in some of their early tracks, the voices were all on one side, but that was the way things were done then, and some things you just want to leave alone," Botnick says.

Selections from the group's first recording dates, their World Pacific demos, were taken from the only known existing copy, keyboardist Manzarek's lone acetate disc. "We transferred the disc using a Sonic Solutions system at Audio Mechanics, for de-clicking and noise reduction. For the sake of clarity, I ended up using only one side or another of the two tracks of the mono disc, because one side of the stylus would be picking up different things than the other," Botnick explains.

While in most cases the previously unreleased selections were taken from original masters or the next best thing, there was one significant, lengthy exception.

"The only live performance of 'The Soft Parade' came close to being lost forever," Botnick notes. The track came from a mini-concert done for a memorable 1969 PBS Doors television special, taped in a New York television studio shortly after the Miami fiasco but long before television's approach to audio was revolutionized. The original master videotape or a second-generation dub, for years the subject of an exhaustive search by the Doors organization and outside consultants, had long since disappeared. "We understand PBS simply erased it," Botnick says.

Eventually a decent 3/4-inch copy of the 1-inch master tape was located (and was earlier used by The Doors for a home video). "Using Sonic Solutions' NoNoise, the sound came out clearly after we got the garbage out," Botnick says. "We heard stuff we hadn't ever heard before. You can also really hear the television studio's compressor pumping away, however, with the band surging up when Jim stops singing and dropping away when he puts out some sound pressure." Despite the flaws, Botnick was happy to have the tape. "Not only is it the only live version, the only live performance ever, but it is also an excellent performance," he adds.

The only new recording was for Albinoni's Adagio in G Minor (which also appeared on the posthumous Doors music and poetry album *All*

American Prayer) and "Orange County Suite." "For 'Orange County Suite,' we only had a 2-track of Jim singing and playing piano himself. We overdubbed The Doors at Ocean Way a week before we delivered the record. The Adagio was recorded in 1968 but had never been finished; Ray had done his parts, but John hadn't added his drums and Robbie hadn't done his solos," Botnick explains.

"The culmination, this period of retrospection, was a wonderful experience for myself, Robby, Ray and John and Jim. Yes, Jim was there, very much so, in spirit! Play it loud, but not so loud that you damage your precious hearing!" Botnick advises. ■

—FROM PAGE 195, "ALL THE KING'S MEN"

and Joe Ely and Steve Earle, both playing with Lee Rocker, Ron Wood and Jeff Beck. Tim Coats and former F Street Band bassist Garry Tallent recorded some tracks, and drummer/songwriter/producer Stan Lynch (of Tom Petty & The Heartbreakers fame) produced two songs. But the bulk of the album was produced and engineered by Moore, who had quit Presley's group after the famous 1968 "comeback" television special, when The King's manager, Colonel Parker, couldn't offer Moore enough money to compete with the lucrative engineering work he had begun while Elvis was in the Army.

"Nashville was at a peak recording time," Moore remembers. "For instance, The Jordanaires [Elvis's backup singers] had 40 sessions on the books with Owen Bradley. What Elvis was offering per week, everybody was making in a day."

Eventually, Moore became Sam Phillips' production manager at the studio Phillips had built in Nashville, splitting his time between there and a sister facility in Memphis. He and Phillips had a parting of the ways, though, when Moore cut an instrumental album with the noted Nashville producer Billy Sherrill. Moore moved to Nashville and owned a studio there for a while; he also started a tape-duplicating business and engineered some CMA shows, as well as a variety of albums. He had retired from playing until Keith Richards flew him to St. Louis during the Rolling Stones' "Steel Wheels" tour in the late '80s. "It got my blood boiling a little bit," Moore says. "To tepid, anyway," he adds with a laugh.

Finally, in 1992, Moore played live

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L to R: Garry Tallent, Rick Nielson, D.J. Fontana, Tom Petersson, Scotty Moore, Bun E. Carlos and Robin Zander

for the first time in 24 years with Carl Perkins at an Elvis celebration. The album he recorded with Perkins that year was the last project he had engineered until *All the King's Men*.

Needless to say, all the artists who worked on *ATKM* were thrilled to have Moore at the helm. Tracy Nelson, who has known Moore since 1970, when Moore and Pete Drake produced a country album for her, comments, "He's the sweetest, nicest, wittiest, brightest man. I count myself lucky to be friends with him because he's just a great guy. Now I'm over the fact that he was Elvis' guitar player and started rock 'n' roll—he's just a great guy."

And accommodating. When Moore wanted Nelson to recut her vocal, he trekked out to Mike Dysinger's studio, 40 miles outside of Nashville, so she wouldn't have to come back into town. He had already redone the basics.

"The way it was done with another producer was just the wrong feel for the song," Moore explains. "It was too chopped up. First, D.J. put down a new drum track, ignoring stops and choppi-ness and stuff. After he got that down, we put down the bass and piano. It's an easy tune—just two piano fills behind her vocal, and I was just doing tremolo chords."

"It wasn't very different when I sang it again," adds Nelson. "It was just a little less arranged and felt a little smoother—better. I didn't have to do anything radically different in the way I approached the tune because they did the new track behind my original vocal, and what they ended up with

probably matched my vocal approach better than what the original track did."

Moore and Fontana ended up changing the direction of Joe Ely's "I'm Gonna Strangle You Shorty," as well. "After working with it a little, Scotty and D.J. both looked at each other and said, 'Ya know, let's just do this the way we know how to do it and don't put anything fancy on it,'" Ely recalls. "From that point on, Scotty pretty much grabbed the bull by the horns. I think at first they were working with another engineer, thinking of doing it as a little more of a modern rock song, but I completely agreed that the style that they defined was the style I wanted the song to be played in in the first place."

Moore says simplicity works best for him. "'Heartbreak Hotel' didn't take very long," he remembers. "Maybe there were half a dozen takes. That's always been funny to me—with Sun, Sam [Phillips] didn't call out, 'Take one' or 'Take two.' He just said, 'Okay, rolling.' Then when we went to RCA, if you broke down during the count-off, or somebody flubbed the intro, it was, 'Take two.' On some of the songs, they listed 70 takes.

"I'm from the old school that says the shortest distance between two points is a straight piece of wire," Moore continues. "I'm not too big on using effects as a crutch. They're fine if they present to the ear a purpose, but just to turn the distortion up on the guitar and play as loud as you can with feedback and all that just doesn't turn me on. There was one review recently that said it didn't sound like we rehearsed very

much, and that was the idea," he laughs. "We didn't want to make it so every note is perfect because I'm from that old school—feel-good music."

Moore admits that recording Cheap Trick was a big challenge. "When they came in to do their number, I said they should do it the way they wanted to," Moore says. "D.J. played, too, and I said I'd try to find some holes in there later. With all their distortion and gimmicks and stuff, there weren't any holes. I brought it to my little home studio and worked on it off and on for a couple of weeks and finally figured out something that I thought would work and wouldn't get too far away from their style. I did all the little guitar parts with the bass and then got Rick [Nielson] in for his solo. I was tickled to death at how wonderful it came out."

But for the most part, the tracks were done in the easiest and fastest fashion. "We set aside one whole day to do each song," Moore explains. "We were also videotaping for a documentary that is going to come along later. I'd say it took about two hours getting a basic track, and the rest of the time was spent with the other stuff. And visiting, of course!"

"When I got the call asking if there was anything I wanted to record with Scotty and D.J., I thought, 'Man, that is something that would make my life complete.'" Ely says. "It was a huge deal to me. Probably one of my first conscious memories of what an electric guitar was came from Scotty Moore. I was real young during the days of those early Elvis songs like 'Heartbreak Hotel,' 'Hound Dog' and 'Blue Suede Shoes,' but it defined a whole music to me.

"I look back at the things that band did," Ely continues. "Of course, Elvis was a great singer and a great energy source, but that band had a huge thing to do with the success of that. Before then, there was sleepy music on the pop charts like Perry Como. But [Elvis' band] took the high-energy stuff that was coming out of the black swing bands in Chicago and all up and down the Mississippi River and St. Louis into a whole other style. I look at their contribution as musicians, as well as Elvis, Sam Phillips, the studio, his engineering, his use of slap-back, and his adventure-some spirit that most engineers didn't have during that period of time, and how all those energies met in that little ol' bitty studio in Memphis and changed the course of recorded music. It influenced me as a real young kid."

Stan Lynch, who had the auspicious

task of producing "Deuce and a Quarter," the Keith Richards/Band track, felt the same way. He had met Fontana a few years ago on a South by Southwest panel about road stories.

"Here I was talking about the '80s excesses, and then it gets to D.J., who tells a wonderful story about how great it was to be with Elvis. It made me realize how inconsequential my thing was," says Lynch. "Afterward, we talked, and he said, 'Maybe sometime you'll come produce something with us.' That's another great indicator of what a great gentleman he is—he actually did call a year later."

Recording Richards and The Band at Levon Helm's Woodstock studio was a tad nervewracking for Lynch, though: "I came up with about 20 great ways of saying, 'Gee, we got it dialed in right now. If you feel like taking another pass, man, go for it.' Fortunately, nobody ever said, 'Who the hell are you?' I would have gone, 'You're right, who the hell am I?'" he laughs. "My initial thoughts were, 'I gotta get them all in the same room at the same time and have a good time. I can't let this be a drag for anybody. These guys are too talented, too good, and have done it too



Scotty Moore

long, and the first sign of a bummer, they're all going to leave."

The first day in Woodstock, only a couple of The Band members made an appearance. On day two, Helm showed up.

"My theory was to just keep gently shepherding the thing as far as it could go," Lynch says. "It was tough teaching

the guys a wordy song, and then I'd kind of ask, 'Hey, is this the kind of groove we could all do? Is anybody in?' Levon said, 'I don't really want to play drums *and* sing on this one.' I remember thinking, 'If I'm going to lose one or the other, I'll lose him as a drummer.' Originally, I wasn't planning to play, but when Keith didn't show up

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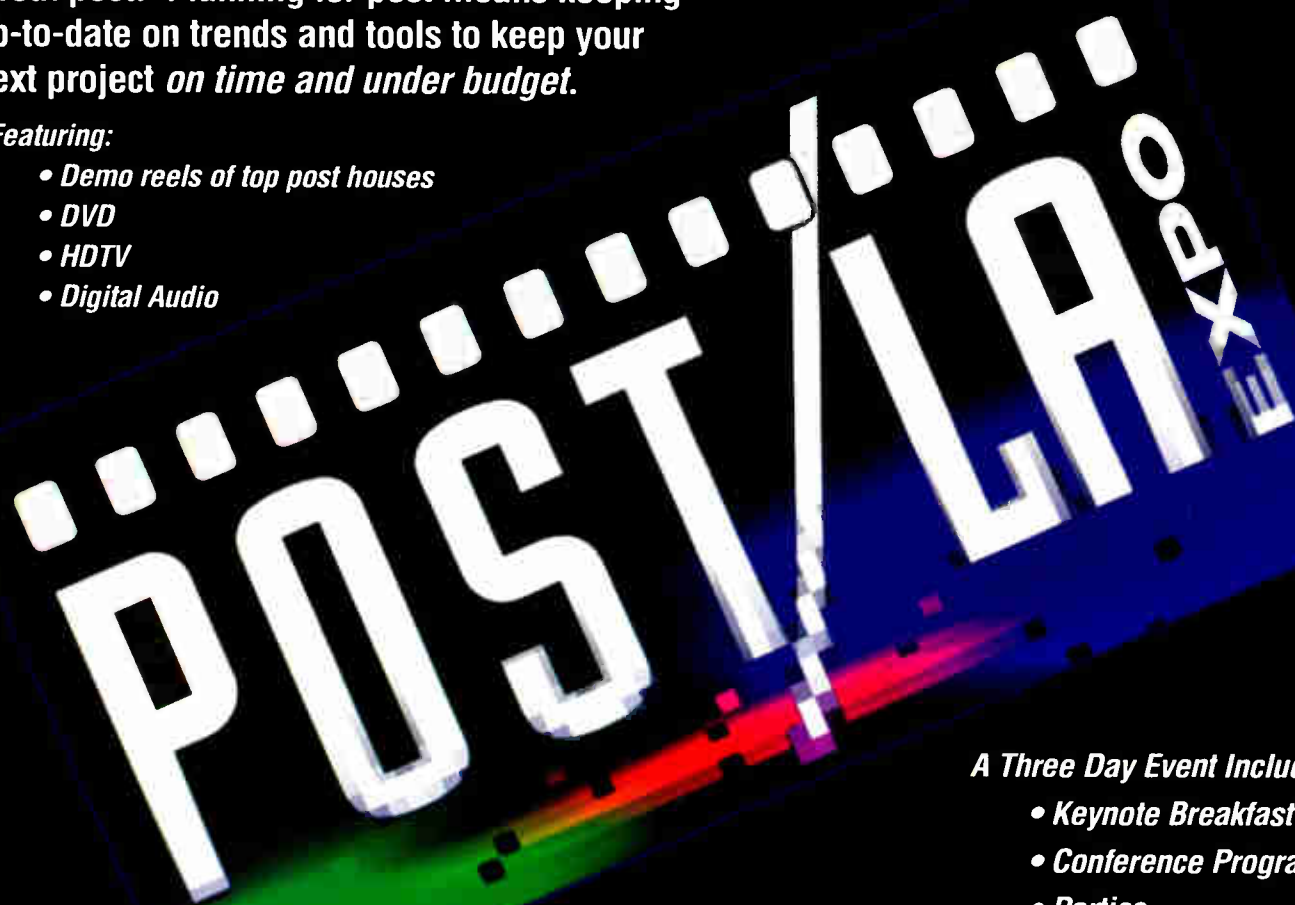
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the first night, I was trying to get the groove going, so I sat down and started playing the drums with D.J. I saw that it would be smart of me to get them on the record before the night got too late, so I tried to keep a microphone on and keep a lyric sheet in case somebody got in the mood, and maybe hint around that, 'It would be nice if you would sing now.'

"On the third day, when Keith came in and I asked him if he wanted to hear what we had, I think he was relieved that there was a track," Lynch says. "I played it for him a couple of times and said, 'Are you in?' He said, 'Man, I love it. Would you mind if I just played on that track?' He played a couple of tracks of guitar. Then I put a giant lyric sheet in front of him, which he made a lot of jokes about, and I said, 'Learn any verse you want.' He kind of learned the song, sang it down, and I mixed between the two of them and made it more of a duet, post-facto."

