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& SOUND

FEBRUARY • 2000

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**Hot House
Four
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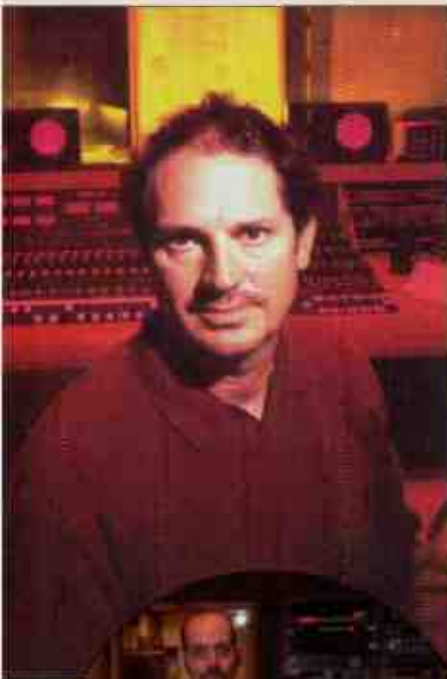


JUST LISTEN.

CIRCLE 05 ON FREE INFO CARD

EQ

PROJECT RECORDING
& SOUND TECHNIQUES
VOLUME 11, ISSUE 2
FEBRUARY 2000



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ON THE COVER:
*Jason Miles by
 Eleonora Alberto*

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The Project Studio Revolution: Chapter Two

Ten years ago, when Paul Gallo and I first developed a strategy for a magazine that would serve the information needs of the nascent project studio marketplace, we were addressing an audience that even the most respected professionals considered to be members of the lunatic fringe. We were privileged to take over *EQ* from the GPI Group, the respected publisher of *Guitar Player* and *Keyboard* magazines, and carefully positioned its editorial for that new generation of creative recordists.

At the time, the very concept of empowering engineers, producers, and musicians with the tools that allowed them to record their music in their own personal production environments was radical, if not downright heretical. That first generation of project studio owners cobbled together their equipment, fought legal battles with commercial studios, and embraced *EQ* as a creative tool.

The studio world has changed, and *EQ* has clearly changed with it. The lunatic fringe has become mainstream. A forthcoming *EQ* reader survey reveals that those project recording revolutionaries have long since changed the way music is being made and recorded. They now represent the most powerful and largest buying force in the business. Meanwhile, their studios have evolved into the most sophisticated around, and their careers now account for most of the more successful album titles, film scores, video games, DVD soundtracks, and concerts being produced.

We could sit back and enjoy the fruits of our labors, but that's simply not *EQ*'s style. It is once again time for *EQ* to lead its market. And, as we enter the second decade of the project studio revolution, we are ready to take our readership to a new period of information delivery. Expect to see several significant changes over the coming months that will herald a new era for the magazine and for project recording.

This job requires a new perspective, and, for this reason, I am pleased to hand over the reins of *EQ* to its new editor, Mitch Gallagher, former senior technical editor of *Keyboard* magazine who has a clear vision for where this market is going, what products will take us there, and how *EQ* will continue to lead our industry in the right direction. Coincidentally, ten years later, Mitch joins us from GPI and *Keyboard*, which is now officially our sister publication as part of a recent merger of the world's finest musician titles with our own network of expert pro audio titles (*EQ*, *Pro Sound News*, *Surround Professional*). This publishing powerhouse now represents over 400,000 monthly readers who include the most respected creators and producers of music and sound in the world.

Together, our unique network of titles are readying themselves for an entirely new era in publishing and information delivery. As you read in last month's News section, we are now coding over 85 years worth of content to create the MusicPlayersNetwork — a super site and Web community for musicians (www.musicplayersnetwork.com) that will provide instant access to the collective archives of *Guitar Player*, *Keyboard*, *Bass Player*, *EQ*, *Gig*, and a range of respected affiliates — as well as fresh content, buying advice, downloads, forums, training, and virtually everything you'll need to make better music. The site is being hosted and directed by long-time *EQ* columnist and online music site pioneer Craig Anderton. Other Web happenings will surely characterize the way that *EQ* itself evolves under Mitch Gallagher's direction. The introduction of the new Roger Nichols Digital Recording Forum on the *EQ* site is the first of many exclusive online expert information resources that we will be providing in order to expand the reach of *EQ*'s columnists and contributors to a broadening international audience of project recordists. Roger will soon be joined by a host of contributors who have helped take *EQ* to its position of leadership over the past ten years, as well as newer names who are ready and eager to help you change with the new technology times. Make sure to visit Roger online at www.eqmag.com.

For those readers who are just joining in — welcome aboard. To those tens of thousands of dedicated *EQ* readers who have participated in the project studio revolution, get ready — the train has just left the station and the trip has only just begun.

—Martin Porter, Publishing Director

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UNDERCOVER COVERS

I agree with the letter from Steven Durr of Nashville, TN [Dec. '99]. For me, several of the *EQ* magazine covers were not appropriate for a professional office. Therefore, I am forced to hide these issues.

I am sure this is just what you want!

I have a problem with "cutesy" magazine covers and do not like feeling that I must hide the magazine from people who might think ill of me if they saw this in my studio.

Don Johnson
via Internet

WHAT'S IN A WORD

In regards to the published letter from Steven Durr [Dec. '99]: As a Nashville musician/engineer/studio builder, I find Steven's complaint of the use of the word "sl*t" (as in "Gear Sl*t") in this — and all audio magazines — as a perfect example of the elitist attitude take-over that has befallen the creative community in and around Nashville. This attitude seems to emanate from the pseudo-sophisticated towns just south of Nashville and their country-club set made up of CEOs, doctors, lawyers, car dealership owners, and studio designers. They seem to want it *all* — including control over the vocabulary.

One of the things that makes this magazine top-class is its ability to hire geniuses like Roger Nichols, Martin Polon, Steve La Cerra, Mike Sokol, Craig Anderton, and all of the others whose so-called genius isn't *only* their aptitude in their respective fields, but also in their ability and willingness to share their knowledge with others.

My point is that Steven and others like him should have respect for the sense of humor that can keep intensity less tense.

Hayward Bishop
Nashville, TN

INSPIRATIONAL WRITING

The article on the ten best recordings and AI's 100 picks [Dec. '99] was most interesting. I only wish AI would have included his opinions on the albums that he produced or co-produced, as some of these were quite popular and good. In any event, my compliments on a job well done in retrieving the history of the ten best recordings. In fact, reading this, as well as AI's column, did

prompt me into going to the local music store and purchase a few discs. And with my new DAC (Bel Canto with 96 kHz upconverter built in), I finally can enjoy sounds from CDs — still not quite a match for the sound from my LP system, but very close nevertheless.

Neal
via Internet

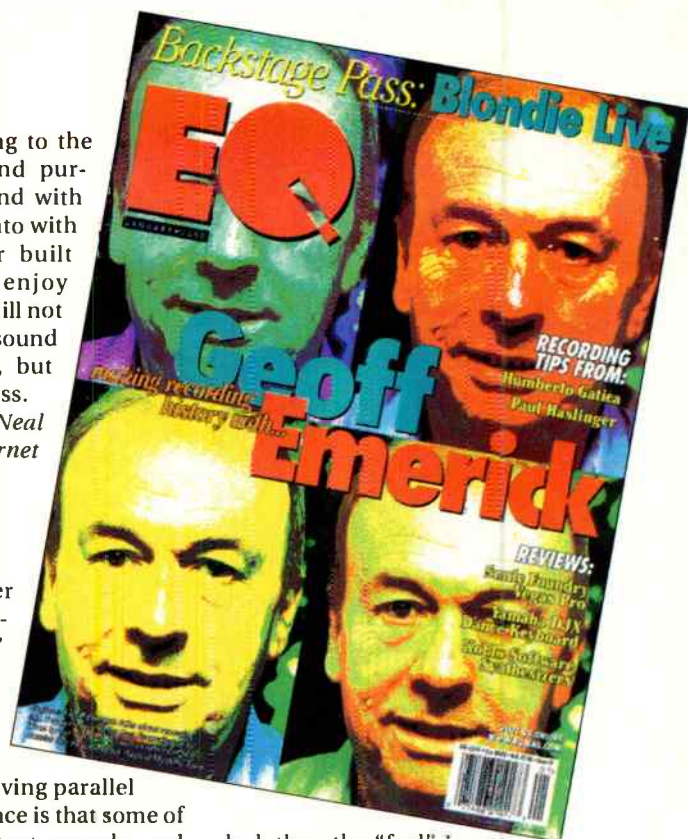
DIGITAL DEJECTED

I just finished Roger Nichols's article entitled "Am I Done Yet?" in the January 2000 issue. I think all of us who have gone to the digital hard-disk recording realm are living parallel lives. The only difference is that some of us can afford the constant upgrades and some of us can't.

October 1998, my studio goes digital. I spend thousands of dollars to get as close to cutting edge as I can get. The learning curve with all of this digital gear has been interesting. I think that I have learned about half the capabilities of my software, and I don't have hours upon hours to learn the balance because of the constant flow of customer demand. In the meantime, there has been two upgrades to my software. The upgrades look great, but by the time I am able to afford them, the company may have merged with another or be out of business altogether. Plus, I don't think I will ever learn everything I could do with what I have.

My biggest complaint about digital is that, no matter how much I tweak, I still have problems making mixes where there is sparkle or that make me want to listen more than once or twice. Some problems I have noticed is what happens as music gets encoded. It seems to lose some character or gain character that you never heard while you were mixing.

I spent a lot of time recording and producing in the mid-sized studios around L.A. back in the '80s and early '90s. It seemed like all one needed was a good song and good musicians, and you could walk in, bias the 16- or 24-track, and get better results on a TASCAM 16-track with a Soundcraft



desk than the "feel" I am getting now with my pile of digital gear. Eventually, I think that I will understand how to get the most out of my digital gear, but by that time I will be another ten years older and have spent a mint on analog gear to make the digital stuff sound right.

I love my digital gear better than my old Portastudio™, but is it going to create the magic I got by just going in and laying tracks all day with a decent engineer into the midnight hour? I better not answer "no," since I am thousands of dollars into my quest for pristine digital. So I will forge ahead with most of the other readers of this publication.

Brad Hardisty
AOA Audio
Hamilton, MO

WRITE TO US

Got something you want to get off your chest? We want to hear about it. Send your thought-provoking letters to:
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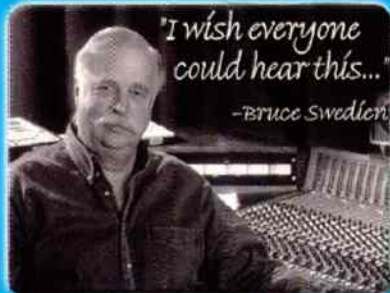


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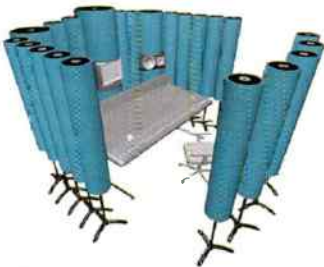
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 Count Basie Quincy Jones Edgar Winter
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CIRCLE 1 ON FREE INFO CARD

pickups make the difference) so I can play CD-Rs on my DVD player and have a digital output.

The real question is: How practical is it to make these AC3 disks?

1. Putting two sound cards in a PC is cheap (shouldn't be over \$30 for another card).

2. How can I record from both sound cards (keeping sync) without spending \$400 on a software package like Cool Edit Pro. I've only got about 20 hours of this music, so keeping costs down is essential.

3. Once I've got four channels (presumably two 2-channel WAV files), is there a less expensive way than Soft Encode to produce an AC3-formatted WAV file. I know Soft Encode may be remarkable for \$999, but to do only 20 hours of music, it is pretty expensive per minute.

Basically, what I am looking for is to find out if this is possible and, if so, is there a way to cut costs. I've got the CD-R burner and enough disk space and CPU power, but don't relish spending nearly \$1500 (mostly on software) to get just 20 CD-AC3 disks.

Peter Neumann

METOC Technology Division
 Planning Systems Inc.
 McLean, VA

A Converting "quad" to CD-AC3 discs should be pretty straightforward as long as you have the right equipment. The answer to questions #1 and #2 is this: Dual sound cards in a PC might work, but the results are going to be pretty inconsistent unless you have identical cards. Even then, without a way for both cards to listen to a common "house" clock, there's a real chance of drift between the two pair of channels. The proper way to get four channels into a computer in perfect sync is to get a sound card made for that task. In the last year, I've reviewed gear from Aardvark, Event Electronics, Frontier, and Yamaha that would easily do the job. I think that Event Electronics even makes a card with just four analog inputs, which is exactly what you need.