The Woodstock sessions were fun for Moore, who says, "I think Keith was born a party." Plus, Richards brought his 80-year-old father along. "He sat there all night long and just watched everything," recalls Moore. "He said to me, 'I wanted to come meet the man who Keith says got him into this business.' Keith tells a story on the documentary we're making that he was listening to Radio Luxembourg on his little transistor radio late at night, and 'Heartbreak Hotel' kept fading in and out. He was running around the bedroom, trying to get it locked in to where he could hear it. He said it was at that point he decided that's what he wanted to do."

The three days at Ron Wood's Ireland estate for the Ron Wood/Jeff Beck track was also a hoot, according to Moore. "I played some tapes for them, then we jammed some," Moore remembers. "Then Ron said, 'We have an idea—do we have to do one of those songs?' I said, 'No, that was the deal going in, for you guys to bring your own thing to the table. We want to do what you want to do and be part of that.' They left the room and came back in 30 minutes. I was just sitting there doing a funky little riff that I had used on one of Carl's songs. They walked in and Jeff said, 'Ron, that's the lick we need for this.' They had written this little tribute thing to us called 'Unsung Heroes,' which is probably the most panned cut on the album. We had a ball doing it, though, at about three or four in the morning. Ron has a bar that

I would put up against anybody's in the world," he says with a laugh.

But Moore's favorite recording experience making the album was with the Bill Black Combo, which reunited to cut "Goin' Back to Memphis." "We had a Memphis reunion here in Nashville doing that," Moore says. "I really hadn't planned to play on that one, but Reggie [Young] insisted. Then at the end, he said, 'On the fade, do the "Heartbreak" lick.'"

Moore says he has only recently come to terms with how much of an impact that song and other Presley numbers have had on musicians around

the world. "I really didn't realize it over the years," he says. "I'd had a few players tell me they were influenced, and I'd always say, 'Don't blame it on me. That's a heavy load to carry around.' But in my old age, I've really come to live with it, and it's enjoyable, especially meeting guys like the ones we worked with on this album and getting to talk with them."

But don't dare suggest that he had a part in changing lives, because Moore will modestly make light of it. "Actually," he says of his pioneering work in the '50s, "all we were trying to do was stay out of the cotton patch." ■

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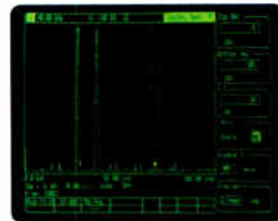
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MEDIA & MASTERING NEWS

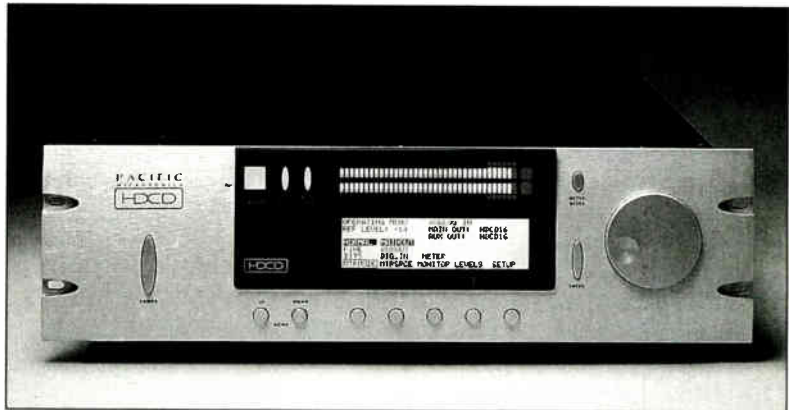
DVD NEWS: STRONG LAUNCH, NEW COPY PROTECTION, MPEG SURROUND

DVD looks to be off to a strong start, according to sales figures released by the Consumer Electronics Manufacturers Association. The trade group announced that 200,000 players had been sold to U.S. dealers in the new format's first six months on the market. Based on shipments so far, CEMA president Gary Shapiro predicted that sales would reach 400,000 by year's end, with an additional 1 million sold in 1998. By way of comparison, CEMA said, it took two years for both home VCRs and Compact Disc players to reach the 200,000 mark.

CEMA also announced new measures aimed at controlling piracy of video programs distributed on DVD. Working with hardware and software companies, the group developed an engineering standard (EIA/IS-702) using copy-generation management codes embedded in the DVD software. The codes, set by the software vendor, tell recording devices whether to allow multiple copies, one copy or no copies of a given program. Copies made in defiance of the system are "severely degraded."

In other DVD news, Philips Electronics announced that home video distributors Warner Home Video, Columbia/TriStar, MGM/UA and PolyGram have all confirmed their intention to use MPEG multi-channel audio on DVDs distributed in territories using the PAL video format (Dolby Digital remains the surround sound format for all NTSC discs). Philips has been a leading proponent of MPEG surround, which uses variable bit rate allocation for audio. In September, Philips had sponsored listening demonstrations for top Hollywood executives at Pacific Ocean Post in Santa Monica, Calif.

Finally, market prognosticator InfoTech is forecasting a rapid transition to DVD-ROM in the packaged goods segment of the interactive



HDCD Model One

publishing industry. In the Ninth Edition of its Optical Publishing Industry Assessment, the Woodstock, Vt., company predicts that DVD-ROM titles will "contribute nearly 85% of total retail revenue by 2001." And despite media focus on the Internet—to the near exclusion of the CD-ROM market—worldwide revenues from packaged interactive media continue to climb, reaching \$13 billion in 1996 compared to less than \$1 billion for the online sector. InfoTech expects this trend to continue at least until 2001, when packaged media revenues are projected in the range of \$23 billion, compared to \$4 billion online.

ITA CLAIMS CAMPAIGN SLOWS CASSETTE DECLINE

International Tape Association executive VP Charles Van Horn told record retailers at a NARM conference in California that the ITA's initiatives to bolster fading music cassette sales are paying off. Van Horn reported that the decline in sales of prerecorded cassettes had been slowed by nearly 35% over the same period last year. "We have slowed the format's decline substantially in just half a year," he said. "And we all agree that the full fruits of our labors won't show themselves until early 1998." Van Horn attributed the slowing of cassette sales erosion to an awareness-raising

campaign, directed at retailers and coordinated by the ITA Audio Cassette Coalition, that featured ads with the slogan "Where'd ya hide the cassettes?"

HDCD DEBUTS 88.2KHZ MODEL ONE

Pacific Microsonics introduced a new version of its Model One HDCD Processor, designed to allow the creation of HDCD recordings at a sample rate of 88.2 kHz. The 88.2 version of the processor adds 88.2kHz A/D and D/A conversion (at 16 to 24 bits) and 88.2 to 44.1kHz sample rate conversion, as well as new simultaneous peak/average metering and new operational modes. In 1998, Pacific Microsonics plans to release Model Two, which will allow (among other things) HDCD conversion of 88.2kHz recordings up to a 96kHz sample rate. The company advocates this upsampling approach as an alternative to recording at 96 kHz and then downsampling to 44.1 kHz for CD release.

SADIE ADDS UV22

CD premastering systems based on the SADiE platform will soon incorporate the UV22 "word length reduction system" from Apogee. SADiE becomes the first third-party manufacturer to license the UV22 algorithm for use in digital audio editing. UV22 will also be available as an optional plug-in for the com-

BY PHILIP DE LANCIE

pany's Octavia line. The UV22 process was previously available only in dedicated hardware units from Apogee or in Apogee's MasterTools TDM plug-in for Digidesign's Pro Tools platform.

IMEDIA BOWS INKJETS FOR CD-R PRINTING

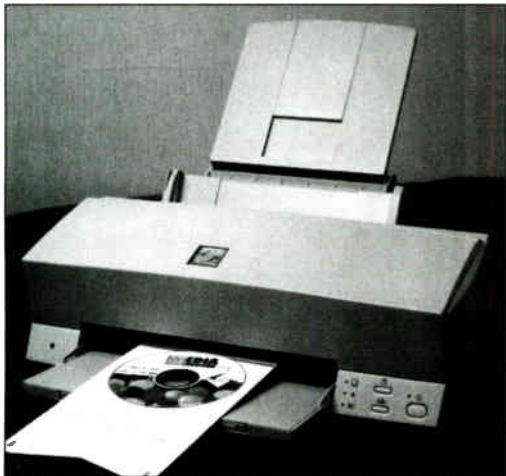
The explosion in use of recordable CDs has created in its wake a demand for print systems that create a presentable finished disc. These range from paper

label approaches up to production units designed to integrate with CD-duplication systems. Aiming for the middle of this market, Imedia Technologies of Bezons, France, has introduced two inkjet models for printing directly on CDs. The machines, which also print on paper, use a caddy to hold and align a CD as it moves through. The CD Style 600 is available for both Macintosh and Windows; the CD Style 400 is for PC only.

MASTERING NOTES

Georgetown Masters became the first Nashville facility to purchase Genex GX-8000 recorders. The tapeless removable media machines were recently used by Georgetown's Denny Purcell to master an upcoming album from George Strait...NT Audio has opened a new audio mastering and restoration suite in Santa Monica, CA. The room is built around a NoNoise-equipped Sonic Solutions system...Delaware Valley Digital Media (Philadelphia) announced its participation in the Advanced Audio Alliance, a group of audio facilities and

record labels collaborating with Sonic Solutions to develop and refine techniques and tools for audio on DVD... Former Tower Mastering engineer Kevin Reeves has joined the staff of PolyGram Studios (home of the Motown catalog masters) in Edison, NJ. Reeves works in the facility's newly renovated Studio B...Dynaudio Acoustics announced the sale of monitors to three mastering houses: MCA Music Media Studios (North Hollywood, CA), Glenn Schick Mastering (Atlanta) and Ozone Entertainment (New York City)... Mastering engineer Geoff Sykes, late of A&M Mastering, has joined the staff of John Golden Mastering in Newbury Park, CA...Phil Austin of Trutone Mastering (Hackensack, NJ) mastered the latest CDs from Tito Nieves and N.Y. Tribe, while Joe Yannece handled Rockell's "In a Dream" and "Luv'd Up" by Crush...Lee Press-On & The Nails mastered their latest with Michael Romanowski at Rocket Lab in San Francisco, as did Jellyroll and Petrol. Rocket's Ken Lee, meanwhile, handled the "Physical Fitness" compilation for Fat Wreck Chords and the rap compilation *17 Reasons* for Sam Quinn/Black-n-Brown Entertainment. ■



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COAST TO

L.A. GRAPEVINE

by Maureen Droney



Ben Grosse at the SSL 9000 J in Studio A, The Mix Room

Mixer/producer Ben Grosse has relocated from Detroit and opened The Mix Room on the Burbank site that was previously Stephen Bray's Saturn Sound. The Mix Room's flagship Studio A features an SSL SL 9000 J with 56 inputs, a 64 frame and Ultimotion. The well-equipped room is also fitted with two Studer A827s and plenty of outboard including Joemeek, Neve, API, AMS, Focusrite and Pultec. Grosse will soon add two more rooms.

In a unique move, Grosse (whose credits include Filter, Republica, Love Spit Love, Barenaked Ladies, Madonna, k.d. lang and the Red Hot Chili Peppers) brought his whole operation with him from the Detroit area, including studio manager Karen Pinegar and staffers Michael "Blumpy" Tuller and Alan Mason, with Angeleno Aaron Lepley rounding things out. About the transition, Grosse says, "I have clients coming to work with me from all over, and in Detroit, after a week or so, they were going insane. I know there's a lot to hate here in L.A., but I love it. I'd been looking for a building for a long time, and when this one became available, it was perfect. It's got just the right size control room and recording space. I knew I didn't want a big tracking room; this one is compact but can still do bright, splashy drums if I need them."

Since opening in September, The Mix Room has

—CONTINUED ON PAGE 219

NY METRO REPORT

by Dan Daley

Happy New Year. New York Metro gets a philosophical facelift for the new year: We'll try to convey to those outside of the region what goes on here. And what better way to start that off than with a look at how much international business New York studios have been doing?

"When you add them up, international sessions account for more than you might at first think," says Barry Bongiovi, studio manager at Right Track. Bon-

—CONTINUED ON PAGE 222



Artist/producer Malik Pendelton and Mary J. Blige remixed Blige's "Seven Days," at The Hit Factory in New York City. The single, written by Pendelton, is the fourth from Blige's Share My World LP.

COAST

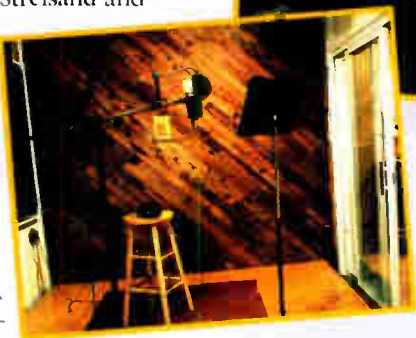
SESSIONS & STUDIO NEWS

SOUTHERN CALIFORNIA

Grizzled but glorious: Motorhead tracked with producer Howard Benson, engineer Mark Dearnly and assistant Chris Morrison for the SPV label at Sound Image Studios in Van Nuys. Trauma recording artists Reacharound and Phunk Junkeez were also in with producer/engineer Lee Popa, assisted by Morrison...Barbra Streisand and Celine Dion worked in the SSL 4 and SSL 1 rooms at Record Plant (L.A.) with producers David Foster, Humberto Gatica and Walter Afanaseff. Stu Brawley assisted...Producers Michael James and Richie Vanilla and engineer Rob Chiarelli mixed for Interscope artist Artificial Joy Club at Westlake Studios (L.A.)...In Studio A at Image Recording (Hollywood), Chris Lord-Alge mixed the song "Anchor" for Letters to Cleo with producer Peter Collins. Michael Dy assisted...Leading Japanese producer Tetsuya Komuro (T.K.) and vocalist Marc Panther worked on an upcoming Sony International release at Sony Music Studios in Santa Monica. Toshihido Wako engineered and Troy Gonzalez assisted...

NORTHEAST

At New York City's Baby Monster Studios, producer David Gamson worked on the new release for Scritti Politti on Virgin Records with engineer John P. Hopkins. Post-mod duo Ronnie Spector and Joey Ramone were in with producer Daniel Rey working on new material...Mach 5 recorded for Island Records with producer/engineer Steve Haigler at Spa Recording Studios (NYC). Both Worlds (including ex-members of Cro-Mags and Leeway) were also in working on a Roadrunner release with producer AJ and engineer Noah Evans...D-Mob tracked for High Wire Records at Cotton Hill Studios in Albany, NY, with producers Tony Sturdivant and Edward Heelan and engineer Robert Turchick...Recent sessions at Acme Studios (Mamaroneck, NY): Island Records artists Evan and Jaron recorded for their debut with producer Danny Kortchmar and engineer/associate producer Peter Denenberg, and Sloan Wainwright finished tracking and mixing her much-anticipated new one with Thom Leinbach...Neon Jesus recorded their new self-produced independent release with co-producer/engineer Tom Richards at Sound Techniques in Boston...Overdubbing and mixing has been under way on *Wolf Tracks*, a tribute to Howlin' Wolf, at Trod Nossel Studios in Wallingford, CT. Producer Randy



Fat Traxx Recording in Carrollton, Texas, is equipped with an MCI JH 528 console, a JH 24 analog deck, 24 tracks of ADAT and a Sonic Solutions mastering system. Recent sessions include new band Gracebudd (featuring former members of Ministry, Revolting Cocks and Purvis) working on a project with Carl Nappa.

Labbe and a core group including Hubert Sumlin and Colin Linden have been joined by guests including James Cotten, Lucinda Williams and Taj Mahal. The album is due out on the Telarc International label...New York City's Clinton Recording had Island Recording artist Tricky in tracking a new release in Studio A with engineer Serge Tsai and assistant Mark Fraunfelder...At Water Music in Hoboken, NJ, John Agnello produced and engineered for Australian combo fini Scad, assisted by Wayne Dorell, and Muzzle recorded for Warner Bros. with producer/engineer Lou Giordano and assistant Jim Cain...

NORTHWEST

At Different Fur Recording in San Francisco, the Charlie Hunter Quartet mixed their next Blue Note release with producer Lee Townsend, engineer Christian Jones and assistant Adam Munoz. Vinyl was in mixing with engineer Ron Rigler and assistant Mark Slagle...

NORTH CENTRAL

Mammoth Records artists Squirrel Nut Zippers mixed live tracks from a show in Denver with producer/engineer Michael Praytor at Smith/Lee Productions in St. Louis. Steve Higdon assisted...Grammy Award-winning producer Gary Hines and A&M recording artists Sounds of Blackness were locked down at Madjef Studios in Minneapolis with engineer/producer Jeff Taylor, working on a soundtrack project for the UK release of *Hercules* as well as a song for a Phil Collins tribute album...Ministry worked on their next

—CONTINUED ON PAGE 224

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NASHVILLE SKYLINE

by Dan Daley

Happy New Year. And welcome to a significantly revamped Nashville Skyline. Not so's you'd notice immediately, perhaps; the graphics are still the same, and, with a few possible exceptions, so am I. The main difference, though, is a shift in focus outward, concentrating on Nashville's interaction with the rest of the world.

Along those lines, then, it was widely agreed several years ago that Nashville studios needed to attract more nonindigenous clients in order to survive; country was entering a period of contraction, and the number of studios had grown significantly in the preceding boom years. Quietly, without much fanfare, but very steadily, Nashville has accomplished that tall order. The "whos" are interesting; the "whys" even more so. Alt-rock acts like Tonic, Flick, Brownie Mary and Patty Griffin have recorded in Nashville in the past year, as have rockers such as Queensryche and Megadeth, pop artists like Sheryl Crow and Widespread Panic, and R&B/urban stars Keith Sweat and Boyz II Men. Lionel Richie and Melissa Manchester recently worked in town, and overseas visitors have included London's Supermodel and Copenhagen's Circus. The contrast from just a few years ago is striking: where Nashville

had acquired a reputation as a refuge for geriatric rockers, it now shows depth and breadth in terms of the young, vital and economically viable bands that the city's studio base needs to survive.

Why did things change? For starters, Nashville's talent base—musicians, engineers, producers—which had always been a drawing card, has changed in terms of demographics. Younger people moved here, which made younger artists more comfortable. Former L.A. session guitarist Josh Leo worked with chronological cohorts Bad Company at The Tracking Room, where the next generation, in the person of another former L.A. studio guitarist, Dann Huff, worked with *his* peers, Megadeth. The generational change ripples throughout Nashville, affecting producers, musicians and engineers alike, and it's probably the single most significant change the city's music industry has experienced.

The second major driving force was the establishment of several new world-class studios, notably three at Ocean Way/Nashville, two at Starstruck Studios, and Masterfonics' The Tracking Room. This total of six new rooms has been able to take advantage of the demographic change, as well as attract some younger non-country artists and producers to town. They have also enlarged the pool of facilities in Nashville, where, as in most other studio markets, studio rates continue to remain static or

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Producer/Engineer

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At Ocean Way Studios in Nashville, recording media manufacturer Quantegy hosted a customer-appreciation party and live recording session, featuring jazz guitarist Larry Carlton. In the studio were (L to R) Mel Gemmill (Quantegy VP of marketing) Michele Pillar Carlton (vocals), Larry Carlton, Viktor Krauss (bass), Matt Rollings (keyboards), Jack S. Kenney (Quantegy president and CEO) and Allen Sides (studio owner). Sides engineered and mixed the session on Quantegy 467 digital tape.

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decline relative to cost of operation. Ostensibly, these new rooms pushed Nashville's historical top end of around \$1,800 per day up closer to \$2,500. In reality, the new palaces have had to wheel and deal as much as most other facilities, here and elsewhere. As hard as this makes it on the studios, it's proven to be a big draw to younger recording artists coming of age in the era of restricted entertainment budgets. Most studio owners will acknowledge, through clenched teeth, that Nashville offers itinerant recording artists and their labels two or three days for the cost of one in New York or Los Angeles. Painful as that can be, it's a distinct advantage, particularly in the case of baby acts that have smaller budgets for first and second records. It's also helped local producers and engineers entice artists to come to Nashville instead of the recordists joining the bands elsewhere.

Third, Nashville, which always had a decent music business infrastructure, now has a better one. There are more rental companies, more techs, more cartage companies, more travel agents and more specialty operations, such as the intramural trade association NAPRS and studio referral service Studio A. That, of course, is on top of the actual music industry infrastructure of major record labels and their affiliates, booking agencies and publishers. It's in that last aspect, ironically, that increased interaction with the rest of the world (meaning the rest of the entertainment industry) has been slowest to come. In Nashville's feudal label hierarchy, matriculation is a function of time as much as talent; thus, the leadership is older, and even though Nashville is the only place left on earth where record company presidents are also working record producers, in Nashville their focus tends to stay on country music.

With few exceptions, such as Monument Records in the 1970s, independent labels have not historically fared well in Nashville, and that's perhaps one of the reasons that its non-country music base has been so slow to expand. However, adjacent regions are picking up the slack. Both Franklin and Murfreesboro have vibrant local alt-rock scenes and independent labels. Nashville studios can only benefit from their success in the future; other music centers like Austin and Macon have had trouble getting some of their breakout artists to continue to make records there, because the studio base is limited and L.A. and New York are alluring. That's not

the case in Nashville.

The question in Nashville now is, is it becoming more of a target of opportunity or an intended destination for recording artists? More and better venues in the city have pulled more touring acts in, and they use the studios. Sheryl Crow, for instance, did mixes for radio broadcasts during her tour stop in Nashville over the summer. Or are artists specifying Nashville for any or all of the reasons indicated above? The answer seems to be a little of both. Nashville does well in the repeat business department; once acts work here, they tend to want to come back. Thus, any increase in non-local studio clients has long-term implications.

More work from outside the walls and from new and current artists has always been the solution that Nashville sought. And it took years and a lot of benign coincidences to make it happen. But happening it is. ■

Send Nashville news to Dan Daley at dauwriter@aol.com or fax 615/646-0102.

—FROM PAGE 214, L.A. GRAPEVINE

stayed busy with altish rock, mixing projects for, among others, Dreamworks' Powerman 5000, Third Eye Blind for the *Scream II* soundtrack, Arista's Sister Seven, Elektra's Tuscadero and Mammoth's Pure, with re-recording and mixing in A and Pro Tools editing and production in Studio C. All are Grosse's clients so far, although The Mix Room is open to the public and Grosse is definitely looking forward to taking some time off with outside clients safely ensconced in Studio A. In reality, time off is probably imaginary for a guy this busy—he'll actually end up working in his own Studio B, tentatively scheduled to be fitted with a Trident A Range or 80 series console and to open for business early this year.

The choice of the 9K board for Studio A was a surprising one for Grosse. He was originally a die-hard SSL hater, and his Detroit studio contained a Neve V3. "Sometimes I squint my eyes a bit and look at the board and think, 'Wait a minute, this looks like an SSL—I hate SSLs!' The bottom line is, the 9000 sounds great, and that's the most important thing. It's also an incredibly flexible board, which can sometimes make it complicated. So the key with this board is to find the way you want to work, and to set it up for yourself. I've

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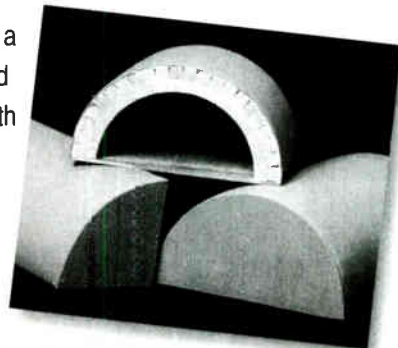
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CIRCLE #159 ON PRODUCT INFO CARD



Westlake Audio chief engineer Hanson Hsu in the new listening room at Dreamworks Records

done that, and I love it."

At Dreamworks Records in Beverly Hills, Westlake Audio's chief engineer, Hanson Hsu, has designed a critical listening room for the executive staff. "Dreamworks has a lot of very happening A&R people, producers and engineers who are on staff," explains Hsu. "They had plans for two conference rooms that they decided to redesign as critical listening environments. When Dreamworks' Mike Simpson and Adam Somers chose to use Westlake BB-10 SWP monitors in their rooms, we advised them to construct the room to control room specifications in order to create the most defined and clear listening environment possible. Somers was intrigued by our ideas and asked me to design the room, so we started from the unfinished walls and hardwood floors and went from there.

The room was built using standard Westlake Audio construction techniques: Fiberglas traps covered with acoustically permeable cloth and machine rubber vibration isolation in required areas. The front audio-visual wall is completely vibrationally isolated from the rest of the room.

"The unique characteristic about this room is that all the equipment is located in the front wall," Hsu says. "Therefore, there are no reflections from a large console in the center of the room as in other studios. Originally, they had been intending to install high-end audiophile gear; that kind of gear tends to be dedicated and not very flexible. I proposed the idea of using professional audio equipment instead. The end result is a system that is completely digital and easily expandable to several varieties of surround sound, including 5.1."

The listening room's audio system is centered around a Yamaha 02R V2 and an Apogee AD8000 with Boulder 102 and 500 series amplifiers driving the BB-10 SWPs. The video system is quite

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Quadim Corp. VP Paul Costa (l) and mastering engineer Brad Vance

extensive as well, with two Mitsubishi 37-inch television monitors, a Stewart 60x110-inch screen with an Ampro three-gun projector. Proline Integrated Systems of Minneapolis provided most of the video equipment as well as an AMX touch-screen controller system.

"The room sounds phenomenal," concludes Hsu. "In fact, Dreamworks' Adam Somers is so pleased with the sound that he has issued a challenge: find a better-sounding room in any record company—period."

Quadim Corporation in Westlake is expanding and opening a new mastering room. VP Paul Costa gave me a quick tour of the facility, a mastering and duplication house in business since 1987, and open at its present location for five years. Quadim has long been known for its work with numerous labels—these are the folks that save the day with high quality and quick turnaround. "We burn 6,000 CDs a month," says Costa proudly, "and we've never had one returned."

Current Quadim mastering engineer Brad Vance has been joined at the facility by Dave Donnelly in the new Chris Pelonis-designed room. Featured equipment in the rooms are Sonic Solutions premastering systems, Focusrite Blue Series, GML 9500 and Oramsonics EQs, Manley compressor/limiters and Manley, Apogee, dB Technologies AD122-96 and Prism converters.

Production equipment includes 16 Yamaha 4x and four Sony CDW-900F 2x10 CD Recorders and two MicroTech CD Image systems. Going with the more expensive Microtech systems was a pivotal decision that required a lot of research and extensive testing, and Costa feels that their reliability helps give Quadim a competitive edge.

"We're well-known among our clients for the quality of our work," Costa says. "In listening tests we've come out above major mastering houses on several projects. But people don't really know about us, so we're targeting

the up-and-comers: the producers, engineers and artists who need high-quality masters but don't have huge budgets or who aren't locked in with another mastering house."

Donnelly, whose recent mastering projects include Aerosmith's "Pink," Aaliyah's "The One I Gave My Heart to" and the Heart of Chicago on Reprise, has been in the business 27 years. Most recently he ran Geffen Records' in-house mastering room, but he's also served previously as mixer, staff producer and executive in charge of recording. "I was just about to sign the lease on a building for my own master-

ing house when the Costas approached me to open a new room at Quadim," he explains. "I admire their operation, and the studio has the best of both analog and digital equipment, so it seems like a great opportunity."

You won't find a more efficient or service-oriented company than Quadim. These guys are tight: Most of their projects are on 24-hour turnaround—no piles of old tapes sitting in these studios—and they even have their own delivery service. ■

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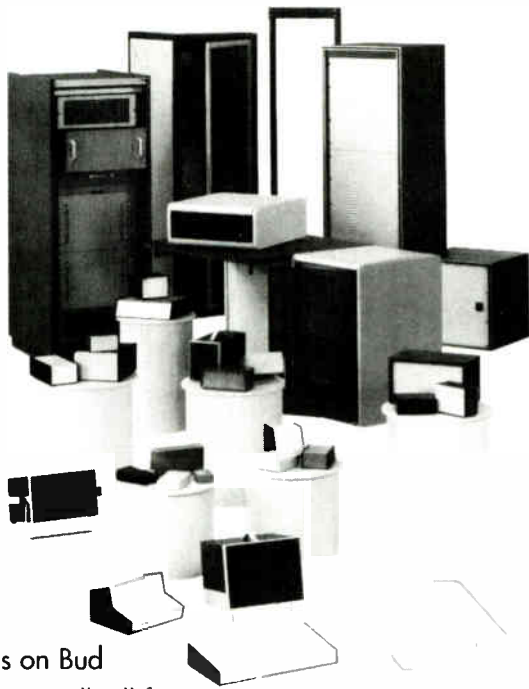
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—FROM PAGE 214, NY METRO REPORT

giovi tallied two Brazilian, two French and three Japanese projects in 1997. At least one of those clients booked more than an entire month in one of the facility's three studios.