After that, you need a Dolby Digital codec to encode your 4.0 channels of music into a red-book AC3 WAV file. But finding an AC3 encoder for a lot less than \$1000 retail may be tough. It's that high because of the Dolby licensing deal with the software suppliers. Sonic Foundry is marketing Soft Encode and

Minnetonka Audio is selling a similar product called SurCode, both of which perform the AC3 encode function. Each application retails for around \$1000, but check for the best discount price.

From your perspective of a one-time project, this is a lot of money, but the software AC3 encoder replaces nearly \$10k of hardware that was previously the only way to do the deed. The alternative to Dolby Digital AC3 is Digital Theater Surround (a.k.a. DTS), but up to a few months ago all DTS projects had to be sent to the "factory" to be encoded. Now DTS encoding can be done in your own workstation with Minnetonka's SurCode DTS. Again, this isn't exactly pocket change, since a software DTS encoder lists at \$2000.

And it's not that the software application is that complex or difficult. In fact, SurCode DTS is almost point-and-shoot kind of encoding, while Dolby Digital is more complex since it's designed as a universal codec for not only music, but television and DVD discs as well.

Once you have your separate quad files (or, if you're mixing for 5.1 surround, six files) it's a matter of tossing them into the codec, picking a few choices, and letting your computer chomp on the bits. Then you burn a Red Book CD-R of the resulting file, and *voila* — you're in quad or 5.1 surround.

Lather, rinse, repeat...

For more info, check out these Web sites:

www.soundav.com/link46.html for my article on making CD-AC3 discs. This is where my adventures in encoding Dolby Digital began.

www.minnetonkaaudio.com for Minnetonka Audio SurCode available in both Dolby Digital AC-3 and DTS flavors. While you're there, check out their downloadable demo of MX51, an application that allows you to mix multitrack audio to 5.1 surround using a motorized joystick. It's like playing a big video game, but you're actually doing something productive. What a blast!

www.sonicfoundry.com/index.html for Sonic Foundry's Soft Encode for Dolby Digital AC3. Yes, in addition to Sound Forge and all their great ACID stuff, they were the first to sell a Dolby Digital software encoder. Have fun on your "quad" adventure.

Mike Sokol
 JMS Productions Inc.
 jmsokol@intrepid.net
 www.soundav.com

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lexicon PreDelay 30ms B1 R6: Large Church

BANK	CATEGORY	F	REORDER	ROUTED	PROFIL STATUS
1	Halls	0	Large Hall	0	Small Church
2	Rooms	1	Large + Stage	1	Large Church
3	Wind Spaces	2	Medium Hall	2	Small Church
4	Plates	3	Medium + Stage	3	Jazz Hall
5	Chambers	4	Small Hall	4	Auto Park

The program in the Hall's bank reverb/ambience programs designed to simulate real concert halls.

Large Church is a big space with the reverb/ambience mostly localized with a comparatively long RT60.

Mix: 100% Ambience: 2.00 Scan: 33M Inst: 4.04s Reverb: 2.523 Diffusion: 30 PreDelay: 30ms RPreDelay: 60ms

REGISTERS	NAME	INFO	OPTIONS
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The New 960L Multi-channel Digital Effects System



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World Radio History

EQ NEWS

FEBRUARY • 2000

Mitchell Gallagher Named Editor of *EQ* Magazine, Nichols Hosts *EQ* Online

This month's edition of *EQ* News actually features literal *EQ* news — with two major announcements from your favorite magazine. First off, we'd like to welcome Mitch Gallagher as editor of *EQ* magazine. Gallagher was formerly the senior technical editor of *EQ*'s sister publication, *Keyboard*.

"I've been a reader of *EQ* magazine since issue one, and I'm thrilled at the opportunity to help guide the magazine as it launches into its second decade of life," says Gallagher. "The past 10 years have seen explosive changes in the dynamic of the recording world with the advent of the project studio. *EQ* has been there from the beginning, holding

a strong position as the leading source of information for project studio owners and recording engineers. My goal as editor is to build on that leadership position, making the magazine an even more indispensable resource for our readership and the industry."

"We're very excited to have Mitch take over the reins at *EQ* and to be able to have this transition of talent within our family of magazines," says Miller Freeman PSN senior vice president/publishing director Martin Porter. "He is the perfect candidate to take *EQ* into the new millennium, with fresh ideas and great direction."

An award-winning composer, Gal-

lagher has served as a project studio owner/operator and a freelance audio engineer, and is an active MIDI/pro audio consultant through his company, MAG Media Productions, providing audio recording/mastering and multimedia/CD-ROM authoring services to a variety of clients. He studied electrical engineering and computer science at North Dakota State University, received a Bachelor of Arts in Music at Moorhead State, and continued his graduate studies in classical guitar, electronic music, and composition at the University of Missouri, Kansas City.

Gallagher will be joining *EQ*'s regular crew, including contributors such as Craig Anderton, Al Kooper, and Roger Nichols, as well as managing editor Anthony Savona.

NICHOLS CONDUCTS DAILY DIGITAL AUDIO RECORDING FORUM

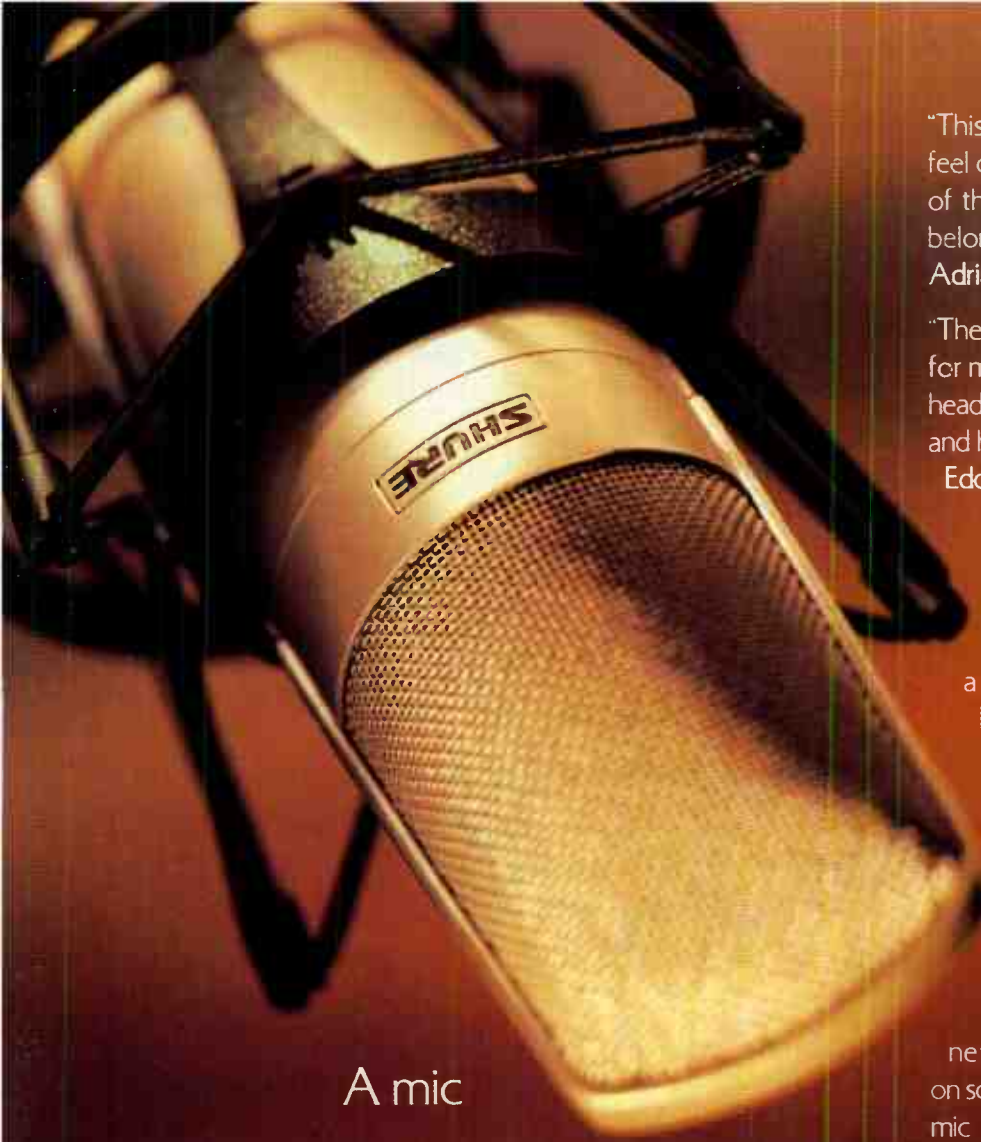
Grammy Award-winning engineer/producer and longtime *EQ* columnist Roger Nichols will now conduct an exclusive daily "Digital Audio Recording Forum" at www.eqmag.com.

"Clearly, we are moving into a more integrated mode of communication as an industry," says Nichols, who has written for *EQ* since its inception. "The fact that *EQ* Online has seized the opportunity to assist its readers on vital technical issues on a daily basis, is a project I am thrilled to be a part of. As *EQ* magazine increases its online presence and enters this exciting new phase in its development, the project recordists worldwide will now be able to turn to its information source of choice through the interactive daily online forum."

"We are taking a more Web-centric approach to many of our magazines, including *EQ*," says Miller Freeman PSN senior vice president/publishing director Martin Porter. "In this day and age of instant information online, print magazines have to rethink their roles. We recognize the times are changing, and we're the first to change with them. Magazines such as *EQ* are more valuable than ever in the Internet age, but they must emphasize their strengths. While *EQ* magazine will remain authoritative and highly visual, *EQ* Online will offer, with the contributions of industry-recognized experts such as Roger Nichols, same-day responses to many pressing questions. From here on out you cannot separate *EQ* the magazine from www.eqmag.com the Web site."

The screenshot shows a Netscape browser window displaying the EQ Community Board. The page title is "EQ Community Board" and the URL is "http://www.eqmag.com/cgi-bin/forumdisplay.cgi?act=topics&forum=Roger+Nichols+ProTools+Digital+Audio+forum&number=13". The forum is titled "BOARD PROJECT STUDIO POSTINGS" and is moderated by Roger Nichols. A table lists various topics with columns for Topic, Topic Starter, Replies, and Last Post.

Topic	Topic Starter	Replies	Last Post
DBB to Lexi 81	Armando Diaz	2	01-20-2000 07:31 AM
tascam DA-38's / Cubase VST / Protools	Jan Pronk	2	01-20-2000 03:41 AM
Opacity of CD blanks?	Chip McDonald	1	01-19-2000 10:05 PM
Mike Sokol's Recipe for Success?	valentin	1	01-19-2000 09:45 PM
Used Mics	Joe Moon	2	01-19-2000 10:54 AM
Monitors	DiDiamond	2	01-19-2000 08:30 AM
May the Circle of Light remain unbroken	David Kempton	6	01-15-2000 09:28 PM
Hard Disk Storage	Brad Moon	2	01-14-2000 12:09 AM
Bit rate output	amerio stefano	1	01-13-2000 08:57 PM
My studio set up	amerio stefano	0	01-13-2000 04:46 PM
Tell Me Your Setup	Roger Nichols	0	01-13-2000 09:40 AM
Thanks Mr. Nichols	amerio stefano	0	01-13-2000 06:52 AM
bugs in for PT	amerio stefano	1	01-12-2000 09:20 PM
Digital Out	DiDiamond	4	01-10-2000 10:52 AM



A mic
so sensitive,
it even picks up
compliments.

"This microphone has the sound, look and feel of the classic vintage models at a fraction of the price. I'm convinced that the KSM32 belongs in any studio."

Adrian Belew

"The KSM32 is becoming my mic of choice for many applications including vocals, overhead drums and bass cabinet. The accessories and hardware are brilliantly executed."

Eddie Kramer

"In the price performance ratings, I would give the KSM32 a solid 10. For what you were planning on spending for a single microphone you can have a pair of KSM32s."

Roger Nichols

"The transparency and apparent depth of field is incredible. In the future the KSM32 will be an increasingly larger part of my microphone arsenal."