Laura Hansen, manager at Room With a View, sees more clients coming from Asia and South America, as well as continued work from Europe. And globalization of the world's business, she says, is making for some strange pairings. "I got a call from a Japanese producer in Ireland for a mixing session he wanted to do in New York," she recalls.

Sound on Sound's owner Dave Amlen believes that increased international bookings are partly attributable to New York's ethnically diverse engineering and producer base. "Some of the mixers here are getting big reputations in certain countries, and when someone wants to work with them, the mixers bring them to the studios they work in here," he says. "As a result, it's hard to know how people are finding out about your studio overseas. Are they reading the back of a CD, or is it word of mouth? You want to know because then you can work that angle harder."

Mark Springer, manager at Quad Recording, believes that Manhattan's friendlier image has contributed to increasing his studio's international bookings in 1997. "We're in Times Square, and Disney has taken a lot of that over and cleaned it up," he says. "Over the last five years, New York has just become a nicer place to be, and people overseas pick up on that." Though most of the studio's international clientele is from Japan, Quad's new Web site has received a lot of European hits on it initially, and Springer finds that e-mail is rapidly supplanting faxes as the negotiating mode of choice for overseas hires.

In response to increased international bookings, some studios are adapting their services. Hansen says that she is planning to offer three levels of prepackaged concierge service for foreign clients, depending on their budget, which will feature amenities such as airport transfers, hotel accommodations and local entertainment packages—all of which will be included in the negotiated studio price.

Other New York studios offer similar, more informal versions of such services to their overseas clients. But Bongiovi says that the most crucial services occur before anyone gets on a plane.

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"We do a lot of faxing, because we want to make absolutely sure that we're getting the most accurate information across to people," he says. "There are language differences involved, and even though the projects generally have someone who speaks English on their team, or we're dealing with a foreign record label, we want to make sure that people know exactly what they're walking into when they get here. It's not like they're coming to a session from across town."

Some studios find international clients easy to deal with on the matter of money, with the clients often finding that the going rate in New York is significantly better than in Tokyo, for instance. Others note that many international clients are more assertive than they used to be about rates. On the other hand, there can be cultural differences in negotiations. "Foreign clients tend to be more passive-aggressive in their negotiations," Amlen says. "Where an American client will scream and say, 'I'm not going to pay that much,' someone from another country will just say, 'this is all I have.' And they usually get what they want in terms of finances. You just have to be ready to react according to how they present themselves."

At New York's largest studio, Hit Factory, executive vice president Troy Germano observes that "Everyone wants to get the best deal they can get, regardless of where they're from." Germano has seen an increase in overseas booking in the last year, particularly from Latin America.

Record labels generally offer purchase orders and pay through their U.S. affiliates; in the case of independent projects, deposits are usually made with wire transfers, the balances paid upon completion in U.S. funds or checks drawn on U.S. banks. Studios use a variety of interfaces with overseas clients, with a heavy reliance on faxes. But more and more, e-mail is becoming a regular route of negotiation. "We're just getting into e-mail now, and our Web site is under construction," says Germano. "I think once that's in place, you'll see that being used a lot more for international bookings."

New York has always been an international city. It's becoming more so every day. ■

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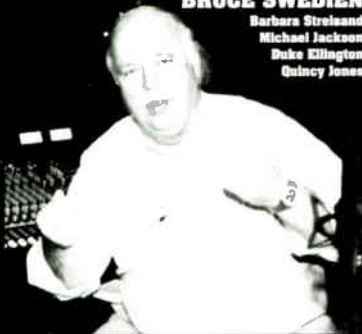
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CIRCLE #165 ON PRODUCT INFO CARD

—FROM PAGE 215, SESSIONS & STUDIO NEWS
Warner Bros. release in Studio 2 at Chicago Trax Recording (Chicago) with assistants Esther Nevarez, Jeff Dehaven and Dan Harkabus. The studio recently hired Mickie Scott as manager and purchased a 72-fader, 128-input AMS Neve Capricorn digital console...At Immortal

self-produced material for Reprise, and W.C. Clark was in with producer Mark Kazanoff. Larry Greenhill engineered on both sessions...King T. worked on his upcoming third release with Dr. Dre at Sierra Sonics (Reno, NV). Also in were Immortal Records artists The Urge, with producer Garth Richardson...



Productions in Canal Fulton, OH, Cal Moore produced and engineered the sophomore release for Bipolar...

SOUTHEAST

Canadian stars The Rankin Family tracked for EMI/Canada at Omni Sound in Nashville. George Massenburg produced and engineered...Warner International artist Veronique Sanson tracked with producer/engineer Justin Niebank and assistant Tim Coyle at The Sound Kitchen in Franklin, TN...At PatchWerk Recording in Atlanta, LaFace Recordings artist Usher Raymond remixed two singles with producer Lil Jon and engineer Josh Butler, and Regina Belle tracked for MCA with producer Gregory Charles and engineer Victor Dufour...Rebecca Lynn Howard overdubbed for Rising Tide Records at Sound Emporium (Nashville) with producer Steve Fishell and engineer Mike Poole...At his DARP Studios in Atlanta, Dallas Austin produced the new "alternative soul" release by Freeworld Entertainment artist Joi. Leslie Brathwaite engineered, and Carlton Lynn assisted...

SOUTHWEST

Ian Moore worked on a Capricorn release with producer/engineer Matt Hyde and assistant Boo MacLeod at Arlyn Studios in Austin, TX...At Pedernales Studios in Spicewood, TX, Wilco worked on



Studio A at Colorado Sound Recording (Westminster, Colo.) features a Euphonix CS2000, an Otari MTR-9011 recorder, Genelec 1031A and Meyer HD-1 monitors, a WaveFrame DAW-80 workstation and a wide array of outboard. Now in its 21st year in business, the studio offers a full range of recording and mastering services. Recent clients have included Tim O'Brien, The Fugees, Bela Fleck and Kai Eckhardt.

STUDIO NEWS

Producer Rhett Lawrence's Lawrence Productions (L.A.) added the new Aphex Aural Exciter Type IIIpi TDM plug-in...The Nashville Network unveiled its new audio remote truck, equipped with a 48-track AMS Neve Capricorn digital console, two Fostex D25 DATs, Dolby surround, Adams-Smith Zeta 3 synchronizer, and outboard by TC Electronic, Lexicon, Sony, Alesis and Aphex.

—FROM PAGE 75, *TITANIC*

iceberg hit, because it continues to bounce along the hull from all different perspectives,” he continues. “Jim said, ‘You know, it’s been described by passengers as the sound of somebody running down the side of the hull with a sledgehammer and hitting it.’ So we had this string of very articulate, metallic, echo-y impacts.” Meanwhile, up in the bridge, the hit barely registers, the only real clue being the slight rattling of the ship’s wooden wheel.

Then a 1,500-ton chunk of ice shears off the iceberg and lands on the deck; the camera cuts to the huge rip in the hull and a tremendous amount of water rushing in; watertight doors begin to seal, trapping boiler-room crew members inside; and there’s a huge rush of steam, subtly played—the last gasp of the engines. Then Cameron cuts to an interior, first class.

“We’ve just been through an amazing amount of noise—articulate, but nonetheless powerful,” Boyes says. “We go to first class and a woman comes out of her door and says to the steward, ‘Excuse me, why have the engines stopped?’ I felt a shudder. In that hallway, we have literally nothing but her dialog and the cloth movement of her dress and her footsteps. And those three elements alone make you realize why it’s so incredibly unsettling. Suddenly, with the absence of the rumble and in the absence of any air at all, you realize something’s deathly wrong.”

POST-ICEBERG

The iceberg hit occurs in reel 11, and the ship splits in two and sinks in reel 17. That meant a slow build back to chaos and climax, with appropriate room to breathe. Pacing became very important. “From the moment you hit the iceberg to the time it sinks is a long period of film time, at least an hour-and-a-half,” Rydstrom says. “So you have every different type of effect in the water category—everything from drips to the sound of water building up behind a wall, water seeping under a door crack, then building up to three inches in the room, then several feet, then climbing to the ceiling, then the big explosions and crash through the glass dome. It was very important for that long hour-and-a-half stretch that everything—creaks, water—have a real sense of progression.

“My first law in terms of sound is to have variation,” he continues. “A steady blast of sound tends to lose interest. So my instinct is to mix so that the water

has splashes and explosions—the water I’m talking about here is the type of water that floods through a hallway and comes rushing at the two main characters and just sweeps them off their feet. But every once in a while—and this is Cameron’s idea, really—you just go for the firehose effect. We just hit every speaker with a roar of water with no modulation, and the lack of modulation in those few scenes gives you the sense that this is more water than you can believe coming at these people.”

Many of the more intricate water effects, and all of the ones that involved people moving, were done by Foley walkers Robin Harlin and Sarah Monat, and supervising Foley editor Tom Small, on the Paramount stage in Hollywood. That particular team had just come off *The Flood*, had use of a heated, 30-foot-diameter Doughboy tank, and had developed specific water-miking techniques. Effects sources came from everywhere, including geysers at Yellowstone, a “geothermal mud and water bubbling cavern” that Boyes recorded in a blizzard-wracked Yosemite, a sea cave, water treatment plants and an aquarium that dumped 1,000 gallons in one fell swoop.

ing, breaking—the whole gamut,” Boyes says. “I tried to stay away from the classic sound design technique of mixing a metal impact with a lion roar or some animal vocal. That sort of gives you that classic high-tech dramatic sound that we’ve come to hear from action films of the ‘90s. I had this notion that it’s 1912, and I wanted it to sound like you’re living in a giant steel chamber that’s coming apart. This is the height of the Mechanical Age.

“Actually, the most powerful elements for the groans came from my assistant sound designer, Shannon Mills, who went down to a pier at the San Francisco Maritime Museum, where this ship was tied to the dock with large steel chains and ropes,” he adds. “The dock has this sort of steel pinion and ramps, and he came up with these recordings of the most powerful straining, moaning, twisting steel sounds. He thought they were okay, but not great, because of background crowd noise. But once I started to play with them—applying all sorts of pitch bends and certain amounts of reverb and EQ—I found that by going way down in the sections where there were voices, the voices themselves added this ghostly



PHOTO: MERVIN WALACE/PARAMOUNT PICTURES/20TH CENTURY FOX

But it is the creaks and groans that most dramatically inspire terror, the sense of impending doom, from the first distant creak when Kate Winslet goes below deck to find Leonardo DiCaprio, to the final rip in two.

“The groans have to constantly change in character, and they have to be moaning, squeaking, straining, twist-

quality. That, combined with straining steel, became the basis for the metallic groans and the ship sinking.”

The scene of the ship sinking, Rydstrom says, is as big as anything he’s ever done, and this from a guy who won Oscars for *T2* and *Jurassic Park*. But for Cameron, and for the sound

—CONTINUED ON PAGE 234

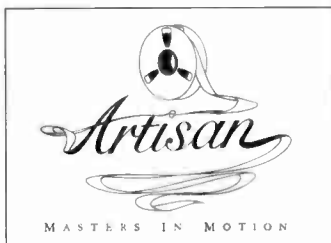
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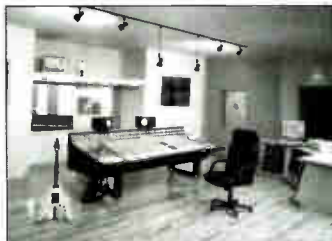
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The only Neve VR60 with Flying Faders and Recall in NYC outside of Manhattan. Newly renovated control room. 24- or 48-track recording on new Studer A827s or ADAT digital formats, at low block rates. Studio B, refurbished Harrison Raven console. MIDI suite for pre-production work. Mackie 8 Bus 32-input console. ADATs. "All-in" lockout. All three rooms for one low price! Program in the MIDI suite. Cut tracks in Studio B, mix on the Neve in Studio A! We'll even supply the transportation from any midtown location!

GETTINGS

Productions



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Ocoee, Florida 34761-2256
(407) 656-8989 (407) 656-9862 Fax
E-mail: gettings@sprynet.com

Web: <http://home.sprynet.com/sprynet/gettings>



Sitting on beautiful Starke Lake, near Orlando, Florida, the studio boasts a Euphonix CS-2000 console, a Synclavier/16 trk. Post-Pro system, an MTR-90II, Genelec & HD-1 near-field monitors and a large assortment of outboard gear and microphones. Our 40x45 main room w/18 ft. ceilings has a great sound and features a Yamaha C-7 piano. We also have a MIDI room for composition. Additionally, we have an integrated multi-format video suite for both off and online editing. Starke Lake and our parent company, Gettings Productions, has world-wide clients including Disney/MGM/Epcot, Gloria Estefan, The Pointer Sisters and many more. Please see the article on Bally's Hyper Surround in this issue of Mix.

Picture by Peter Murphy



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HARD DISK RECORDING



ProTools Project™ Digital Audio Workstation for Macintosh

ProTools Project is designed to provide ProTools functionality at a more affordable price. The system includes an audio card as well as award winning Pro Tools software and you choose either an 888 or an 882 I/O interface to complete the package. Project also features 8 tracks of record/playback, 4 bands of digital EQ, MIDI record/playback and Quickpunch. Digidesign also has an upgrade path when you're ready to expand your system.

REQUIRES-

- Qualified NuBus or PCI Macintosh CPU
- 24MB RAM minimum
- Hard Drive, system software 7.1 or greater
- 14" monitor (17" recommended).

ProTools 4.0 Software-

ProTools version 4.0 software provides the next step in the evolution of Digidesign's award-winning digital audio production software for the Mac. Fully Power Mac native, 4.0 features noticeable improvements in every major area. ProControl support, improved automation features, relative fader groupings & group nesting, plug-in MIDI personality files, multiple edit play lists, Sound Designer II functionality, Finder-style searching & sorting, and mmore.



Session 8™ Digital Audio Workstation for Windows

Session 8 is a professional quality digital audio recording, editing, and mixing system created specifically for personal and project recording studios. Designed to operate with Windows 95 or Windows 3.1, Session 8 offers professional recording features, powerful random access editing, automated digital mixing, & unparalleled integration with most popular MIDI sequencers.