John Cooper

"In my 35-year recording career, I've never come across a mic that works so well on so many instruments. If you are looking for a mic that is accurate, uncolored, pristine, dead quiet and doesn't cost much, you may want to own several KSM32s. I just ordered a dozen."

Tom Jung

"I've been using the KSM32 on vocals and acoustic guitars...it maintains the warmth and roundness of the Shure dynamics while adding the hue and shimmer of the best condensers."

Don Was

"The KSM32 is absolutely one of my all time favorite mics."

Bob Whyley



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TOA Talks Tech in The Tool Box

TOA Electronics, Inc. has launched *The ToolBox*, a new technical newsletter. Solutions to technical problems and challenges, technical spotlights, detailed product articles, and useful TOA product tips are just some of the topics featured in this quarterly digest.

"Readers won't find any hype or fluff in *The Toolbox*," says Jeff Pallin, vice pres-

ident of TOA. "The sole focus of the newsletter is to provide practical, useful, and current TOA technical information to audio technicians such as engineers, service managers, and installation techs."

Those interested in receiving a copy of *The ToolBox* can download it from the TOA Web site at www.toaelectronics.com. Or call 800-733-7088.

BitHeadz' Steve Reid's Global Percussion Sound Module Ships

BitHeadz, Inc. announces that the newest addition to its virtual instrument collection, *Steve Reid's Global Percussion*, is now shipping. BitHeadz has partnered with world-renowned percussionist Steve Reid to combine samples of his vast world percussion instrument collection with the Unity DS-1 playback engine.

Steve Reid's Global Percussion contains samples of exotic percussion instruments from all over the world. No additional hardware is required to play these sounds, thanks to BitHeadz' Unity DS-1 Digital Sampler Engine, which installs on your Mac or PC along with the sample data. You can trigger the samples in real-time from any MIDI keyboard, or incorporate the instruments into your MIDI sequencer running on the same computer. The instruments are sampled in both Unity DS-1 format and Voodoo format to provide new sounds for owners of the award-winning Unity DS-1 Digital Sampler and Voodoo MIDI Drum Machine.

Over 200 MB of samples are included with instruments ranging from durbeks, kalimbas, and hand drums to shakers, frame drums, and water-phones — over 100 instruments cover everything from the Amazon to the Euphrates. Many of the models utilize four velocity layers for ultimate expressiveness. There are also several GM mapped kits to "replace" standard drum kits.

Using *Global Percussion* with your favorite sequencer is simple. If you use Cubase VST, Vision DSP, or Emagic's Logic, you can use ReWire to route different Percussion Kit sounds into individual mixer inputs on up to 16 different MIDI channels. Plug-in effects can then be added to each of these parts if desired. If you use Digital Performer by MOTU, you can achieve the same results using MOTU's new MAS 2.0 plug in standard.

Steve Reid's Global Percussion retails for \$199. Call Bitheadz at 831-465-9898 or check out www.bitheadz.com

WaveBurner Wins Eddy Award!

At this year's Macworld Expo in San Francisco, Emagic received an Editors' Choice award from *Macworld* magazine on the eve of the show's opening.

The award for the Best Audio Software in 1999 was presented to Emagic in honor of WaveBurner 1.0. It seems that the editors of *Macworld* were impressed with WaveBurner's elegant interface and unique features, which include an interactive waveform display, drag-and-drop PQ editing, real-time sample rate conversion, and non-de-

structive region-based editing.

The 15th Annual Macworld Editors' Choice Awards ceremony (nicknamed "the Eddys") was held at the Museum of Modern Art in San Francisco and hosted by John de Lancie, the actor most famous for his appearances as the sentient being Q on Star Trek's *Next Generation* series. Emagic's president, Sven Kindel, was on hand to receive the award and reiterated Emagic's commitment to the Macintosh line in his acceptance speech.

Win a Neumann KMS 105 Microphone at NAMM 2000

For the first time, NAMM attendees will have the chance to win a Neumann KMS 105 microphone simply by stopping at the Neumann Booth #701 and filling out a short registration form.

Each entry form will be sequentially numbered. Upon completing the form, the entrant will be given a correspondingly numbered Neumann laminate. Be sure to keep this Neumann laminate containing your personal ID number. Not only will that number identify the KMS 105 winner at NAMM LA 2000, but it will serve as your entree into the new Neumann Audio Engineering Club (joining is an option on the registration form), it will access future Web site promotions offered only to Neumann Club Members, and it will provide preferential access to upcoming Neumann tradeshow events.





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sampling, to tone generation, to hardware that pulls it all together — Pro Tools gives you the complete system for stretching the traditional boundaries of musical creation.

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SampleCell II Plus

SampleCell II Plus™ is a scalable PCI card-based sampler and waveform editor. It features optional TDM integration, a super-fast trigger time, 32 voices and 32 MB of RAM per card.

Virus

Utilizing the same DSP algorithms as the Access Music Virus hardware synthesizer, the Virus TDM Plug-In is the ultimate software tone generator, providing up to 80 voices on a Pro Tools|24 MIXplus system.



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Bag End Redesigns Web Site with Many New Features

The first thing to greet visitors at Bag End's new Web site is a much improved, more user-friendly home page that takes them wherever they want to go, easily. The most significant improvement, however, is that the site now contains a complete catalog, with a separate specification page for each one of Bag End's more than 70 products. Each page is downloadable and includes a schematic drawing and photo of the product, as well as every measurement a designer or contractor will need to spec a job.

"Technology has advanced light years since we launched our first Web site," says Henry Heine, director of research and development (and Bag End's Web master). "We re-designed our site based on what our customers asked for. It's now quite literally a very complete, easy-to-access catalog that makes it simple for the sound designer or contractor, the musician/recording artist, or the home theater/home stereo aficionado to find out what we have to offer in enough detail to understand what sets us apart.

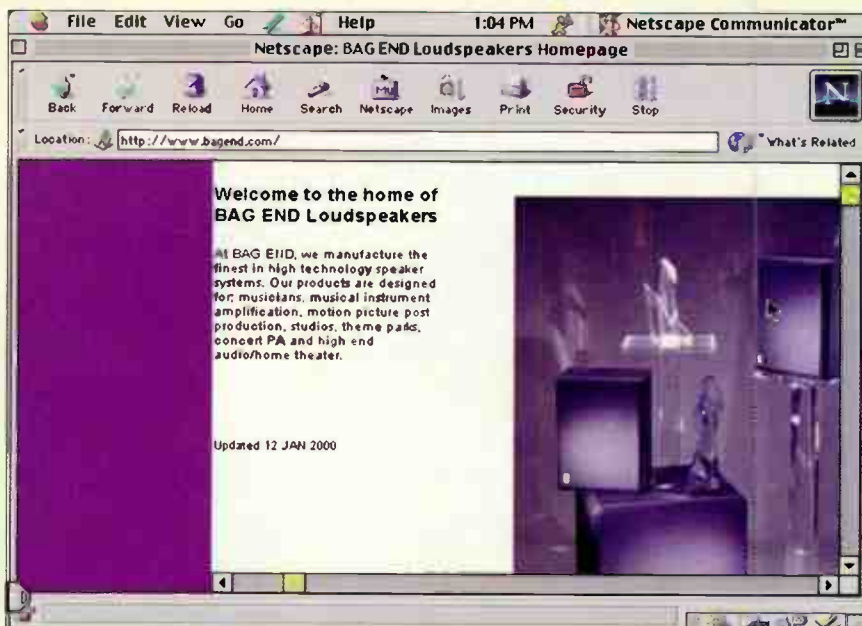
"And as part of the 'user-friendly'-ness of our new Web site, every page is downloadable. Designers or contractors working on drawings can download

our CAD files directly into their files, which should really make life a little easier when preparing bids."

Some of the other new features include: a technical library containing tech notes for designers and contractors; a complete explanation of the Time Alignment

Technology; a complete explanation of ELF (extended low frequency) technology; reviews of Bag End products; press releases; and a list of Bag End reps and distributors.

For more information, call Bag End at 847-382-4550 and, of course, visit www.bagend.com.



Secure Digital Distribution Successful for Phish Eve Concert

The case for secure digitally delivered music took a giant step forward over the New Year's weekend when some 70,000 fans of the rock band Phish downloaded live concert tracks from the group's Florida Everglades performance. To ensure the security of the downloaded tracks, the band turned to the eLicense System, a new technology from ViaTech, Inc. for securing, distributing, and selling music online.

Tracks were made available shortly after each set, with a total of six songs offered as secure MP3 files at the band's official Web site (www.phish.com). With more than 500,000 hits from every continent on the globe, there were 70,000 downloads and about

1000 songs purchased through ViaTech's eLicense System.

The eLicense technology was developed by ViaTech, a leading provider of software for securing all forms of digital intellectual property, such as music, software, video, text, etc. for electronic distribution. For the music industry, the company's patent-pending technology deters piracy, offers customizable trials, is file-format and player independent, and offers built-in electronic order processing, so purchasing the music is quick and easy. In addition, the system's protection and a listen-before-you buy feature remain with the music as it is e-mailed from one Phish fan to another (super-distribution).

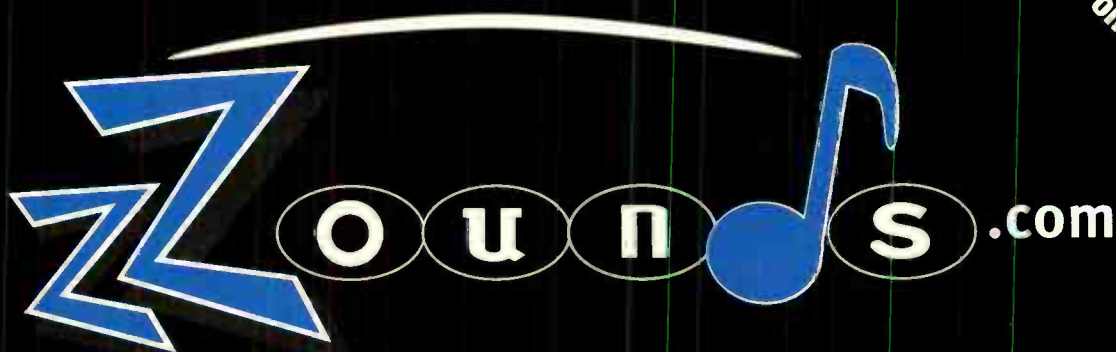
Sennheiser Building New Manufacturing Facility in Albuquerque, New Mexico

The first Sennheiser manufacturing facility in the Western Hemisphere is currently under construction in Albuquerque, New Mexico. This 45,000-square-foot facility will manufacture printed circuit boards to support global requirements, as well as wireless headphones and wireless microphones for the American market.

This is the first Sennheiser manufacturing facility outside Europe, and is modeled after the Wedemark, Germany facility to minimize any startup risk. Prior to selecting the New Mexico location, Sennheiser conducted an extensive global investigation to determine the optimum manufacturing site. Selection was based largely upon favorable economic conditions and suitable labor pool. The building was designed by Reid & Associates, located in Rio Rancho, New Mexico.

Heading the project in New Mexico is Bill Jenner, recently named vice president and general manager of the Sennheiser New Mexico facility. Jenner has been involved in planning and developing manufacturing sites for over fifteen years.

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Oh yeah, about the free gear. (After all, that's why you stopped to read this ad, right?) Every day, until the boss comes to his senses, we're giving away gear. Not last year's left-handed kazoo, but cool stuff you'll actually be happy to win, like Mackie mixers and Roland keyboards. Just go to www.zZounds.com/free and find out what we're giving away today.

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“REASONS NOT TO

AND 3 MORE

1 DIGITAL 8-BUS 3rd PARTY PLUG-INS!

certified d8b plug-in

t.c. electronic

From the undisputed industry leader in digital effects, comes the new TC2 Series for the D8B.

TC Reverb is bundled with the D8B UFX card. It provides Reverb 1 and Reverb 2 algorithms from the renowned TC Electronic M2000 Studio Effects Processor.

Two additional upgrade packages are also available from Mackie Digital



Systems Dealers: TC FX contains an expanded set of M2000 reverbs plus Delay, Chorus, and Pitch; TC 2000 adds Reverb 3 from the TC M2000, de-essing, tremolo, phasing, and panning.

certified d8b plug-in

DRAWMER



With twenty years of experience designing dynamics processors, Ivor Drawmer's products are world-renowned among mastering engineers and anyone with an appetite for high quality noise gates and compressors. Now you can enhance the Digital 8•Bus with ducking, frequency-conscious triggering, keying from other channels,

“Gate Hold” and other signature Drawmer dynamic effects. Drawmer offers two dynamics packages for the D8B: ADX100 includes their industry standard frequency conscious gating, plus compression and limiting; ADX200 adds variable “Peak Punch” and further Drawmer innovations.

certified d8b plug-in

Massenburg DesignWorks

Multiple Grammy and TEC Award-winner George Massenburg is an internationally renowned producer and recording engineer whose stereo analog mastering equalizers have been dubbed the best sounding EQs available at any price.

His new company, Massenburg Designworks' first digital products are developed for the Digital 8•Bus, Sonic Solutions Mastering System and Sony Oxford console — obviously we are in good company!



The MDW 2x2 High-Resolution Parametric Equalizer plug-in provides mono or stereo EQ to the D8B master stereo bus, any individual channel, or surround bus. It operates at double sample rates (96kHz) to deliver unprecedented clarity and response with superlative smoothness in the HF audio spectrum.

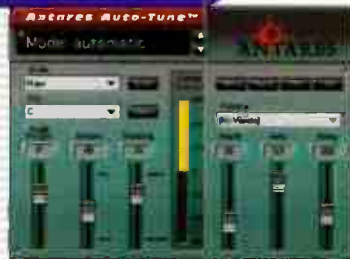
ANTARES

certified d8b plug-in

Antares Audio Technologies is renowned as a developer of innovative, DSP-based audio software and hardware, including the ATR-1 Intonation Processor and JVP (Antares Voice Processor) DSP plug-ins.

Auto-Tune for the D8B is a fully automatable software plug-in that uses advanced DSP algorithms to detect the incoming pitch of a voice or solo instrument and instantly correct it to the desired pitch without introducing distortion or artifacts.

Simply identify a scale to automatically conform a track to that scale in real time... while preserving all of the expressive nuance of the original. D8B Auto-Tune works while the track



is being recorded, so it goes to tape (or disk) already in tune! Micro-adjustments can be automated with hands-on D8B controls instead of a mouse, a huge advantage when correcting a melody that has modulated to another key.

Up to 4 channels of Auto-Tune for the Mackie Digital 8•Bus cost less than one ATR-1 hardware processor!

2 D8B TEC AWARD!



We have a strict policy of not naming competitors in our ads. But in this case, we just gotta tell you the nominees for Mix Magazine's 1999 TEC Award for Outstanding Technical Achievement in Small Format Consoles: Allen & Heath's GS-3000, Digidesign's ProControl, Panasonic's WR-DA7, Spirit's Digital 328, Yamaha's O1V, and li'l ole us.

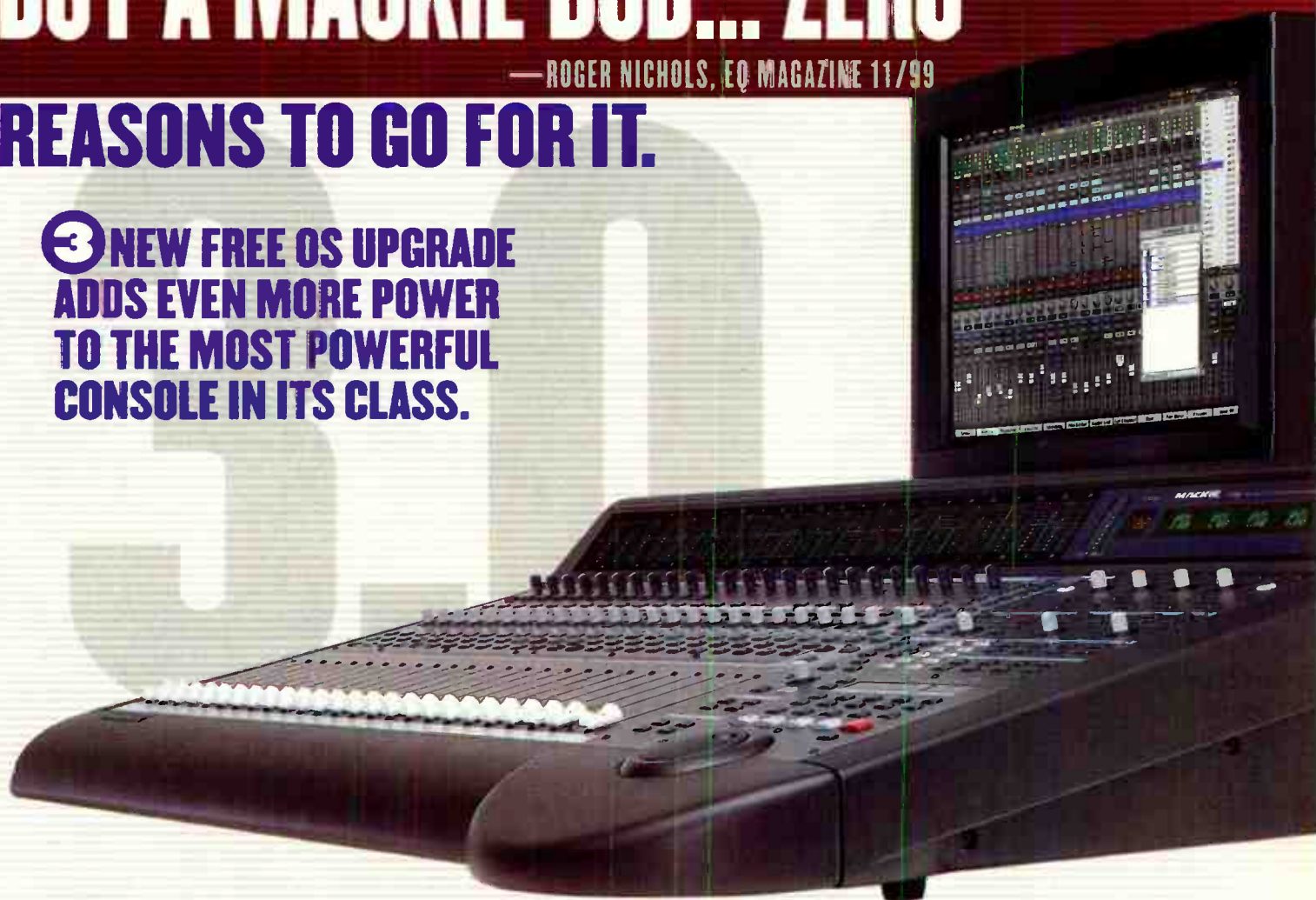
“Could we have the envelope please...” (drum roll in the background). “The winner is... THE MACKIE DIGITAL 8•BUS!” Thank you to all of those who voted for us. We're very proud.

BUY A MACKIE D8B... ZERO"

—ROGER NICHOLS, EQ MAGAZINE 11/99

REASONS TO GO FOR IT.

**③ NEW FREE OS UPGRADE
ADDS EVEN MORE POWER
TO THE MOST POWERFUL
CONSOLE IN ITS CLASS.**



VERSION 3.0: OVER 30 NEW FEATURES!

Our Programming Department has been chugging the double lattes. The result is Mackie Realtime OS™ Version 3.0, packed with more new features and enhancements than you can shake a mouse at.

Here's just a partial list of what 3.0 adds to the already amazing D8B. Log onto our website for more information.

- **New key (sidechain) inputs** for all 48 onboard dynamic processors featuring soft knee architecture and 20-20k parametric EQ for frequency dependent processing such as de-essing
- **3rd-party plug-ins** via the new UFX card. Up to 16 simultaneous plug-ins on the first 48 channels, pre or post DSP, pre-fader via up to 4 UFX cards. Each plug-in is available twice — once when tracking, and again at mixdown!
- **Externally or internally accessible inserts across Mains and Buses plus channel inserts pre and post DSP**
- **Multiple Undo List** — 999 levels!
- **Updated GUI** including 48-channel fader bank view screen
- **New Snapshot libraries**
- **MixLink™ networking** allows cascading of multiple Digital 8•Buses and remote control console mirroring of D8B from a second D8B or laptop via Ethernet
- **Time Offset** (delay) adds a delay of up to 999 samples to the signal at the pre-DSP (dynamics / EQ) point in the signal path
- **New surround capabilities** including depth-of-center control (LCR mixing with divergence), multiple surround panner window, individual LFE channel level control.
- **Multiple direct outs** per channel
- **Auto Punch mode** (MMC). Record punch in/out are automatically toggled from the console, via MIDI MMC.
- **MIDI assign** on transports for sequencer users
- **Optional level to tape** fader control.
- **Assignable, bi-directional MIDI control** of all D8B parameters.
- **Cross patching** allows channels from various banks to be substituted with those from other banks

The list of top engineers and producers who have opted for the award-winning Mackie Digital 8•Bus is growing daily. For information on the D8B, 3rd-party plug-ins and how D8B owners can get their free OS upgrade, call toll-free or log onto our web site at www.mackie.com.



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EQ PRODUCT VIEWS



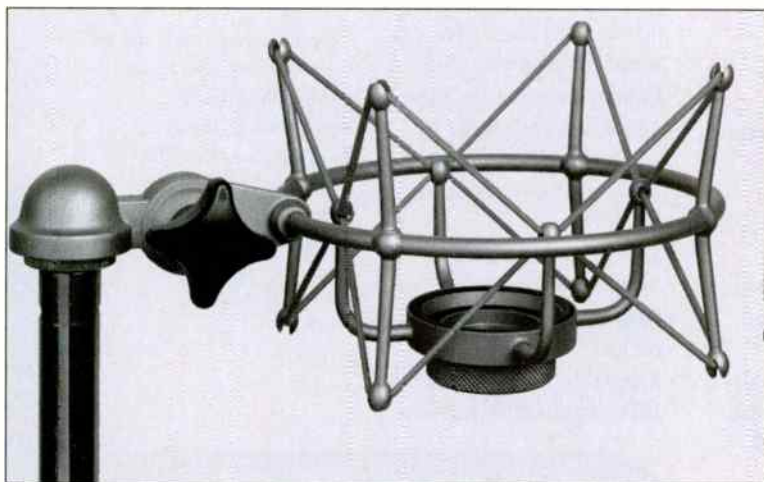
THE RIGHT TRAC

The Soundtracs DS-M is based on the architecture of the company's DS-3 digital console combined with storage and editing technology from Studio Audio Digital Equipment (SADiE). Featuring a 64-channel digital console, the DS-M integrates up to 32 tracks of random access audio, video, and full console automation. Sub-frame-accurate sync between audio, video, and automation allows for precise spotting, processing, and mixing of all sound elements. All console, automation, and audio session data is saved in one operation on the same media, simplifying the archive and restore process. Audio I/O formats include 24-bit analog, AES-EBU, TDIF, ADAT, and MAD1, with up to 112 inputs and outputs. Other system highlights include background recording and archiving functions, auto conforming, plug-in support, machine control, audio scrubbing, and waveform display. Available options include networking and OMF file import/export. For more information, call Soundtracs at 516-249-1234 or visit www.soundtracs.com. Circle EQ free lit. #107.



AND-A-ONE AND-A-TWO

TC Electronic has unveiled the M•One dual effects processor and the D•Two multi-tap rhythm delay. The M•One dual effects processor features delay, dynamics, pitch, classic chorus and tremolo, and more. There are a total of 25 different algorithms in all, accessible via a fast, simple user interface. The unit's hardware consists of full-resolution 24-bit A/D and D/A converters with 24-bit internal processing driven by a 100-million instruction-per-second DSP engine. The D•Two Multi-Tap Rhythm Delay offers a very musically oriented Rhythm Tap feature. The Rhythm Tap can be applied for live sound and recording applications. Featuring up to 10 seconds of delay, the D•Two provides six Direct-Access add-on features, including Spatial, Ping Pong, Reverse, Dynamic Delay, Chorus, and Filter. The D•Two's hardware also consists of full-resolution 24-bit A/D and D/A converters with 24-bit internal processing driven by a powerful 100-million instruction-per-second DSP engine. The retail price of the M•One is \$699, while the D•Two costs \$699. For more information, call TC Electronic at 805-373-1828 or visit www.tcelectronic.com. Circle EQ free lit. #108.



PRESENT SHOCK

Neumann USA has announced the availability of the EA 1 shock mount for the TLM 103 and M 147 Tube microphones. This all-metal suspension shock mount was designed not only to complement performance, but also to blend aesthetically with the newer, smaller microphone bodies. The EA 1 is available in both satin nickel finish for the TLM 103 and M 147 Tube, and matte black for the TLM 193. It replaces the older EA 103 and EA 193 suspensions. Retail price for the EA 1 is \$195. For more information, call Neumann USA at 860-434-5220 or visit www.neumannusa.com. Circle EQ free lit. #109.