FEATURES-

- 8-channel direct to disk digital recording
- Random access, non-destructive editing
- Automated, intuitive digital mixing environment
- Built-in volume & pan automation
- Complete SMPTE frame rate support
- Digital parametric EQ
- Frame accurate sync with built-in AVI video playback window
- Support for multiple hard drive partitions
- Auto sample rate convert to 44.1 or 48 kHz mono, WAV file format
- Choice of audio interface options



Audiomedia III™ Digital Audio Card

Available for both Macintosh and Windows OS systems, Audiomedia III will transform your computer into an powerful multitrack workstation. Compatible with a wide variety of software options from Digidesign and Digidesign development partners, Audiomedia III features 8 tracks of playback, up to 4 tracks of recording, 24-bit DSP processing, multiple sample rate support and easy integration with leading MIDI sequencer and other software programs.



PORTABLE HARD DISK RECORDING

Roland VS-880 V2

This new version of the popular VS880 incorporates powerful additional software functions that allow you to get the most out of this baby's incredible creative potential.

FEATURES-

- Auto Mixing Function records and plays back your mix in realtime
- Process the master output with a specific inserted effect such as total compression.
- Simultaneous playback of 6 tracks in MASTER MODE.
- 10 additional effect algorithms (30 total) including Voice Transformer, Mic Simulator, 19-band Vocoder, Hum Canceller, Lo-Fi Sound Processor, Space Chorus, Reverb 2, 4-band Parametric EQ, 10-band Graphic EQ, and Vocal Canceller.
- 10+ additional preset effects patches.



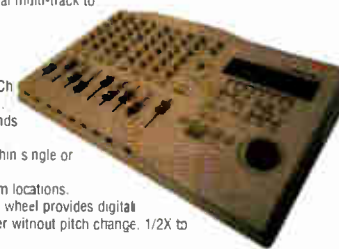
- In total, over 20 powerful and convenient features in editing/sync sections have been added. Some require the optional effects expansion board

Fostex DMT-8 VL

The latest in the Fostex HD recording family, the DMT-8 VL truly brings the familiarity of the personal multi-track to the digital domain.

FEATURES-

- 18 bit A/D, 20 bit D/A
- Built-in 8 channel mixer, Ch 1 & 2 feature mic/line level.
- 2 band EQ and 2 AUX sends per channel
- Cut/Copy/Move/Paste within single or multiple tracks.
- Built-in MIDI Sync, 6 mem locations.
- Dual function Jog-Shuttle wheel provides digital "scrub" from tape or buffer without pitch change. 1/2X to 16X
- Divide the drive into 5 separate virtual reels, each with its own timing information.
- NO COMPRESSION!



CD & CASSETTE DUPLICATION

marantz CDR615 / CDR620 Compact Disc Recorder

Both next-generation stand-alone write-once CD recorders, the CDR615 & 620 offer built-in sample rate conversion, CD-DAT/MD/DCC subcode conversion, and adjustable dB level sensing. They also feature adjustable fade-out, record mute time & analog level automatic track incrementing. A 9-pin parallel (GPI) port, headphone output with level control and RC620 remote are also included. The CDR620 adds a SCSI-II Port XLR (AES/EBU) Digital In/Out and Digital cascading, 2x speed record, Index Recording and playing and defeatable copy prohibit and emphasis.



Telex ACC2000/ACC4000 Cassette Duplicators

Designed for high performance & high production, Telex duplicators offer easy maintenance and operation. The ACC2000 is a 2-channel mono duplicator while the ACC4000 is stereo. Each produces 3 copies from a cassette master at 16x normal speed & by linking additional copy modules, you can duplicate up to 27 copies of a 60 minute original in under 2min!

ACC2000XL / ACC4000XL

The XL Series feature "Extended Life" cassette heads for increased performance and wear characteristics. They also offer improvements in wow and flutter, freq. response, S/N ratio & bias.



STUDIO DAT RECORDERS

SONY PCM-R500



Incorporating Sony's legendary high-reliability 40.D Mechanism, the PCM-R500 sets a new standard for professional DAT recorders. The Jog/Shuttle wheel offers outstanding operational ease while extensive interface options and multiple menu modes meet a wide range of application needs.

FEATURES-

- Set-up menu for preference selection. Use this menu for setting ID6, level sync threshold, date & more. Also selects error indicator.
- Includes 8-pin parallel & wireless remote controls
- SBM recording for improved S/N (Sounds like 20bit)
- Independent L/R recording levels
- Equipped with auto head cleaning for improved sound quality.

TASCAM DA-20/DA-30mkII



- Multiple sampling rates (48, 44.1, and 32kHz).
- Extended (4-hour) play at 32kHz.
- S/PDIF Digital I/O, RCA Unbalanced In/Out.
- SCMS-free recording. Full function wireless remote.

DA-30mkII Additional Features-

- Variable speed shuttle wheel.
- Digital I/O featuring both AES/EBU and S/PDIF.
- XLR balanced and RCA unbalanced connections.
- SCMS-free recording with selectable ID.
- Parallel port for control I/O from external equipment.

Panasonic SV-3800/SV-4100



The SV-3800 & SV-4100 feature highly accurate and reliable transport mechanisms with search speeds of up to 400X normal! Both use 20-bit D/A converters to satisfy even the highest professional expectations. The SV-4100 adds features such as instant start, program & cue assignment, enhanced system diagnostics, multiple digital interlaces and more.

Fostex D-15TC/D-15TCR



The new Fostex D-15 is the least expensive timecode CAT on the market. It has a host of new features aimed at audio post production and recording studio environments. The D-15TC comes with the addition of optional chase and sync capability installed. It also includes timecode reading and output. The D-15TCR comes with the further addition of an optional RS-422 port installed, adding timecode and serial control (Sony protocol except vari-speed)

FEATURES-

- Hold the peak reading on the digital bargraphs with a choice of 5 different settings
- Set cue levels and cue times
- Supports all frame rates including 30df
- Parallel interface

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MICROPHONES



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- Dual 1" Gold-sputtered diaphragms.
- Flat on-axis response.
- 126dB dynamic range.
- Switchable 10dB and 20dB pad.
- 20Hz-20kHz.



E-300

Studio Condenser Microphone

A multi-patterned side address mic that combines vintage capsule design with advanced head-amp electronics, the E-300 has an unusually wide frequency response of 10Hz to 20kHz & an exceptional dynamic range of 137 dB. It also features extremely low self noise of 11dB. Ideal for even the most critical studio applications.

Shown with optional ZM-1 Shockmount



Unique powering of all Equitek Series microphones is accomplished with a pair of rechargeable nicad 9-volt batteries in combination with 48V phantom power. This overcomes inherent current limiting associated with most phantom power supplies & can supply 10x the current.



audio-technica.

AT4050/CM5

Cardioid Capacitor Microphone

The AT4050 multi-pattern condenser expands upon the AT4033 to set the standard for studio performance mics.

FEATURES-

- 2 capacitor elements.
- Cardioid, Omnidirectional, & Figure 8 polar pattern settings.
- Vapor-deposits of pure gold on specially-contoured large diaphragms are aged through 5 steps to ensure optimum characteristics over years of use.
- Transformerless circuitry results in exceptional transient response and clean output even under extremely high SPL conditions.



MD 421

For over 20 years, the MD 421 has been one of Sennheiser's most popular dynamic mics. The large diaphragm, dynamic element handles high sound pressure levels, making it natural for recording guitars and drums. The MD 421's full-bodied cardioid pattern, and 5-position bass control make it an excellent choice for most instruments, as well as group vocals, or radio broadcast announcers. One listen and you'll know why it's a classic.



MIXING BOARDS



Get on the 8-Bus!

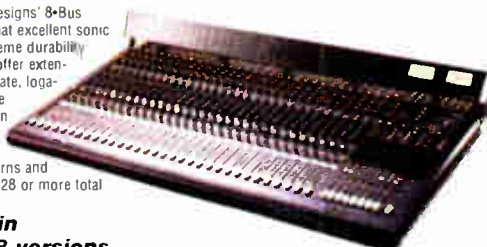
Since its introduction, Mackie Designs' 8-Bus Series consoles have proven that excellent sonic quality, practical features and extreme durability can be affordable. All 3 versions offer extensive monitoring, 4-band EQ, accurate, logarithmic taper faders, and expansive headroom. The 24x8 and 32x8 can be expanded using Mackie's 24-E Expander console which consists of 24 input channels and tape returns and may be daisy chained to provide 128 or more total input channels.

Available in 16x8, 24x8, & 32x8 versions.

FEATURES-

- Each channel includes Mackie's well-known Mic pre-amp and a -10/+4 switchable tape return
- 8-assignable submasters and a L/R mix master
- 4-band, true parametric EQ

- Extensive routing capabilities
- Optional Meter Bridges available
- Optional 24-E Expander console available
- Rugged all-metal chassis
- In-line monitoring effectively doubles input channels



TASCAM M-1600

16 & 24 Channel 8-bus Consoles

Great for modular Digital Multitrack setups and hard disk recording, the M 1600 is part of Tascam's next generation series of recording consoles. It features multiple options for inputs and outputs and uses the same, easy-to-install D-sub connectors as Tascam's more expensive consoles, all in a compact design.

FEATURES-

- XLR Mic inputs w/phantom power on 8 channels.
- Signal present/overload indicators on each channel.
- Balanced & Unbalanced tape returns & Balanced Group/Direct outputs using D-sub connectors.
- TRS Balanced Line Inputs on all channels.
- 3-band EQ with sweepable mids.
- 5 Aux sends (1 stereo)



- 4 assignable aux returns.
- Perfect for use with DA-88 and ADAT setups.

MINIDISC MULTITRACKS

TASCAM 564

Digital Portastudio

The Tascam 564 Digital Portastudio combines the flexibility and superior sound quality of digital recording with the simplicity and versatility of a portable multitrack. Using MiniDisc technology, the 564 has many powerful recording and editing features never before found in a portable 4-track machine.

FEATURES-

- Self-contained digital recorder/mixer.
- Uses low-cost, removable MiniDiscs.
- 2 AUX sends / 2 Stereo returns
- 4 XLR mic inputs.
- Channel inserts on inputs 1 & 2.
- 5 takes per track, 20 patterns, 20 indexes per song.
- Random access and instant locate.



- Non-destructive editing features with undo capability include: bounce forward, cut, copy, move
- Full-range EQ with mid-range sweep
- S/PDIF digital output for archiving
- MIDI clock and MTC



SONY

MDM-X4 MD Multi-Track Recorder

MD recorders are here! Offering up to 37 minutes of high-quality 4-track digital recording, the MDM-X4 is truly the next generation of personal multi-tracks. With a built-in mixer, exclusive Track Edit system, and a Jog/Shuttle wheel for sophisticated editing with ease, the MDM-X4 will encourage you to flex your creativity.

FEATURES-

- Records on high quality, removable MD data discs
- 3.5-gen. ATRAC LSI for wide dynamic range.
- 10 Input / 4Bus mixer.
- 2 AUX sends, 3-band EQ.
- 11-point locator.
- Random access memory for quick playback and record from anywhere on the disk.
- Editing features include: Undo, Redo, & Section/Song editing for flying material between different tracks.



STUDIO MONITORS

ALESIS Monitor One

The award winning Monitor One provides the last critical link in the recording studio's signal chain, giving you an accurate reproduction of what is being recorded.



FEATURES-

- Excellent image and transient reproduction, powerful bass, and smooth, extended high frequency detail.
- Exclusive SuperPort speaker venting technology
- Ferrofluid cooled 1" silk-dome driver



PBM 6.5II

The PBM 6.5 II is the industry standard for studio reference monitors. They provide true dynamic capability and real world accuracy.

FEATURES-

- 6.5" low frequency driver and 3/4" tweeter
- Fully radiused and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass



4206 & 4208

The 4206 & 4208 studio reference monitors are 6" and 8" respectively. Both offer exceptional sonic performance, setting the standard for today's multi-purpose studio environments.

- Multi-Radial baffle ABS baffle virtually eliminates baffle diffraction.
- Superb imaging & reduced phase distortion.
- Pure titanium diaphragm high frequency transducer provides smooth, extended response
- Magnetically shielded for use near video monitors.



SPIRIT Absolute Zero

Absolute Zero monitors maintain a wide frequency response at high and low listening levels, both on and off-axis for consistent results everytime.

FEATURES-

- High definition linear phase design
- Wide, controlled dispersion
- CAD optimized, low loss crossover
- Custom designed drivers
- Long throw 170mm LF driver
- 25mm soft dome HF unit on proprietary waveguide



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PORTABLE DAT RECORDERS

TASCAM DA-P1



- Rotary 2 head design, 2 direct drive motors.
- XLR mic/line inputs (w/phantom power)
- Analog and S/PDIF (RCA) digital I/O.
- 32/44.1/48kHz sample rates & S/M51-free recording.
- Built in MIC limiter and 20dB pad.
- TRS jack w/level control for monitoring.
- Includes shoulder belt, AC adapter, & battery.



PDR1000/PDR1000TC



The PORTADAT has fast become an industry standard location DAT machine. Popular for film and video production use, as well as ENG/FPV, the PDR1000 features a large backlit display, 4 motor transport and AES/EBU and SPDIF digital ins and outs. The PDR1000TC adds the ability to record, generate and reference to timecode as well as jam sync to convert absolute time to timecode.

FEATURES-

- 4 head Direct Drive transport.
- XLR mic & line analog ins, 2 RCA line outs. Digital I/O includes S/PDIF (RCA) and AES/EBU (XLR).
- L/R channel mic input attenuation selector (0dB/-30dB)
- 48V phantom power, limiter & internal speaker.
- Illuminated LCD display shows clock and counter, peak level metering, margin display, battery status, ID number, tape source status and machine status.
- Nickel Metal Hydride battery powers the PDR1000 for 2 hours, AC Adapter/charger included.

PDR1000TC Additional Features-

- All standard SMPTE/EBU time codes are supported, including 24, 25, 29.97, 29.97/DF, & 30 fps.
- External sync to video, field sync and word sync.

NEW Options-

- **MS1000 Master Sync module** ensures drift will be no more than 1 frame every 10 hours.
- **HM1000 Headphone Matrix** provides a rotary switch for selection of Stereo, Mono Left, Mono Sum, & M/S (mid-side) Stereo modes.

SONY TCD-D10 PROII

A reliable, high-performance DAT recorder the portable TCD-D10 PROII is designed with rugged professional use in mind. It has many enhanced features including absolute time recording, allowing immediate use of the tapes as source material for Sony's PCM-7000 series DAT editing system.



Fostex PD-4 V.2

The second-generation portable, professional TC DAT recorder from Fostex. Version 2 software includes many features and functions for improved performance in the field.



FEATURES-

- 4-head design • Punch-in/out
- Pre or post stripping of SMPTE/EBU timecode
- 3 in X 2 output mixer with 3-position scan functions
- Selectable 48V phantom powering and variable low-cut filters

EFFECTS PROCESSING

Lexicon PCM-80 & PCM-90 Digital Signal Processors



A great combination for any studio owner with an ear for the best. The PCM-80 delivers high quality multi-effects based on the legendary PCM 70, maintaining Lexicon's high standards for sonic clarity and extraordinary processing power. The PCM 90 is a digital reverb with its roots stemming from the studio standard 480L and 300L effects systems. Reverbs from telephone booths to the grand canyon, the PCM 90 is incredibly realistic, an excellent addition to any rack mount arsenal.

**Buy a PCM-80 from B&H before
December 25th, 1997 and receive a
FREE Pitch FX Card & \$100 -
a \$350 Value!**

**Buy a PCM-90 from B&H before
December 25th, 1997 and receive a
FREE Dual Reverb Card & \$250 -
a \$500 Value!**

Lexicon MPX-1 Multi-Effects Processor



Lexicon's latest addition to their Digital effects family, the MPX-1 features top-quality effects in an easy to use, 1 rack space unit. With 56 Pitch, Chorus, EQ, Modulation, Delay, and world-class reverb effects accessible from the front panel, as well as TRS and XLR balanced I/O and complete MIDI implementation, the MPX-1 creates a new standard for cost and quality in a multi-effects device.

t.c.electronic

Wizard M2000 Studio Effects Processor



The M2000 features a "Dual Engine" architecture that permits multiple effects and 6 different routing modes making it a great choice for high-end studio effects processing.

FEATURES-

- 25+ factory programs including reverb, pitch delay, chorus, flange, phase, EQ, de-essing, compression, limiting, expansion, gating and stereo enhancement
- 20-bit A/D conversion, AES/EBU and S/PDIF digital I/O.
- "Wizard" help menus, 16-bit dithering tools.
- Tap and MIDI tempo modes.
- Single page parameter editing, 1 rack space.

SONY

DPS-V77 2 Ch. Master Effects Processor



Sony's latest effects processor, the DPS-V77 yields excellent sonic quality combined with realtime control, a digital I/O and many more features that will put a smile on the face of any discerning studio engineer.

FEATURES-

- 19+ preset & 198 user-definable programs.
- Control up to 6 parameters in realtime via MIDI information and an optional foot pedal
- Use the AES/EBU & SPDIF digital I/O to link multiple V-77's together & when working with digital mixers
- 10-key pad input
- Shuttle-ring equipped rotary encoder allows for quick patch changing.
- A noise gate circuit is provided ahead of the input for guitar players and other instrumentalists who want top quality effects without sacrificing tone.

Roland

SRV-330

Dimensional Space Reverb



The SRV-330 provides exceptional sound quality, using proprietary Roland Sound Space technology to achieve three-dimensional spatial effects with conventional two-channel playback.

FEATURES-

- Discrete stereo reverb algorithms for independent processing per channel
- 30-bit internal signal processing for a clear and accurate sound
- 300 preset and 100 user patches
- MIDI and realtime control via remote, control and expression jacks

PRO HEADPHONES



K240M

The first headphone of choice in the recording industry. A highly accurate dynamic transducer and an acoustically tuned venting structure produce a naturally open sound.

- Integrated semi-open air design.
- Circumaural pads for long sessions.
- Steel cable, self-adjusting headband.
- 15Hz-20kHz, 600Ω



SONY MDR 7506

The Sony 7506's have been proven in the most trying studio situations. Their rugged, closed-ear design makes them great for keyboard players and home studio owners.

- Frequency Response 10Hz to 20k Hz
- 1/4" & 1/8" Gold connectors
- Soft carrying case
- Plug directly into keyboards



beyerdynamic

DT 770 Pro

These comfortable closed headphones are designed for professionals who require full bass response to compliment accurate high and mid-range reproduction.

- Wide frequency response
- Durable lightweight construction
- Equalized to meet diffused field requirements
- Padded headband ensures long term comfort



SENNHEISER

HD 265/HD580

The HD-265 is a closed dynamic stereo HiFi/professional headphone offering high level background noise attenuation for domestic listening and professional monitoring applications. The HD 580 is a top class open dynamic stereo HiFi/professional headphone that can be connected directly to DAT, DCC, CD and other pro players. The advanced design of the diaphragm avoids resonant frequencies making it an ideal choice for the professional recording engineer.



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KEYBOARDS & SOUND MODULES

Roland® A-90EX Master Keyboard Controller



The A-90EX is an 88-note, weighted master controller with one of the best keyboard actions currently on the market. It offers incredibly realistic piano sounds, powerful controller capabilities and "virtual" programmable buttons which can be configured to operate your software and other devices. The A-90EX combines the majestic sound of a concert grand, the expressive action of a fine acoustic keyboard and the comprehensive MIDI functions of a master controller—all in a portable stage unit.

- FEATURES—**
- Master Volume Slider and Global Transpose features
 - Proprietary 88-note hammer-action, velocity sensitive keyboard with aftertouch
 - 2 types of stereo-sampled grand pianos, various acoustic and electric pianos (including a great classic Rhodes).
 - Stores up to 64 Performances

Roland® JV-2080 64-Voice Synthesizer Module

Roland resets the standard with the incredibly expandable JV-2080 64-Voice Synthesizer Module. This amazingly powerful package offers unprecedented expandability, digital signal processing, and remarkable operational ease, all housed in a 2-unit rack-mount design.



- FEATURES—**
- 64-Voice 16-part multitimbral capability
 - 8 slots for SF-V80 Series wave expansion boards.
 - 3 independent effects sets plus independent reverb/delay and chorus.
 - 6 outputs: Main Stereo and 4 assignable.
 - NEW patch finder and Phrase Preview functions for easy access to all patches.
 - Large backlit graphic display
 - Compatible with JV-1080, XP-50, & XP-80.

KURZWEIL

K2500 Series Music Workstation



Building on the same features that made the 2000 series popular, the 2500 utilizes the acclaimed V.A.S.T. technology for top-quality professional sound. Available in 76-key (K2500), 88 weighted key (K2500X) and rackmount (K2500R) configurations, the K2500 combines ROM based samples chosen from the best of Kurzweil's collection, on-board effects, and full sampling capabilities on some models (K2500S, K2500RS & K2500XS).

- FEATURES—**
- True 48-voice polyphony
 - Fluorescent 64 x 240 backlit display
 - Up to 128MB sample memory
 - Operating system stored in flash ROM (for software updates via floppy disk and SCSI)
 - Full MIDI controller capabilities
 - 32-track sequencer • Dual SCSI ports
 - Advanced file management system
 - Sampling option available
 - Optional DMTI Digital Multitrack interface for data format and sample rate conversion with ADATs/DA-88s

MIDI SOFTWARE



Digital Performer 2.1



Mark of the Unicorn Macintosh MIDI Sequencer w/ Integrated Digital Audio

Digital Performer contains all of the sequencing capabilities of Performer V.5 and adds Digital Audio to the picture. Apply effects such as Groove Quantize, shift velocity scaling and more—**ALL IN REALTIME.**

- FEATURES—**
- MIDI Machine Control, QuietTime Video playback.
 - Sample rate conversion.
 - Spectral effect, pitch correction.
 - Real-time editing and effects processing.
 - Full featured Notation section that rivals dedicated notation software programs
 - Playback using QuickTime Musical Instruments
 - Virtual automated mixing
 - Non-destructive MIDI output processing

SAMPLING

E-MU Systems, Inc.

e-6400 Emulator

The e-6400 offers the power of E-mu Systems' renowned Emulator Operating System (EOS) and superb audio quality in a package perfect for the budget-minded professional. The e-6400 comes with stereo sampling, 4MB of RAM and is fully upgradeable to E-mu's top of the line Emulator sampling synthesizers, the E4X, and E4XTurbo.



- FEATURES—**
- 64 voice polyphony (expandable to 128)
 - 4MB sound RAM
 - 2 CD-ROM's included (400MB of sounds)
 - 8 balanced analog outputs
 - Onboard graphic waveform editing
 - Load while play
 - Stereo phase lock time compression.

THE NEW MPC!

AKAI MPC2000

MIDI Production Center



Whether you're producing rap or hip-hop, sequencing a rack of MIDI modules, or performing live, the MPC2000 gives you powerful tools to make your music shine. It's the NEW MPC!

- FEATURES—**
- Large 248 x 60 LCD Graphic display
 - 64-track, 100,000 note sequencer with linear drum machine style programming.
 - 16-bit, 32-voice stereo sampler
 - Standard SCSI interface
 - Soft keys, Data/Digit wheels, cursor control and more.
 - Keypad for directly entering sample points.
 - Note variation slider gives you realtime control of any sound's tuning, attack decay, or filter frequency.
 - Floppy Disk Drive
 - Powerful expansion options.

MIDI HARDWARE



Mark of the Unicorn

MIDI Time Piece™ AV 8x8 Mac/PC MIDI Interface



The MTP AV takes the world renowned MTP II and adds synchronization that you really need like video genlock, ADAT sync, and word clock sync, even Digidesign superclock!

- FEATURES—**
- Same unit works on both Mac & PC platforms.
 - 8x8 MIDI merge matrix, 128 MIDI channels.
 - Fully programmable from the front panel.
 - 128 scene, battery-backed memory.
 - Fast 1x mode for high-speed MIDI data transfer.



Mark of the Unicorn

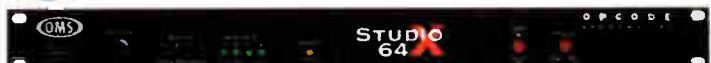
Digital Time Piece™ Interface



Think of it as the digital synchronization hub for your recording studio. The Digital Timepiece provides stable, centralized sync for most analog, digital audio, and video equipment. Lock together ADATs, DA-88's, ProTools, word clock, SMPTE, video, SMPTE, and MMC computers and devices flawlessly. It ships with "Clockworks" software which gives you access to its many advanced features and remote control of some equipment settings such as record arm.

OPCODE

Studio 64X Cross Platform Interface



The Studio 64X is part of Opcode's new Studio X Series. This 64 channel MIDI interface is compatible with both Macintosh and Windows and features SMPTE synchronization as well as OMS (Open Music System) compatibility for total integration with any OMS compatible application.

- FEATURES—**
- Cross-platform Mac and Windows compatibility
 - 4 MIDI inputs and 6 MIDI outputs, 64 MIDI channels
 - Stand alone programmable patchbay, any in to any out
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—FROM PAGE 20, FIVE MAPLE LEAVES, EII?

the business decisions were that got us here, it looks like we are here. Personally, I am amazed at two aspects of this: first, that "they" actually got us to buy into the idea that we need to completely upgrade our pitifully inadequate stereo systems and stereo TVs to surround, and now 5.1, or we won't have any idea of what is going on; and second, that they may be right.

SO WHAT TO DO ABOUT IT?

Almost a year ago, I decided that I had better look into all this a bit, so I did some worldwide shopping. I decided almost immediately that imaging and spectral consistency were going to be important for proper audio imaging for film, so I concentrated on systems from manufacturers that could offer entire integrated 5.1 solutions. From the cold north came a *very* integrated and complete solution, and at a fraction of the price of some of the other contenders.

I liked it right away because all of the HF and mid-drivers were identical, so imaging and spectral integrity were amazing. Then I liked it because it was impressively neutral. Then I noticed how accurate it sounded. Then something came along that woke up the subwoofers, and I was sold. I set up the following: two Paradigm Active/450-LRs for the front left and right, two Active/450-ADP for the rear left and right, an Active/450-CC for center, and two Servo-15 subwoofers (with an X30 control unit) for the neighbors and any local seismographs. In the precise scientific jargon, this system rules!

The front and center units each have two 6.5-inch mid-low drivers and an aluminum ferrofluid tweeter. They are actively bi-amped, and, of course, all the new crossover optimization tricks—along with all the cool phase correction and frequency-response optimization that becomes possible when the designer knows exactly what drivers will be used (and how they will be used) with his amps and preamps—are in there as well. I *love* a good active monitor! These things are ridiculously time-aligned and have frequency-response curves that are so flat that they would be pronounced dead in any self-respecting emergency room.

The rears also have two 6.5s each, but they have two aluminum tweeters, as they are bipolar. Each of these five ported speakers has EQ tailoring, shelving and other miscellaneous buttons and

knobs, and generates over 100 watts for the bottom, over 50 watts for the top.

Each sub has about 400 watts interacting via a very, very nice servo setup with a 15-inch woofer in a sealed cabinet. A little box called an X30 handles sub-crossover with all the desired adjuster knobs. You know what all these controls are—you don't need me to actually do a real review and list every screw and connector, do you? All specifications subject to change if I am wrong, or if I decide at some later date that I hate the system (not very likely, actually).

So how does all this integrated hardware sound? Well, if you have actual 14-karat golden ears, you won't like them too much at first—they need to be broken in. Let me repeat that for you. *They need to be broken in.* Loan them to a drummer for ten days when they show up. The drummer will play them loud and hard, you won't have to hear them before they are ready and, of course, the drummer won't be able to tell the difference at all and will just think it was a cool, friendly move that you loaned out your brand-new toys to play with before you even opened them. Everybody wins, and besides, it's not a bad idea to have a favor to call on a drummer.

Okay. Now that they are broken in, how do they sound? Well, after my first movie on this setup, I lost all measurable desire to even hear any more 5.1 systems. I simply didn't see any point to it. Still don't. They are great.

But like women and microphones, you can't take another man's word any further than as a recommendation for you to try them yourself. (And lest *Mix's* PC lawyers frantically rush to the phone to push the speed dialer button with my name on it, let me add that like men and microphones, you can't take another woman's word for it any further than as a recommendation for you to try them yourself.)

Keep in mind that these are not consumer speakers, but high-quality studio monitors with specialized matched rear and center versions for the purpose of providing the most natural speaker-to-speaker image transitions possible. It works. They work. Go hear them.