Capture the Warmth. Vintage-style.

When it comes to capturing the essence of a musical moment, every nuance... each subtlety... it's hard to beat the warmth of a vintage-style, large-diaphragm microphone.

That's why we created the new AT4047/SV. It offers the sonic characteristics reminiscent of early F.E.T. studio microphones and delivers the consistent performance and reliability you've come to expect from A-T's 40 Series.

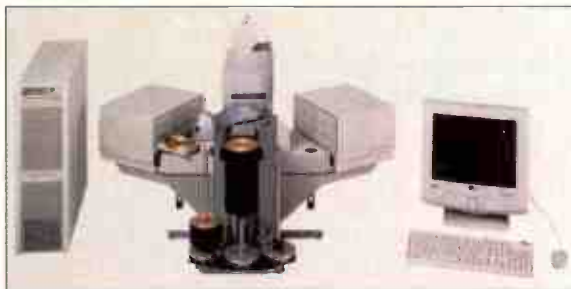


The AT4047/SV gives you a perfect blend of classic sound and modern precision engineering. We call it a contemporary replication of vintage condenser technology. You'll call it amazing.

*AT4047/SV Cardioid
Capacitor Microphone*

 **audio-technica.**

EQ PRODUCT VIEWS



SPEED TO BURN

Microtech Systems has added Plextor 8X write/record drives to all its ImageMaker

and ImageAutomator CD-R production systems for increased duplication output and improved overall throughput. For publishing applications, a full disc can now be produced in under 11 minutes, including printing. The base system has also been upgraded to include a faster processor, a new motherboard, and two additional hard drives. The faster ImageMaker and ImageAutomator models also feature Custom-CD software that streamlines the production of one-of-a-kind CDs drawn from information stored in a large library. For more information, call Microtech Systems at 650-596-1900 or visit www.microtech.com. Circle EQ free lit. #110.



THE WRITE STUFF

HHB has released two new re-writable CD-RW discs in its Advanced Media Products range. The CDRW74 and CDRW80 have been developed in direct response to customer demand for pro audio optimized re-writable media, especially those users of HHB's own CDR850 and CDR850 PLUS professional audio CD recorder/players. Both new discs feature wide power margins, ensuring compatibility with a wide range of professional CD recorders, while a Silver-Indium-Antimony-Tellurium phase change recording material delivers more than 1000 erase/record cycles and a secure archival life in excess of 100 years. The CDRW80 (with an actual recording time of 79 minutes and 59 seconds) is particularly useful in broadcast and music recording applications where longer record times are necessary. For more information, call HHB Communications at 310-319-1111 or visit www.hhb.co.uk. Circle EQ free lit. #111.

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Pro Tools users can now increase their working speed and productivity with ProKeys. ProKeys is a color-coded overlay with more than 75 preprogrammed shortcuts using Quickeys that allow users to access Pro Tools preferences, settings, and frequently used functions up to four times faster than with standard mouse navigation;

become a Power User by accessing multiple functions with a single key stroke; and learn Pro Tools faster. ProKeys can be purchased separately or bundled with Quickeys. For more information, call PowerKeys at 323-655-4282 or visit www.powerkeys.com. Circle EQ free lit. #112.

DIY DVD

MARCAN is now representing the Microboards line of CD-R and DVD-R production systems, including a new, multifunction, 4.7 GB DVD-R production system. The DVR-1000 includes a DVD-R writer and multidrive DVD reader. When operated as a stand-alone unit, it offers one-button, one-to-one operation in a desktop footprint. When connected to a PC, the DVR-1000 will run DVD-ROM and DVD-R drives simultaneously, offering 13.7 GB capacity. For information and pricing, call MARCAN, Inc. at 800-635-7477 or visit www.marcan.com. Circle EQ free lit. #113.



Use the VF-1 and realize limitless sonic possibilities with your effects.

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EQ PRODUCT VIEWS



MAKE A PAS

Professional Audio Systems (PAS) has released the MF-218, a compact, light-weight, dual 18-inch sub-woofer system. The MF-218 is the newest

member of the TOC family of

loudspeaker systems and boasts an extended frequency response down to 30 Hz in an enclosure that measures 21 inches (H) by 42 inches (W) by 24 inches (D) and weighs 150 lbs. The MF-218 uses two model LX-2800 18-inch low-frequency transducers. The system is rated at 2400 watts continuous program and has a sensitivity of 102 dB with a maximum SPL of 132 dB. The list price is \$1495. For more details, call PAS at 760-431-9924 or check out www.pas-toc.com. Circle EQ free lit. #114.

THRU AND THRU

MAudio has introduced the CT-14 and the OT-14, two new digital audio thru-boxes. The CT-14 is a 1-in/4-out active thru-box for coaxial S/PDIF signals, enabling the user to copy a coaxial digital signal of any bit width or sample rate to four separate synchronized outputs. The OT-14 is the optical equivalent of the CT-14, supporting optical S/PDIF and ADAT data formats (not both formats simultaneously, however). These products add flexibility to your digital audio system: copying optical and coaxial signals between S/PDIF or ADAT Lightpipe equipped devices such as dedicated converters, ADATs, DVDs, and DAT machines, MIDIMAN SAMTM, digital mixers, and many other digitally equipped devices. For more information, call M Audio at 626-445-2842 or visit www.m-audio.com. Circle EQ free lit. #115.



KEY PLAYER

Kurzweil Music Systems introduces the PC2 and PC2X Performance Controller keyboards. Features include 64-voice polyphony (expandable to 128), 24-bit stereo digital output, 4-zone MIDI controller, four sliders, two wheels, four footswitch pedal inputs, two CC pedal inputs, one breath controller input, and one 600-mm ribbon input. The 76-note lightweight action PC2 is expected to have a suggested retail price of \$2395 and the 88-note fully weighted PC2X will cost \$2895. For more information, call YCA/Kurzweil at 253-589-3200 or visit www.youngchang.com/kurzweil. Circle EQ free lit. #116.

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CIRCLE 32 ON FREE INFO CARD

Since we introduced the MX-2424 hard disk recorder, there has been a lot of speculation about its price (which is so low it seems too good to be true).

So we get questions. Like...

"24 tracks is an upgrade?" (No, it's 24 tracks right out of the box.)

"24-bits is an upgrade?" (No, all the bits are there too.)

"Do I have to pay extra for inputs and outputs?" (No. At \$3,999 estimated street price* you get a full set of 24 TDIF-1 or ADAT® optical digital inputs and outputs — plus an assignable stereo AES/ EBU - S/PDIF pair. For a little more you can get 24 channels of AES/EBU digital I/O, or analog — or both digital and analog!)

"Does it need an external computer?" (No. The MX-2424s front panel has a full set of professional transport, editing, and track assignment controls, including a shuttle/ scrub knob. So you don't have to have a computer to run it. But — if you happen to own a Mac or a PC, you can take advantage of the digital audio editing and control software that comes standard with each MX-2424 to do even more. Your choice.)

"Before I start recording do I need to buy a monitor, a keyboard, or a hard drive? Or anything else?" (No. Nyet. Nope. Not at all. Just hook up power and start recording.)

So let's make this as plain as we can: The MX-2424 is an amazing, full-featured professional 24-track digital recorder. And there's never been anything like it at this size or price.

Its sonic performance is outstanding. Lots of companies claim 24-bit 48k performance, but only the MX-2424 is part of TASCAM's M Series family of multitracks — the products chosen for their sonic performance by such discriminating facilities as Skywalker Sound, Universal Studios, and 20th Century Fox.



\$3,999^{ESP*}

Superior reliability is guaranteed. The MX-2424 was designed from the bottom up to be a great recorder, and nothing but a great recorder. Its processors and circuitry are fully optimized for audio - not video games, spreadsheet software, or surfing the web. And isn't that absolute focus and rock solid performance exactly what your music deserves? Over the last three decades we've designed and built literally millions of professional recorders and recording systems; the MX-2424 is the culmination of everything we've learned.

So easy to operate, you could do it blindfolded. Of course that way you'd miss the great light show from the 24 tracks of level metering and channel status displays... but the real point here is simplicity. When you want the MX-2424 to start recording, just reach over and press REC + PLAY (just like a traditional tape recorder). In a fast-paced production environment, you can record to hard drives that mount into standard Kingston® carriers and plug into the front panel drive bay. Just pop in a new drive at the start of each session. It doesn't get any simpler than that.

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It's a complete professional hard disk multitrack in a portable, affordable, rack-mount box. You can plug it in, turn it on, and start recording.

✓ Back panel ports include Fast/Wide SCSI, ethernet, MIDI, RC-2424 remote, and TL-BUS!

Extend your reach — Want a remote control? Get the one that's made to take advantage of the power in your MX-2424. The RC-2424 remote is a powerful, professional multi-machine controller with all of the MX-2424's front panel features, plus macros and more.

Really.

The power to meet your needs. A standalone MX-2424 is an incredibly powerful unit, with enough internal hard disk capacity to hold about 45 minutes of 24-bit 24-track audio. The MX-2424's Fast/Wide SCSI port lets you connect up to 15 external drives and record directly to all of them. And if you need more than 24 simultaneous tracks, just add additional MX-2424's. Up to 32 MX-2424's can be locked together in *sample accurate sync* to act as a single recorder.

Professional recorders need to interface with increasingly complex systems.

- ✓ It provides video and time code lock capabilities as standard features, making it easy to integrate with external workstations.
- ✓ It resolves to AES/EBU, S/PDIF, word clock, TDIF-1, ADAT optical, SMPTE Time Code (LTC), and video, and chases MIDI Time Code.
- ✓ Available Input/Output modules include TDIF-1, AES/EBU, ADAT optical, and analog.

MX-2424 shipments are about to start, and there is already a waiting list. To get yours sooner instead of later, contact your authorized TASCAM dealer!

**So... what's this Estimated Street Price? Instead of quoting you some meaningless "List Price," ESP is what we expect typical U.S. customers to actually pay for an item. It gives you a better way to compare value when you shop.*



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Soundscape R.Ed Digital Audio Workstation

The makers of the venerable SSHDR1 are back with a versatile high-res audio system

BY HOWARD MASSEY

Soundscape R.Ed (short for Recorder/Editor) is a new 32-track digital audio workstation from the manufacturers of the venerable SSHDR1 system. Running under Windows 98/95 or Windows NT, the R.Ed software supports both 16- and 24-bit files as well as sample rates of up to 96 kHz (although, when working with 96 k files, only 16 tracks are available). A full complement of non-destructive editing tools are provided, including cut, copy, move, trim, slip, and normalization. Other features include multichannel audio scrubbing, multiple levels of undo, and real-time fades. The on-screen mixing interface comes in the form of a customizable 16-bus environment, with full parametric equalization for each channel. All mixer configurations can be saved to disk for total recall, and mixing parameters can optionally be controlled via MIDI by external controllers.

R.Ed's hardware interface consists of a rack-mount unit that provides bays for four IDE hard drives — two fixed and two removable — with a maximum limit of 137 GB per disk (that oughta be enough to hold ya!). All four drives can be accessed by the software simultaneously for playback (recording is to one target drive at a time). Although the drives are not recognized by the host computer operating system, a proprietary Explorer-type interface allows files of any type to be stored and moved as necessary to OS directories.

The rear panel of the rack unit provides a proprietary host computer connection to the included ISA card (which Soundscape says is "easily" reconfig-

urable to PCI or USB if necessary) and word clock and super clock I/O, as well as a host of digital I/O connectors: two AES/EBU input channels and four AES/EBU output channels, plus three discrete 24-bit, 8-channel TDIF (TAS-CAM digital interface) ports, providing 24 additional channels. ADAT users can connect the TDIF ports to Soundscape's optional TDIF-to-Lightpipe interface box. If analog I/O is required, up to three rack-mountable Soundscape SS810-1 audio interfaces can be connected to the TDIF ports. Each of these adds eight channels of balanced I/O on XLR connectors, plus eight channels of bidirectional TDIF to ADAT Lightpipe conversion.

R.Ed also boasts a wealth of features for the postproduction studio. With the use of an optional video capture card, high-quality digital video files can be played in synchronization with the audio data, facilitating ADR (Automatic Dialog Replacement), track laying, sound effects design, and audio dubbing. Up to 999 namable markers can be dropped on the fly, useful for auditioning edits and loops. Hardware options include a sync card that provides LTC and VITC in/out, as well as support for RS422 control (via Sony 9-pin protocols) for remote track arming, recording, and playback, either as a master or slave device.

With the addition of one or more optional Mixtreme PCI cards, advanced audio mixing and real-time processing capabilities can be added to the basic R.Ed system. The Mixtreme card provides on-board DSP, mak-

ing for extremely low latency times and minimal host computer requirements. Unique multi-client capability allows multiple applications to access the card simultaneously, and numerous plug-ins are available from Soundscape and third-party manufacturers such as TC Works, SyncroArts, and Wave Mechanics. LCRS encoder and decoder plug-ins are also available from Dolby, with a 5.1 Dolby Digital version expected shortly. Although there is no support for DirectX plug-ins, R.Ed files can be easily exported to third-party programs for additional processing as necessary and then re-imported back into R.Ed.

Two R.Ed systems can be linked together to provide a full 64-track system with 48 24-bit digital inputs and outputs. If that isn't enough for you, either your name is Roger Nichols or you should be nominated for this millennium's first Gear Sl*t of The Century award!

R.Ed systems begin at \$6495, with pricing dependent upon system configuration. For more information, contact Soundscape Digital Technology, Inc., 4435 McGrath Street #308, Ventura, CA 93003. Tel: 805-658-7375. Web: www.soundscape-digital.com. E-mail: sales@soundscape-digital.com. Circle EQ free lit #101.

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The VSM I offers the warmth and smoothness you expect from a large diaphragm tube condenser. But what makes it different is its enhanced sensitivity—to capture and articulate voices, instruments and rooms with their distinctive character intact.

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Unlike many of the new "vintage" replicas, the VSM I is an original. It's the result of decades of microphone wisdom combined with our own innovations, including the inspired circuit topography developed for our acclaimed VX2 twin tube condenser. Unlike many of today's so called "classics," the VSM I is built in the US, in our state-of-the-art facility. With meticulousness found in mics costing several times as much—and it sounds like it!

Visit your CAD microphone dealer for a listen, compare it with anything on the shelf. Hear what you've been missing. In fact, with VSM I you'll hear so much more you may want to clean your studio.



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CIRCLE 93 ON FREE INFO CARD

Sony DMX-R100 Digital Console

Sony shrinks its Oxford console in a nice, take-it-home package

BY ROGER NICHOLS

If you were drooling over the Sony Oxford digital console I reviewed for Pro Sound News a couple of years ago, then this announcement is for you. Sony has introduced the Oxford Jr. — the new DMX-R100 is basically a scaled down center section from the Oxford console. Everything from the touch-sensitive faders, to the color LCD touchscreen and complete digital input and output routing.

Sony has crammed a lot of features into a 45-x26-inch package. The features that set the Sony DMX-R100 apart from other small-format digital consoles are 100-mm faders with 1024-step (10-bit) resolution that gives you 0.1 dB steps (highest resolution of any small format console), faders with adjustable touch sensitivity (full-size consoles with moving fader automation won't let you do that), 88.2 kHz and 96 kHz sample rates, color LCD with built-in touch panel, optional plug-in digital input card with built-in sample rate conversion (so you can fly CD samples into a 48 kHz mix), built-in surround monitoring capabilities (you don't have to use aux outputs for the additional monitors), built-in MS decoder on linked stereo inputs, surround panning by touching where in the picture of a room you want the sound location, both Sony 9-pin and MMC machine control directly from the console transport control window, the selection of automation punch points so you only effect automation data between those points, and it's a Sony.

MORE DETAILS

Are you stuck with a multitrack 96 kHz recording and nothing to mix it on. The Sony will handle 44.1 kHz, 48 kHz, 88.2 kHz, and 96 kHz. When the high sample rates are selected, the frequency re-

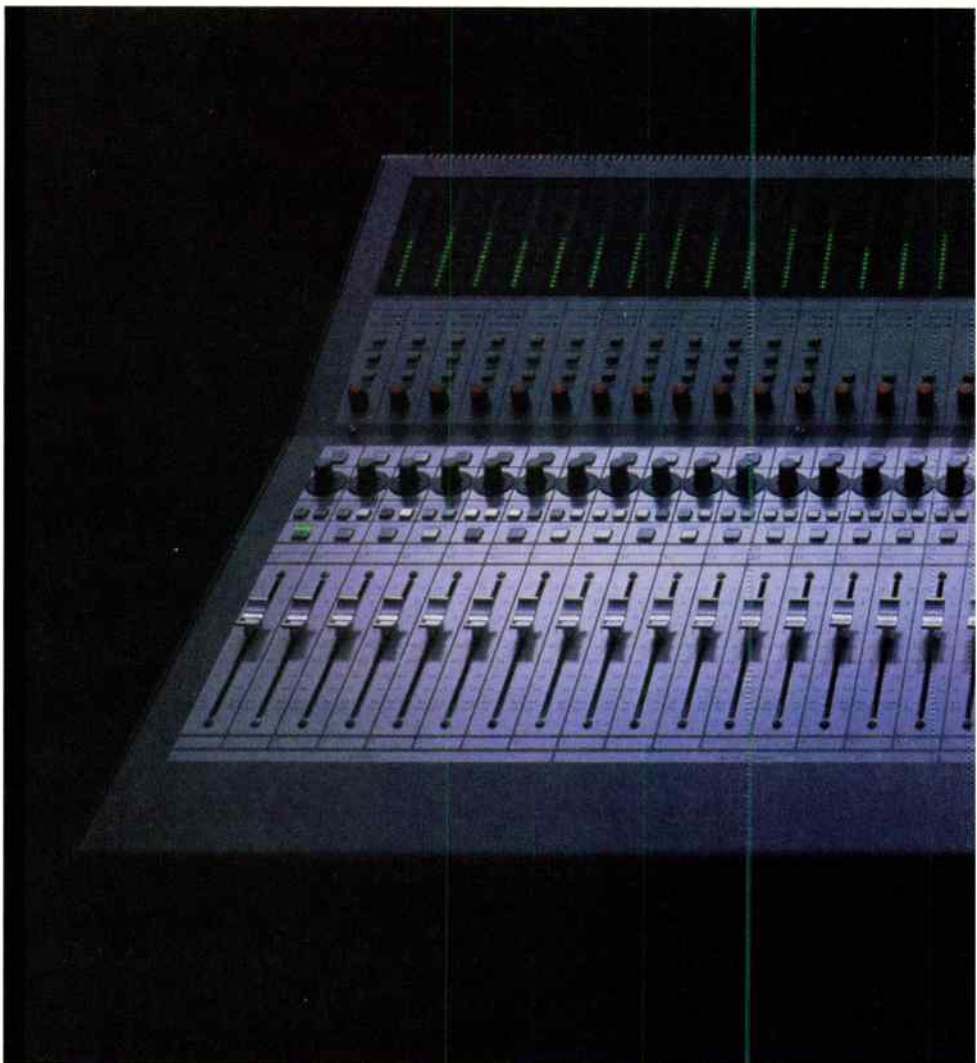
sponse expands to 40 kHz. You can even EQ the high end up there at 40 kHz if you want to. The only drawback of high sample rate operation is the extra bandwidth requirements. The number of channels and auxes available has to be cut in half.

Twenty-four-bit digital I/O and 24-bit 128x converters for the analog I/O assure that the sound quality will be top notch. The console is equipped with 24 analog inputs and 8 aux inputs. The first 12 analog inputs have two input connectors. Twelve "A" inputs are through XLR connectors that feed the microphone "head amps" with an unbelievable -126 dB noise floor. The first 12 inputs also have insert connectors for insertion of outboard analog pro-

cessing gear. There are 1/4-inch balanced TRS connectors for the "B" line level inputs. The second set of 12 line inputs are coaxial XLR/1/4-inch TRS connectors.

Card slots on the rear panel provide input for the 24 tape returns. These returns can be analog, AES, ADAT, or TDIF, depending on which optional I/O cards are fitted. The console has eight bus outputs and eight aux outputs, plus the stereo main mix outputs. The eight main bus outputs are used for 5.1 surround outputs. Six channels of monitoring are standard, so you don't have to use aux sends for control room monitors.

In addition to the digital outputs to



the eight busses, there is a stereo digital main output and two stereo digital aux outputs. The aux outputs are paired with digital aux inputs for connection of external digital effects. There is a digital 2-track input for monitoring stereo digital recorders.

All of the inputs and outputs can be re-routed internally. Aux inputs can show up as additional mix inputs, 2-track digital inputs can be routed to input faders...you are not limited to cross patching in groups of eight inputs.

Data input can be accomplished using the knobs on the console or via the high-resolution color LCD and touch panel. The parameters of each channel are displayed graphically on the screen to allow comprehensive feedback on equalization and compression operations. The graphics look exactly like the graphics presentation on the Oxford. Nice touch! There is a 15-pin video mon-

itor connector on the back panel that duplicates the display on the LCD monitor.

Snapshot and dynamic settings can be stored and recalled via the built-in 3.5-inch floppy drive. Up to 99 snapshot memories save every parameter on the console. Dynamic automation can be synchronized with SMPTE or MTC (MIDI timecode). Dynamic automation includes the touch-sensitive faders, pan control, equalizers, dynamics, and aux signal settings. The dynamic automation can also recall snapshots at timecode-based cue points. Automation data can be written in both absolute and trim modes.

More and more artists and producers are building project studios in their homes. These little rooms help to keep the budgets down by allowing some of the work to be done away from the gazillion dollar studios. I like to do the same thing. I cut basic tracks and

record the orchestra dates at the big studio, and work on the overdubs at a smaller facility or at my project studio. I then usually go back to the big studio for the mixing. I prefer to stay digital throughout a project.

This is the first look at a console that I can't wait to get my hands on. I got to see it at the 1999 AES show in New York, but they slapped my hands every time I tried to hide it under my jacket. I have personally done many projects on the Sony Oxford console. I recall myself saying, "This Oxford would look really good in my project studio." Well, maybe a mini Oxford will do.

For more information, contact Sony at 800-686-SONY, or visit www.sony.com. Circle EQ free lit. #117. Want more Roger? Be sure to check out his online digital audio recording forum at www.eqmag.com.



Lexicon 960L Multichannel Digital Effects System

Surround sound processing takes a bold step in Lexicon's new flagship product

BY STEVE LA CERRA

It's almost hard to imagine that Lexicon introduced their Delta T-101 delay line — the first commercially marketed digital delay — back in 1971. Since that time, Lexicon has remained a leader in the development of digital delay and reverb processors, having produced a well-respected lineage that includes (among others) the 224XL, 300L, and 480L digital effects. Now Lexicon is ready to raise the bar a notch with the introduction of their latest accomplishment: the 960L multichannel digital effects system.

BASICS

The Lexicon 960L multichannel digital effects system is an eight-in, eight-out, true multichannel surround sound processor that features powerful new algorithms and 3DPM Perceptual Modeling, plus an all-new LARC2 remote controller. Intended for high-end pro audio, broadcast, film, and

postproduction applications, the 960L picks up where the esteemed 480L left off, assuming the role of the company's flagship.

Two main components make up the 960L system: the 960L CPU and the new Lexicon Alphanumeric Remote Controller (aka LARC2). Housed in a 4-rackspace chassis, the 960L CPU processes audio in 24-bit/96 kHz words and supports multichannel audio by including many surround and stereo reverb algorithms. Lexicon stresses the fact that these new multichannel algorithms are not simply juxtapositions of mono reverbs, but are dedicated surround algorithms designed specifically to support multichannel audio. In an effort to provide high-quality sound and realism, the 960L employs Lexicon's proprietary 3DPM Perceptual Modeling.

3DPM combines insights from both physical and psychoacoustics to create spaces with a compelling sense

of envelopment, without compromising clarity and intelligibility.