And as for two subs? Always use two subs, even if you don't need the SPL, just to give yourself a fighting chance at controlling the big, the bad and the ugly room nodes down there. ■

SSC really likes these. Can you tell? He would like to take the remainder of this space to tell you... Oh. Wait. No space left.

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—FROM PAGE 225, TITANIC

crew, this is a dramatic film, not a disaster movie. So the rush of the people, and the chaos of the last few hours on-board, form the heart and soul within the horror and cacophony.

"The loop group [Mitch Carter and Mad Dogs, recorded at Todd-AO] was a very important component in this film," says supervising sound editor Belfort, "because from the time the ship hits the iceberg, the people occupy the main dramatic element of the film. And you can't have people screaming for nine reels, so you create these ebbs and flows, these spikes, and decide when to use them. Compounding the problem were the problems of languages. The Titanic was a very international ship, insofar that first class was primarily made up of British and American passengers. The crew itself had to be made up of various British classes—the waiters, for instance, were not as 'lower class' as the stokers. And you had the international makeup of steerage, so you had Russian voices, Lithuanian, Arab, Polish, Swedish, Irish—the range was phenomenal. The loop group was truly one of the threads that linked the last nine reels, from the time of the impact to the scenes in which there are fewer and fewer survivors screaming in the ocean at the end, until you reach silence."

The silence was actually pegged in notes as "the presence of water." Cameron wanted the feeling of being surrounded, without really having an effect, which proved challenging. It was a sound Boyes didn't come up with until the final mix, and he has his 10-year-old son, Tyler, to thank.

While mixing the trailer for the film, Boyes received a call from Tyler saying he was going to Hog Island for one of the last nights they would allow camping in Tomales Bay, an hour-and-a-half north of San Francisco. Having worked a grueling six months, he decided to skip out and spend time with his boy, so he got a ride in a motorboat and arrived at the island around 9:30 p.m. "I woke up about 2:30 in the morning," Boyes recalls, "and I just crept out of my tent and set up my rig. It had become calm and we were surrounded by water. It was tough because it was one of those recordings that was just on the edge of technically what a preamp can deliver without applying noise to your recording. I got this sense of feeling surrounded by a mass of water without really feeling surf. No lapping. More of a presence.

"The other sound came from the Foley crew down at Paramount," he continues. "I had requested that they record the sound of frozen hair, because toward the end of the film, Rose is left on a raft in the middle of the Atlantic and you can see the icicles in her hair. So I asked them to try freezing celery or green onions or something of that nature and give me a crunchy effect every time she moves. Between the frozen hair and the presence of water, I think we leave the audience with an absolutely chilling emotional moment. And it worked out magically."

EPILOGUE

So much more could be written about the tracks for this epic, which is not so much a disaster movie as it is a love story, on a scale with *Doctor Zhivago* and *Gone With the Wind*. The dialog edit alone could fill an article, with its 127 speaking roles, more than 4,000 principal ADR lines (masterfully handled by supervising ADR editor Hugh Waddell, Boyes says) and the fact that it sits in a frequency spectrum that competes with water and wind. Or the Foley, with its frantic action and its quieter moments, such as the scene in which DiCaprio sketches the nude Kate Winslet, and she removes a barrette as he sharpens his charcoal then sketches on paper—a favorite of Boyes'. Or the dramatic score (composed by James Horner, recorded by Shawn Murphy, with synthesizer sweetening delivered LCR), which at times moves from sweeping, panoramic love themes to driving, action-packed, pulsing rhythms.

As surprising as it may sound, both Rydstrom and Boyes spoke of the sound design for *Titanic* as an exercise in restraint, in pulling back and building to the proper big moments. It's not always about big sounds or a massive number of tracks, they say. ("I don't know what I would do with 120 inputs for effects," Rydstrom says.) It's about choosing the right sounds and articulating them. They are aware that films are getting bashed for being too loud. In a film as long and heavily dramatic as *Titanic*, they say, there has to be time to breathe. And in a sense, the most memorable sounds of all may be two key moments of silence: when the engines shut down, and when a final survivor slips into the icy ocean. ■

Tom Kenny, managing editor of Mix, wishes to thank Ellen Pasternack of Lucas Digital Ltd.

—FROM PAGE 98, TOM LORD-AIGE

tween the bass, the vocals and that guitar. So what I wanted was for the guitar to come out of the sides, and the effect I used actually took the center out of the guitar.

A Spatializer?

No. So I shut off all the instruments except the guitar and the vocal, and just screwing around I turned the drums on where there was a drum fill. Really, it was a complete fluke. And when I got it done the way it is on the record, I asked the band to please just live with it, so that when we finished mixing the album we could discuss it. Because they'd been living with it the other way so long it was very hard for them to make a decision on it. At the end, everybody went for it. It really set the song up to hear the guitar lick and Ed on their own.

The great thing with Live is that their music paints such a picture, and they really let me create a soundscape. Whenever it slows down and there's some space, I put a nice reverb on the guitar and really flood it, and I do the same with Ed. I can make it dramatic.

"Lightning Crashes" is another example of an interesting guitar sound. On that song, there were three tracks of guitar, three different amplifiers at the beginning of the song. And again, I had a problem because three amplifiers, same performance, it really sounded mono no matter what I did. So I took a delay and had it sweep; it created that interesting phase sound that plays over the intro. At one point, we actually took all those guitars and ran them through Pro Tools because there was so much guitar amp noise. We de-noised it, then we all listened to it and said, "Nah! Too clean."

So grit isn't hard for you—it doesn't take a leap of your engineering mind to make things dirtier?

I have no problem getting things to distort.

The Verve Pipe's "Reverend Girl" seems to have a stereo effect on the bass.

I don't remember. It's not unusual for me to take the bass and split it off and EQ it without any bottom end, then send it to a stereo chorus. Generally, I don't want the bottom end to chorus, I just want the top end to glisten. So the bottom end stays in the center and the top end spreads.

You don't do a lot of recording these days. Do you miss it?

Sure I do. I love recording bands.

There's something about setting a band up and just having them play; it's very exciting, and I miss it immensely. And I think as a recording engineer, I'm as good as most. But I've made a conscious effort to focus on something that I do really well. And I think I mix really well. I have a unique perspective, and I really apply myself.

You still do some live mixing.

I do it for fun. Last year I had a vacation, so I got in my car, and as I was driving cross-country, I hooked up with Tracy Bonham, who I'd worked with and who was on tour. I decided to hang around for a couple of days and see some shows. Turns out she didn't have someone to do sound, so, as I had nothing to do for two weeks... We always used the house system, and the house guy would always be coming up to me and saying, "Uh, did you notice that you're hitting the compressors really hard?" and I'd say, "Yeah, but it sounds great, doesn't it?"

To what do you attribute your success?

I can only attribute it to the fact that I'm not afraid to do whatever it takes to make the mix sound great and the song come across better. And that, again, falls back on the fresh ears—I'm not afraid to turn stuff off, I'm not afraid to move stuff around, I'm not afraid to have my way with the artists' tapes. I just go for it.

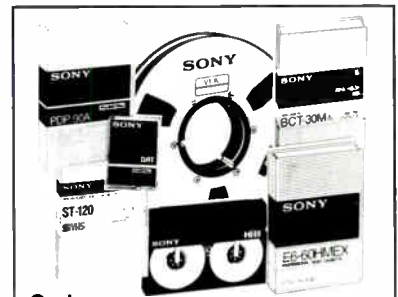
I know you love what you do, but it must be difficult to have to be "on" every day. As a mixer, you're never allowed to have a bad day.

That's right. I have to perform every day.

What inspires you? How do you keep going?

Well, I'm not unlike other people. I wake up in the morning some days and I don't want to go to work. I come into the studio some mornings in a bad mood. But as soon as I walk through the control room door, that's it. I've got to put myself in the frame of mind to be creative, and any problems that I've had before that need to just go away. Because, really, how can you not love coming in here and doing this work? I miss it when I take a vacation. I get to work with great musicians, great bands and great songs. That's how I'm able to do it. What better job is there for somebody who's creative in music but isn't a musician? This is my only creative outlet. The SSL is my instrument, and I just treat every song like it's the one that everybody is going to hear. ■

Maureen Droney is Mix's Los Angeles editor.



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INTERNATIONAL UPDATE

—FROM PAGE 118, MICHMUSIC AWARDS

A one-hour break for supper, a quick line check of the opening band's setup, and we were ready. We went live on air nationwide at 8 p.m. Blur opened the show with an energetic version of "Song 2," and the kids in the parking lot went crazy.

On a multiband show like this, since we don't have snapshot recall on the Neotek, I record the dress rehearsal on 40 tracks of DA-88 (one mic per track), keeping the mic input levels constant and only adjusting the monitor faders to create the broadcast mix for each band. During the show, I put up the dress rehearsal tape while the stage crew changes over the band gear and rebuild my monitor mix, including levels, panning and effects, using the multitrack. That way, I only have to document EQ

changes. Hey, it's cheaper than a Neve Capricorn! The show went off without a hitch, mainly due to the good planning and professional attitude of both the TV personnel and the various band crews.

Next year, the show will be broadcast in surround sound. We are currently outfitting the LiveWire mobile with a 5.1 system using all Genelec speakers. Because we are not the last console in the chain, the five tracks will be sent discrete to the master audio control room, where additional elements will be added to the mix before surround encoding. If you think you're going to have problems setting up five speakers in your studio control room, try installing them in a truck! Oh well, that's the remote business. ■

Doug McClement is the owner/operator of LiveWire Remote Recorders, based in Toronto, Ontario.

—FROM PAGE 114, JAMES KEELAGHAN

allow all of the players to see each other. "The place is really well put together," Champagne says, "and there's really strong studio assistance. I had Rod Michaels assisting me on those sessions, and I can't say enough about him. Rod was fantastic as far as knowing the room and the technical aspects of where to go to get what on the patchbay for the console, getting music copied and distributed, you name it."

Champagne and Pennington recorded bed tracks first (bass, drums and some guitar) and overdubbed the rest of the instruments and vocals. They recorded to an MCI 2-inch machine at 30 ips, using the studio's rack of three UREI 1176 compressors and the API's EQ. "I'm not crazy about the fact that the EQ notches in," Champagne says, "but it has outboard patchable 4-band parametric EQ also, so I used that on the kick and snare and bass, for example, where I wanted to EQ strongly."

An AKG C-414, pointed down at the guitar, was used to record Keelaghan because the artist sings while he plays: "We tried to mike him in such a fashion that the vocal would not get into the guitar mic," Champagne says. "It's a bit tricky, but we managed to do it with mic placement and the narrow hypercardioid pattern of the microphone. The vo-

cals were always redone afterward, with a [Neumann] U47 mic."

On the other string instruments, Champagne used "the highest-quality condenser microphones that were there. I'm a big fan of the [Neumann] U87A, and KM184s are excellent. I remember also using the KM184s on the concertina, which is, of course, a chromatic instrument. We kind of cheated in that we made it super-stereo by putting two microphones on each side, at a bit of a distance. We thought it was neat to play with that a bit, even though you wouldn't get that kind of super-stereo image in a concert situation." Drums were captured with an EV RE20 on kick, Shure SM57s top and bottom on snare, SM81 on hi-hat, Sennheiser MD409s on tom-toms and two Neumann KM184s overhead.

Champagne and Pennington will be hooking up with Keelaghan again in the spring to record the artist's next release. Meanwhile, the pair continue to work together on extracurricular projects, which Champagne says he truly enjoys. "I think Don is one of the best producers around," he says. "He's a musician himself, so he understands the way musicians work. On *A Recent Future*, he co-wrote three of the songs, so he's obviously a big part of the creative energy that's all around this album." ■

—FROM PAGE 179, DOLBY SURROUND TOOLS

around the four quadrants, and the output can be configured for LCRS, if desired. The Game Mode Plug-In is quite exotic, as it claims to allow sound to be positioned with a joystick, for example. (I was unable to verify this claim, as I did not test the module.) Of course, the target system (video game, CD-ROM, etc.) must support Dolby Surround Game Mode for the process to work.

ON TEST

For this review, Surround Tools was compared to both the SEU4 and SDU4 at Ultrasonic Digital in New Orleans; Surround Tools matched both products transparently.

The provided Surround Templates make the process of starting your session virtually foolproof. Setup was very easy, and alignment "caret" marks on the meters make it very easy to set up levels—the software is considerably less "twitchy" than the pots on the SDU4, which are so sensitive that it sometimes seems that levels will change if you blow on them.

One note of caution: The nominal 0VU reference level in Surround Tools is indicated at -20 dBFS. Unfortunately, the current Digidesign 888 audio interface cannot be used at that level; there simply is not enough range in the input and output trim controls, which only go as far as -18. While this does not seriously hinder the integration of Dolby Surround Tools in a mixing studio, it can present obstacles when seeking the holy path of unity gain during print mastering. Let's hope that Digidesign corrects this problem with the new 888/24 interface.

The Dolby Surround Tools manual is simply superb and lays out the hows and whys of matrix encoding and decoding very clearly. Some might argue that it is *too* clear, since there is a lot of repetition of both important and not-so-important points. My opinion is that the repetition is called for; most users of Surround Tools undoubtedly will be matrix encoding/decoding virgins who will need some hand-holding. (After all, some of us had to have drop-frame timecode explained ten times.)

One point made clear in the manual is that to record in the center with professional 4:2:4 encoding/decoding, you have to disabuse yourself of the notion that center *equals* "panned to the center." Also described in detail are the issues involved in setting up a mix

room for surround.

The Mixing Techniques section in the Appendix is quite good, though I would strongly advise users to disregard the paragraph titled Stacking Encoded Tracks, which describes the practice of premixing to multiple surround-encoded Lt-Rt elements. Never! (Dolby, indeed doesn't recommend encoding at this point in the film post sound process, although they note that it is commonly done in television. Nonetheless, I feel strongly that 5.1 mixes for standard TV programs are just around the corner, and all master stems recorded today should contain separate, discrete center-channel information.)

The only use I can see for this feature is on temp dubs, where you are short of mix stage time and perhaps even recorder tracks, which would allow you to record separate surround channels for dialog, music and effects stems. Thus the left-right tracks of each stem actually contain matrix-encoded information that required no extra mixing time to create because the encoding had been done during editing.