The 960L is built in a modular "mainframe," accepting up to three DSP cards per chassis. Each DSP card holds four of Lexicon's proprietary Lexichip large-scale IC's used for the algorithmic processing of audio. In the tradition of the 480L, users may apply this processing power to their own unique advantage by configuring a DSP card to function as four stereo reverbs or two multichannel surround "machines" at 48 kHz, or as two stereo reverbs running at the 96 kHz sample rate. Regardless of sample rate, word depth is maintained at 24-bit. At first customer ship, rear-panel features of the 960L will include eight balanced, analog audio inputs and outputs on XLR connectors, as well as four pairs of AES/EBU digital inputs and outputs. Lexicon has thoughtfully incorporated external word clock in/out/loop con-

continued on page 144



More Secrets of the DAW Masters

Pro-FX PLUS
now shipping!
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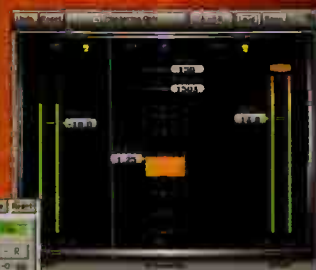
▲ MetaFlanger

TDMII • NPPII

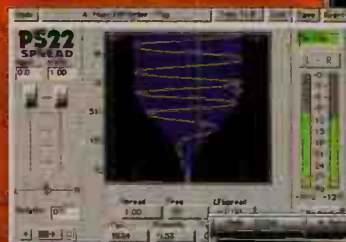
MaxxBass ▶



◀ De-Esser



▲ Renaissance Compressor



PS22 ▲



▲ Renaissance EQ

Pro-FX is for TDM. Only TDM II contains PS22.



THE GENUINE ARTICLE

USA: 1-865-689-5395 ■ Rest of the World: 972-3-5107667
w w w . w a v e s . c o m

CIRCLE 56 ON FREE INFO CARD

Player's Paradise

Musician/engineer/
studio owner Jim Sabella
sees things from the
artist's point of view

STUDIO NAME: Sabella Recording Studios
LOCATION: Long Island, NY; www.sabella.com

KEY CREW: Jim Sabella, owner/engineer
CREDITS: Sabella has worked with Blues Traveler, LL Cool J, Public Enemy, Govt. Mule, Exposé, Marcy Playground, Butthole Surfers, Track One A.B., Suicide Kings, Johnny Marz, Speedball, Waterdog, Step Lively, Jono Manson, and Guitar Pete
CONSOLE: Neve 8068 Mark II with automation

MONITORING EQUIPMENT: Altec Big Reds with custom construction; Yamaha NS10M's; Tannoy PBM 6.5's; Auratone's; JBL Control 1's; Amplifiers include Perreux 8000C; Hafler DH500 and DH200 (for the headphone system); and Dynaco Premium Ultra

COMPUTERS & SOFTWARE: Apple Power Mac G3 with Digidesign Pro Tools V4.0; Cubase VST; MOTU Performer

RECORDERS: Studer A80 2-inch, 24-track; MCI JH110 1/2-inch and 1/4-inch, 2-track decks; Ampex AG350 1/4-inch, 2-track [2]; Technics M65/M85 cassette deck; Studer A-710 cassette deck; Harman Kardon CD 941 cassette decks [2]; Sony DAT machines [2]; Denon DN-770R cassette deck

REVERBS AND DELAYS: Lexicon Model 92 [2], PCM41, and PCM42; TC Electronic TC2290 delay and M2000 reverb; EMT 240 gold foil reverb, EMT 140 plates with TimeLord modification for stereo [2], and EMT 251 digital reverb; Eventide H3000 Harmonizer™; BEL BD80 and BD240 delays; Marshall Tape Eliminator

OUTBOARD GEAR: Neve compressor/limiters [2]; Univer-

sal Audio LA-3A [4] and 1176 [2]; RCA BA-6 compressor; Neumann compressor/limiters [2]; Drawmer gates [8]; Neve 2254 compressor/limiters [2]; Empirical Labs Distressor [2]; Altec 1591a compressor; Pultec tube EQs [9]; DW Fearn VT-2 mic pre; Demeter tube DI; Simon Systems DI [8]; Acoustilog DI [2]; Pro Co DI [4]; Cinema Passive Pro EQ

MIDI EQUIPMENT: Roland D-50; Alesis D4; Korg Wavestation AD; MIDI Timepiece, EMU Emax sampler, Planet Phatt, and SP1200

MUSICAL INSTRUMENTS: *Guitars:* Fender Custom Stratocaster and PJ Bass; Gibson Les Paul [2]; Rickenbacker guitar; 1964 Danelectro. *Drums/Percussion:* Ludwig 5-piece kit; Gretsch kit; Noble & Cooley snare drum; Yamaha brass piccolo snare; Sonor Rosewood 6.5x14-inch snare; Gretsch piccolo 4x13, 5x14 chrome, 6.5x14-inch snares; Vintage Paiste and Zildjian cymbals; Vibraphones and Marimba. *Piano:* Baldwin baby grand piano.

INSTRUMENT AMPLIFIERS: Marshall JCM900; 1963 Fender Band Master, 1964 Fender Super Reverb, and Vintage Fender Tremolux head; Groove Tubes Studio Series; Demeter Studio Series; Vintage Marshall 4x12 cabinet; Ampeg B-15

and Jet; Vox AC30; Gibson GA9.

MICROPHONES: Neumann U 47, M 49, M 49B, and U 67 tube mics; Neumann U 47 FET, U 87, KM 86, and KM 84; beyerdynamic M88, M160, and Sound Star; AKG D12, C452, and C414; Shure SM57; Sony C37 tube mics; Sennheiser MD421 and MD504; Electro-Voice RE20; Altec "salt shaker" mics [2]

STUDIO NOTES: Sabella notes: If your guitar sounds good and your amplifier sounds good, with the Neve console — or any high-quality console — your guitar is gonna sound good. That's primary to me as a player. Some really perfectly made precision instruments today have no character. It can be perfect — every note can be in tune — but it's a mannequin. A Les Paul — a '55 Les Paul or a '60 Les Paul, or a '67 Stratocaster, or a '60s Stratocaster — you gotta work to make those guitars sound good! The personality comes across. **PRODUCTION NOTES:** Sabella continues: I've evolved into a player/producer. With my own personal preferences as far as recording techniques, I'm able to bring those qualities to the unsigned talent that comes in here — a one-oneness with the players — so they can realize their own creative groove. It's about understanding the person on the other side of the microphone. **EQ**



The John Lennon

SONGWRITING CONTEST



Categories

- Rock Country
- Jazz Electronic Pop
- Gospel/Inspirational
- Rhythm & Blues
- Hip-Hop Latin World
- Folk Children's

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to enter your original song(s) fill out this application and... just imagine

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ADDRESS _____

APT. _____

CITY _____ STATE _____ ZIP _____

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EMAIL _____

SONG TITLE _____

CHECK ONE: LYRICS INCLUDED INSTRUMENTAL COMPOSITION

CIRCLE ONE (IF PAYING BY CREDIT CARD): VISA MASTERCARD

CARD # _____

EXP _____ SIGNATURE _____

Mail your entry to: **John Lennon Songwriting Contest**
620 Frelinghuysen Avenue, Suite 131
Newark, NJ 07114

each entry must consist of:

- Completed and signed entry form (or photocopy). All signatures must be original.
- CD(s) or audio cassette(s) containing ONE song only, five (5) minutes or less in length.
- Lyric sheet typed or printed legibly (please include English translation if applicable). Sheets not required for instrumental compositions.
- Check or money order for \$30.00 per song (U.S. currency only) payable to John Lennon Songwriting Contest. If paying by credit card, \$30.00 per song will be charged to your account.

Entries must be postmarked no later than August 31, 2000

Please read all rules carefully, and then sign your name in the space provided. If entrant is under 18 years old, the signature of a parent or guardian is required.

2. Prizes: Twelve (12) Grand Prize Winners will receive \$2,000 in cash, \$5,000 in Yamaha project studio equipment, and a \$5,000 advance from EMI Music Publishing. One (1) Grand Prize Winner will receive \$20,000 for the "Song of the Year" courtesy of Maxell. Thirty-six (36) Finalists will receive \$1,000. Seventy-two (72) Runners-up will receive \$100 gift certificates from Guitar Center Stores.
3. Contest is open to amateur and professional songwriters. Employees of JLSC, their families, subsidiaries, and affiliates are not eligible.
4. Winners will be chosen by a select panel of judges comprised of noted songwriters, producers and music industry professionals. Songs will be judged based upon melody, composition and lyrics (when applicable). The quality of performance and production will not be considered. Prizes will be awarded jointly to all authors of any song; division of prizes is responsibility of winners. Void where prohibited. All federal, state, and local laws and regulations apply.
5. Winners will be notified by mail and must sign and return an affidavit of eligibility/recording rights/publicity release within 14 days of notification date. The affidavit will state that winner's song is original work and he/she holds all rights to song. Failure to sign and return such affidavit within 14 days or provision of false/inaccurate information therein will result in immediate disqualification and an alternate winner will be selected. Affidavits of winners under 18 years of age at time of award must be countersigned by parent or legal guardian. Affidavits subject to verification by JLSC and its agents. Entry constitutes permission to use winners names, likenesses, and voices for future advertising and publicity purposes without additional compensation.
6. Winners will be determined by January 15, 2001, after which each entrant will receive a list of winners in the mail. CDs, cassettes and lyrics will not be returned.

1. Each song submitted must be contestant's original work. Songs may not exceed five (5) minutes in length. No song previously recorded and released through national distribution in any country will be eligible. Songs may have multiple co-writers, but please designate one name only on the application. Contestant may submit as many songs in as many categories as he/she wishes, but each entry requires a separate cassette, entry form, lyric sheet, and entrance fee. One check or money order for multiple entries/categories is permitted. (Entrance fee is non-refundable. JLSC is not responsible for late, lost, damaged, misdirected, postage due, stolen, or misappropriated entries.)

SIGNATURE

DATE

AKG C28

A classic mic that came
in many configurations

MICROPHONE NAME: AKG C28

FROM THE COLLECTION OF: Bill Schnee, L.A.

PRICE WHEN NEW: \$320 (list price circa 1965)

YEAR OF MANUFACTURE: 1958 through 1968
(approximate)

TYPE OF MIC: Vacuum tube condenser mic

TUBE TYPE: 6072 (one)

FILAMENT VOLTAGE: 6.3 volts DC at 175 mil-
liamps

PLATE VOLTAGE: 120 volts DC at 0.7 mil-
liamps

FREQUENCY RESPONSE: 30 Hz to 18,000 Hz
(±2 dB)

POLAR PATTERN: Cardioid

FRONT-TO-BACK REJECTION: Approximately
20 dB at 1000 Hz

EQUIVALENT NOISE LEVEL: Less than 20 dB

SENSITIVITY: 1.3 millivolts/μbars in open
circuit

RATED SOURCE IMPEDANCE: 200 ohms @ 1000
Hz, ±15%

DIMENSIONS: 1.03 diameter x 6.853 over-
all length, inches

WEIGHT: 7.05 ounces

MIC NOTES: The AKG C28 as pictured con-
sists of the CK 28 cardioid capsule and
the V 28A amplifier. Several variations of
the mic were produced by AKG, with the
most notable being the C26A, which em-
ployed the CK 26 omnidirectional cap-
sule along with the V 28A amp. For un-
obtrusive use in radio, television, stage,
or public speaking applications, AKG
manufactured two extension tubes for
the system: the VR 29 (13-inch) and VR
30 (39.38-inch). Either capsule could be
attached to the top of a VR tube, which
was then connected to the V 28A ampli-
fier. Since the diameter of the extension
tubes is only 0.275-inch, they are much
less noticeable when used on a podium.

The "EMT" designation visible on
the capsule of this particular micro-
phone indicates that it was made by
AKG for the German company Elek-
tromesstechnik Wilhelm Franz KG in
Lahr/Schwarzwald (other OEM ver-
sions were for Altec and Philips). The
C28 also appears under the designation
C28A, which is actually identical to the
C28. While the C28(A) had an end cap
fixed by three very small screws, the

continued on page 142



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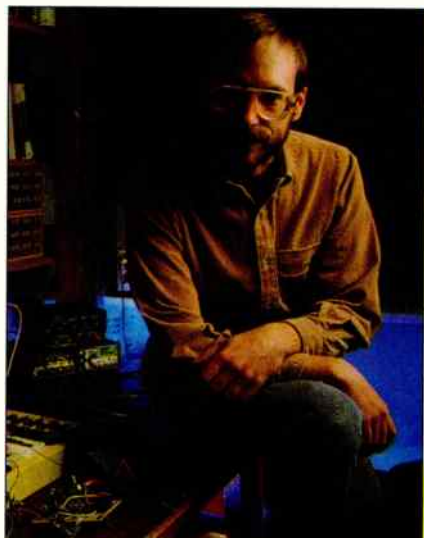
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CIRCLE 71 ON FREE INFO CARD

Adventures in Surround

A look at my first foray into surround sound mixing



BY CRAIG ANDERTON

Some tunes off my *Sexy World* CD have already received the remix treatment over in Germany, but recently I was given the opportunity to check out the world of 5.1 surround remixing. As a "surround virgin," I wasn't quite sure what to expect. However, after hearing what six discrete channels of audio can do for a mix, I must say that I'm hooked — big time.