Surround Tools can also be a big cost- and time-saving device in the temp dub/previewing process by making it possible to create print masters in an edit room. (Danger, Will Robinson! I'm assuming that you do your first mix on a standard mixing stage with calibrated monitors. What follows applies to subsequent mixes.) Let's say that for a stereo temp dub you're recording 8-track stems as follows: two channels of dialog, LCR music and LCR effects. A 2-track print master is then made for screening purposes, and the stems are loaded back into Pro Tools to be conformed to picture changes, with additional sweetener elements cut as necessary.

As long as the 0VU stem tones are copied into the Pro Tools session to be conformed, it will be easy to create a new print master onto DTRS (for example) that can be noise reduction-encoded during the transfer to 35mm mag in preparation for the next screening. The limitation to this procedure is that it assumes that only minimal "mixing" needs to be done to the original stems, which would make it possible for Pro Tools automation to control levels, or that an external Pro Tools control surface (such as Mackie's HUD) is available. Also, one would have to take care to create a new set of updated stems in addition to the composite print master.

Surround Tools will be especially useful when the dream of Pro Tools users is finally realized: recording stems

onto a digital dubber and then booting the disk up in a Pro Tools system without any sort of conversion. In this scenario, the stems for a film can play back through Pro Tools on their way to being matrix-encoded and can be recorded digitally either within Pro Tools or to an external recorder such as timecode DAT, DTRS or another digital dubber. Simultaneous mixes should become even easier when Dolby licenses the digital encoding technology to digital console manufacturers.

The multiple simultaneous encoders available within the Surround Encoder plug-in can also be used to create matrix-encoded stems (from original LCRS stems) while making a standard composite print master. These elements are especially useful for creating radio and TV ads, for which 2-track stereo is the norm. Without Surround Tools, you generally have to bring in a series of SEU4 encoders and elaborately patch them in; with Surround Tools, the process can be performed almost automatically.

Of course, this whole process changes completely if one is making a print master for theatrical release; not only do you have to go into the analog world to NR-encode the print master, but the monitoring path has to include some sort of optical track simulation. With all of this in mind, Dolby requires that you use either the Dolby DS4 or an SEU4/SDU4 combination in conjunction with the new SPU4 unit, which provides additional functions needed for theatrical print mastering. (Let's not forget to mention that you also need to pay Dolby a license and trademark fee in order to have access to the DS4 and SPU4, neither of which is sold.)

Surround Tools is an essential purchase for anyone who uses Pro Tools on a mixing stage, or for serious sound effects creation, where both the 4:2:4 matrix simulation and automated surround panning can come in handy. The software is really easy to use, and even the least film-sound-savvy mixers will feel comfortable. After all, this is the same matrix-encoding technology that has found its way into millions of homes via Dolby Pro Logic decoding.

Dolby Laboratories Inc., 100 Potrero Avenue, San Francisco, CA 94013; 415/558-0200; www.dolby.com. ■

Larry Blake is a sound editor/recording mixer who writes the monthly Sound for Film column in Mix. This month's column deals with issues involved in print mastering of films today.


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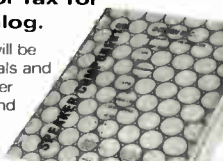


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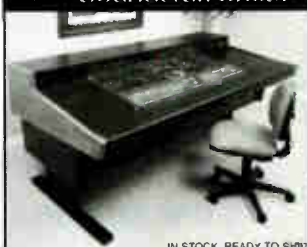
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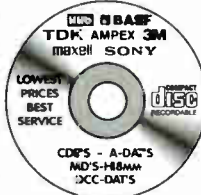
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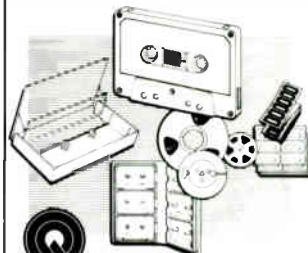
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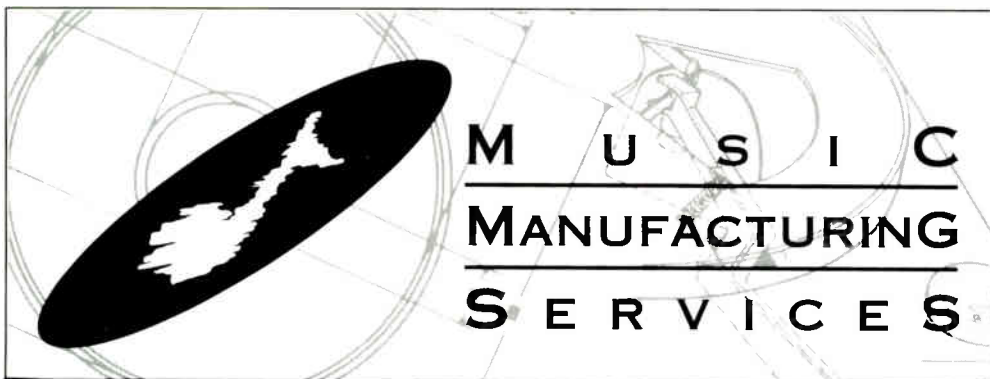
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—FROM PAGE 163, *THE EARWITNESS PROJECT* marked, “the ultimate pianist.” Why, Fostle wondered, would Hofmann express enthusiasm about reproducing pianos when subsequent generations thought they were junk? Why would the era’s most prominent artists record rolls and advocate the system if it were junk? As these recordings reveal, reproducing pianos are, in fact, extraordinary devices that enable past performances and dead pianists to live again. Their reputation as junk comes from the almost insurmountable difficulty in properly restoring and operating them. As Fostle points out, a classic sports car is unlikely to run smoothly without proper restoration and servicing.

To be sure, there are clues that the piano is machine- rather than hand-operated. Occasionally, you hear the roll gliding over the tracker bar. There are moments of staircased dynamics and stilted phrases. You do not hear the tiny imperfections that we associate with live



Recording engineer Jerry Bruck (left) and executive producer Don Fostle recorded in a small chapel at Centenary College in rural N.J.

performances. And some rolls are better than others, with faster pieces generally more convincing than slower

ones. Furthermore, there are few moments of genuine *pianissimo*. Perhaps the pianists had acclimated to the dynamics required to carry their music to the back of halls or the 30dB S/N ratios of their analog recordings.

However, just as we suspend our disbelief when we watch the computer-generated dinosaurs in *Jurassic Park*, it is easy to suspend disbelief and get sucked into the fantastic world of these recordings. You feel as if you were there, an Earwitness to Prokofiev playing Prokofiev, Grieg playing Grieg, Paderewski playing Paderewski, and Stravinsky playing Stravinsky. Imagine that: a superb digital recording of Stravinsky, one of the greatest composers of all time, performing a section of *Firebird*, one of his most celebrated works! In My Humble Opinion (to co-opt cyberspeak’s most disingenuous phrase), anyone who can listen to these CDs and not get goose bumps isn’t breathing!

Currently, two two-CD sets have been produced from the 26 hours of recorded material. One, entitled *Critic’s Choice*, represents Harold Schonberg’s favorites. The other, entitled *Earwitness Transcriptions*, is a beautifully-packaged set of many familiar selections chosen by the team at Madrigal Audio Labs. At \$29.95 each, both sets are available at Madrigal Audio Labs dealers and at www.madrigal.com. ■

Working in a variety of styles and media, Arthur Bloom is a composer, producer and, from time to time, doctoral candidate at Yale University. He can be flamed at ArthurBloom@compuserve.com.

—FROM PAGE 161, *SPHERE WITH EARS*

suades the listener that the recording occurred in an actual place during playback on loudspeakers.

However, there were a few problems using the stock 8-inch KFM 6U to record the piano. If the microphone was too close to the piano, the left and right channel “split,” leaving a hole in the middle. At too great a distance, reverberant sounds were overpowering. Also, when the microphone’s signal was played back on two speakers, the practical recording angle from the center of the microphone was limited to about 95 degrees, with sounds beyond 95 degrees clumped to the sides. Also, Fostle felt that the KFM 6U’s compensatory equalization was excessively bright.

Therefore, Bruck redesigned the KFM 6U, reducing the diameter from eight to seven inches. At Fostle’s direction, the “minisphere” was fashioned out of laminated black walnut in order to create a more inert baffle. Reducing the size increased the recording angle to about 120 degrees. More importantly, at seven inches, the sphere could be positioned close enough to the piano to achieve an optimum relationship between direct and reverberant sound without opening a hole between the left and right sides.

A significant modification Bruck had developed for the KFM 6U that was incorporated into the minisphere was the attachment of two bidirectional pickups, resembling ears, next to the omnis. For 4-channel surround sound, signals from each side of the modified sphere are decoded through an M/S matrix with the omni as M and the figure-8 as S. Since the decoded signals represent front and back rather than left and right, the overall left and right channels are each comprised of a set of front and back signals: Left (front + back) and Right (front + back). Adjusting the relative volumes of the front and back signals “steers” the microphone through the sound field, pulling the sound closer or pushing it away, altering the relationship between presence and ambience. Since the sphere-with-ears’ 4-channel format can be mixed to two or four channels, Fostle and Bruck did both; of the two digital chains, one was optimized for mastering in two channels, the other for four. For the 2-channel master, the figure-8s were subtly mixed in 35 dB below the omnis.

Schoeps microphones are available from Jerry Bruck at Posthorn Recordings. Call 212/242-3737 or e-mail jbruck@tiac.net.

—Arthur Bloom

DIGIDESIGN PRO TOOLS

SHORTCUTS TO SPEED UP YOUR SESSION

Editors' Note: This month marks the debut of our new Power Tools column, featuring user-to-user tips for getting the most out of your gear. To start us off, Dave Whittaker shares some tips he and his colleagues at Weddington Productions in North Hollywood have collected over the years for optimizing Pro Tools sessions.

Working Tracks: It's safest to do all dialog, effects and music editing in a dedicated set of "working tracks." Place these tracks at the top of the screen—when each chunk of work is complete, move it down to the track where it will play later at the mix. Then you'll never accidentally move or damage finished work that's down the timeline. With Foley, it's okay to edit within the final tracks, but *never, ever* use Shuffle mode when editing this way.

Memory Locator as a Zoom Controller: Three or four zoom settings cover most needs; these can be preset in the Version 4.x Memory Locations window (found in the Display menu) or the Version 3.x Autolocator. Assign each favorite setting to a Locator number; de-select the default Current Time/Selection box and select the Zoom Settings box instead—give each one a name like 10sec zoom, 5sec zoom, etc. Access them quickly by typing the setting's number and a period on the numeric keypad.

Get Around Fast: Press the Down arrow key. Your insertion point will drop at incoming timecode and its location appears in the Current Location Counter at the top. If the insertion point is out of the Edit window, hit the Left or Right Arrow—the session shifts to place this new location in the middle of the Edit window. Type a desired location directly into the Current Location Counter and hit Return to take you right there, no Left/Right arrows needed.

Volume Graphing: Using Pro Tools' precise volume automation, I've salvaged dialog cluttered with

clunks and bangs, and boosted mumbled syllables and consonants. But keep all volume graphing "breakpoints" (those tiny circles in the automation line) within a region boundary. If you don't, the volume change point lives within the timeline, not the region you wish to affect. Don't expect Pro Tools to move any volume-graphing from one track or location to another unless all the breakpoints are *inside* a region boundary—it can't read your mind (yet).

To volume graph an entire region, or group of adjoining regions, select them all (double-click with the Selector if in Volume mode), switch to the Trim tool, and click and drag up or down on the volume line. This creates breakpoints exactly inside each end of the region.

Your Pal, the Option Key: Hold Option and drag the Zoom tool across a region to change the time axis *only*, while leaving the amplitude unchanged. This is particularly useful when working in reduced track height, as the range of useful amplitude settings is narrower.

Hold Option and click on any Display Scale arrow to return the zoom scaling to its prior orientation. Subsequent clicks while holding Option down toggles the zoom setting back and forth.

Hold Option, click on the Zoom tool and a selection fills the entire window (very cool!).

Your Other Pal, the Control Key: Press Control, click on a region with the Grabber and it moves so its start lines up wherever the insertion point is parked. Hold Control down while you drag and drop regions from the region list onto the edit window and they'll snap right to the insertion point.

When a region is selected, Pro Tools considers the beginning of that region as the insertion point, so click with the Grabber on another region while pressing Control and



The Memory Locator window can store zoom settings.

the *second* region lines up with the first. This is great for dropping multiple regions that must play simultaneously—i.e., gunshot sweeteners. It also quickly restores an accurate phase relationship to two halves of a stereo pair when one side's region has been inadvertently bumped out of sync.

Hold Control as you nudge a region with the + or - keys: The audio file slips forward or backward *inside* the region boundaries.

Audio Importing: To quickly jump around within an audio file you're auditioning in the Import window, click on the numbers displaying your location within the audio file (directly above the Play and Stop buttons). Click near the left side of the numbers and you'll move forward just a bit, click over to the right and you'll move a lot more.


In System 7.x, you can "batch import" several audio files at once. With your session open, switch to the Finder, and drag and drop the desired files onto the Pro Tools application icon (or desktop alias). Your Pro Tools session re-appears and the files will load into the Audio Region list.

Try these out! I hope that these ideas are as useful to you as they have been for me and my colleagues. ■

A writer for the Motion Picture Editor's Guild Newsletter and a 1997 Oscar nominee for Daylight, Dave Whittaker is currently supervising Sour Grapes.

BY DAVE WHITTAKER

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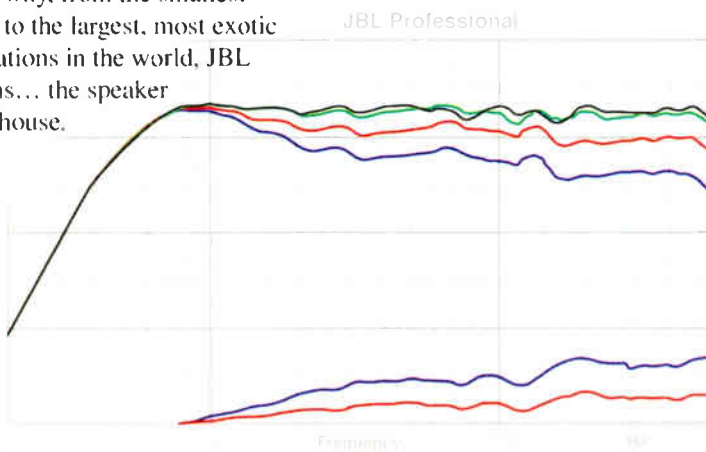
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