It all started because George Daly, a record industry veteran who is currently CEO of Above Records, was putting together a label called Flight Records that specializes in producing surround sound CDs in the DTS (Digital Theater Sound) format. He had previously heard a test copy of the *Sexy World* CD, and felt some of the material was particularly well-suited to the surround treatment. So it was time for a quick trip to the San Francisco Bay Area and one of the label's studios (Walnut Studios, which specializes in surround productions).

For those new to DTS, the basic process in creating a DTS CD is to mix down to six mono files (left front, center, right front, left rear, right rear, and subwoofer). These are then digitally encoded into a 2-channel data

file, which gets burned onto a conventional CD. However, this is not a Red Book format CD, even though it can play back on a standard CD player; it's more like a data CD, so hearing audio requires sending the CD player's digital out through a suitable decoder. We used the Millennium Technologies 2.4.6, which, at \$399, is a relatively inexpensive way to get into surround. The decoder produces audio, which goes to six speakers. Walnut Studios uses Yamaha NS-10s for the five main speakers (not necessarily because they're the greatest speakers in the world, but because they're very well-matched), and a Hsu Research HRSW12V 12-inch subwoofer.

Of course, DTS isn't the only game in town; Dolby Digital (AC-3) has its proponents as well. But a lot of musicians feel that DTS, with its ability to generate truly discrete channels, sounds better. Whether it becomes *the* standard is anybody's guess, but it's commonplace in movie theaters (if you've seen *Jurassic Park* or *Apollo 13* in a digitally equipped theater, you've heard DTS in action), and is starting to catch on with consumers.

POWER TO THE PEOPLE

The main barrier to creating a DTS CD has always been the encoding process, which used to require renting an encoder for *extremely* big bucks. But all of that changed in 1999, when Minnetonka Software introduced SurCode, a software-based DTS encoder that runs on Windows computers and lists for \$1995. With SurCode, you take six WAV files, pull them into the program, tell it to create the 2-channel DTS data file, and you're done. Burn the file to CD, feed it into a decoder, and voilà — instant surround. We'll talk about actually encoding and burning the CD in a future article; for now, let's investigate what it requires to make the surround mix in the first place.

PREMIXING FOR REMIXING

Minnetonka also makes a program called Mx51, which is basically a hard-disk recording/editing system optimized for use with 5.1 projects (fig. 1). Superficially, it looks like other DAW programs — a "playing field" with space for multiple tracks of WAV files, along with a virtualized mixer — except for the surround sound panner, subbass (LFE) sends, and a 6-channel monitor section.

Due to hardware limitations at Walnut Studios (since remedied by replacing an aging Digital Audio Labs V8), we were limited to 16 channels (and mono channels at that; a stereo file used up 2 channels). Most of the *Sexy World* cuts, which were recorded in Sonic Foundry's ACID program, had anywhere from 30 to 60 tracks, so some premixing was in order.

We had to decide which tracks needed to remain isolated so they could receive



FIGURE 1

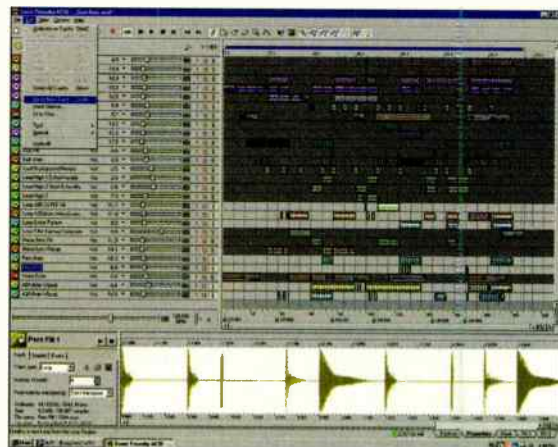
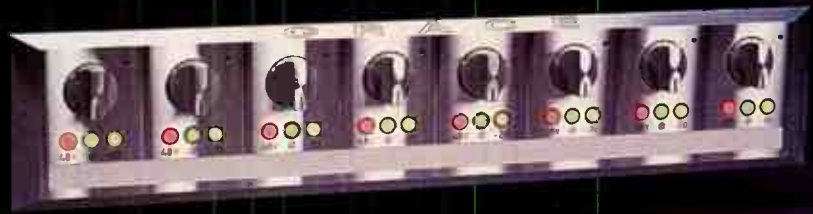


FIGURE 2

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 experienced before"
 -Tom Jung, Pro Audio Review

"The Grace Preamps were stunning and, indeed, beat our
 most costly tube preamps in a blindfold test."
 -Gary Barlough and Richard Zwiebel, Mix

"With the signal flowing, the 201 declares its worth...The
 sound is pleasingly open and uncolored"
 -Tim Goodyer, Studio Sound

"Overall, the Grace 801 sounds great, is built like a Porsche
 and is priced right. Anyone looking for a high-quality
 preamp should check this one out."
 -George Petersen, Mix

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THD+N
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CIRCLE 83 ON FREE INFO CARD

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...the word is out

the full surround treatment, and which tracks could be safely combined and placed more or less permanently in the soundfield. For example, on one tune, we wanted the kick to be able to "float," but premixed the rest of the drums and percussion to two tracks, thus reducing 7 tracks to 2 (fig. 2). ACID makes it easy to premix; you just define the area you want premixed (in this case, the entire song), solo the tracks you want premixed, set the levels to make sure they don't distort, and select "Mix to New Track" from the Edit menu.

Eventually, all the ACID tracks had to be converted to WAV files, all of the same length. As ACID always premixes to a stereo track, even with a mono source, we needed to convert tracks derived from a mono source (such as bass) back to mono in order to avoid using up any more of our precious 16 tracks than necessary. The conversion process involved importing any stereo files into Sound Forge, and converting to mono.

MIXING IN SURROUND

After opening the 16 premixed WAV files in Mx51, it was time to mix. One problem with surround is that only one person can be in

the "sweet spot," so, basically, George would mix, then I'd pop into the spot to check out what he did, and sometimes add a few tweaks of my own.

The key to placement is the surround panner; referring to fig. 1, it's the brown square with the X in the middle. The red ball, which can be placed anywhere in the square, determines where the sound will sit. Mx51 has a very intuitive automation system, which lets you really get crazy with cool surround moves — and, yes, we succumbed to the temptation! But it made artistic sense. For example, in the tune "Goa Girls," there's a point where the entire tune is submixed down to two tracks, which go through an Electrix Filter Factory. Over the course of several measures, the high-pass filter frequency goes higher and higher until the sound just about disappears, then a backwards sound comes in as a prelude to the drums entering the mix. With surround, we had the filtered premix move from front to back, then the backwards part came in from back to front, at which point the drums slammed into the front left and right — a very, ahem, effective effect.

One subtlety with 5.1 is the difference between center placement and merely placing sound in the right and left front speakers to generate a "phantom" center, as is done with traditional stereo. Mx51 has a clever "spread" control that determines the spread of a centered sound, i.e., whether it goes to the left and right channels only, the center only, or a blend of the two. There is a definite difference; anchoring a sound solely in the center channel can produce a very powerful, focused effect.

After getting the mix, it was time to create the master file and encode the CD...but we've run out of space for this month. We'll return to this subject in a future column, and talk about what's involved with actually getting the result into a 5.1 file.

Craig Anderton has played on, produced, or mixed 17 major-label recordings, presented lectures on technology and the arts in 37 states and 10 countries, and written 15 books. He is also the online content editor for the MPN Network (www.MusicPlayersNetwork.com).



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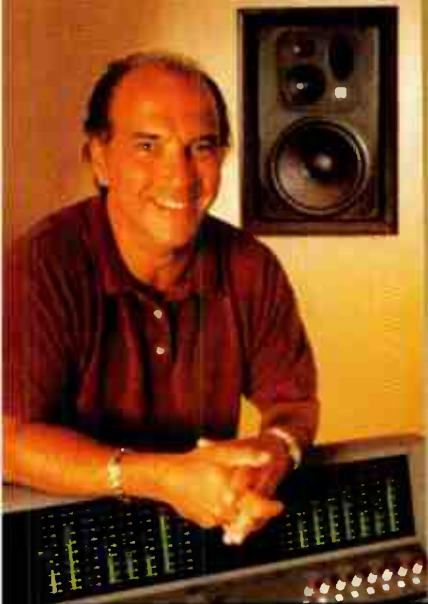
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CIRCLE 57 ON FREE INFO CARD



Neil Karsh is the Vice President of Audio Services for New York Media Group. Recently, Karsh selected LSR monitoring systems for two of his Manhattan facilities, *Lower East Side* and *East Side Audio*.

“We’ve installed the first of our LSR 5.1 surround systems at East Side Audio and it’s a great addition. The sound is extremely clear and is enjoyed by our mixers and our clients. Everyone is very pleased with the result.”

New York

LSR. Profiles

The world’s most noted recording professionals discuss the world’s most advanced monitoring systems.

NO.1: New York / Los Angeles

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David Kershenbaum is a Grammy Award winner who has been on the cutting-edge of music production for decades. His discography is a remarkable ‘who’s who’ of popular recording.

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Los Angeles



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CIRCLE 12 ON FREE INFO CARD

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Eye & I



PHOTO BY JONATHAN POSTAL

If you've got your health,
you've got everything

BY AL KOOPER

This will be an unusual column for me. It will be serious, although, like my other columns, it's about my everyday life. I'm writing about it because perhaps it can help somebody who may find themselves in my situation. I am definitely not the self-pitying type, so please, "don't let me be misunderstood," to quote the 1965 Animals record of the same name.

It started in early December. I remember noticing one day that my vision seemed "different." Now, I'm a glasses-wearing mofo with a good left eye and an unhealthy prescription in my right one. My vision seemed worse somehow, but I couldn't tell exactly why. Three days later, I happened to close my left eye and noticed a problem with the right one. It seemed like the aftermath of a flashbulb shoot. My vision was clouded, obliterating a great deal of the straight-on sight in my right eye. This was on a Friday — I couldn't get an ophthalmologist appointment until Tuesday. *To say the least, I was worried.*

Now, I have gone 55 years without

noticeable health incidents. No cancer, AIDS, loss of limbs, or even a broken bone. Five years ago, I was diagnosed with Diabetes 2 — but I quickly got that under control with a severe change of diet. Truly a lucky guy. I've been blessed in that way, and I never take it for granted. Tuesday came, and I sat in the doctor's chair with my pupils dilated as he repeatedly stabbed and raped my eye with blinding lights. Later he told me soberly that he had made an emergency appointment for me the next day with the head of the Neuro-Vascular Department at Massachusetts General Hospital. He thought there was a serious problem with my right eye.

That night, I stared repeatedly out of the right eye with my left eye shut. After a minute or two, I could close that eye and "see" a glowing pattern that basically outlined the extent of my sight loss. In the new doctor's office, I took a test with just my right eye. I stared into a diorama-type box and pressed a button every time I saw a flashing light within my field of vision. The test took approximately ten minutes. A short while after I was done, the nurse handed me a sheet of paper. On it, the pattern I was able to "see" in my head with my eyes shut was clearly drawn. They had been able to document the exact outline I had seen in my head! With these results in hand, I received the doctor herself. An elderly, white-haired British woman, she had not the slightest thread of a sense of humor:

"You've had a stroke in your right

eye, brought on, I believe, by diabetic origins. Your sight loss is most assuredly permanent. The end arteries in your right eye are most probably blocked, and your optic nerve appears to be swollen. Through medication, we will attempt to thin your blood and get it back into the eye to prevent further sight loss. We will also attempt to stop the swelling of the optic nerve with anti-inflammatory steroid treatment. There is no cure for this, and the methods we attempt are empirical; that is, from patient to patient, we are experimenting to try and stem this sort of damage."

I sat there stunned. Never for a moment did I consider permanent sight loss and yet, right off the bat, here it was. Two thirds of the vision in one eye — gone forever in one terse doctoral paragraph.

The doctor then went on to describe a worst-case scenario of the side-effects of each medication. The one for the steroids was particularly gruesome. She didn't flinch when I told her I was considering not taking them because of these possible side-effects: "You think about it tonight and let me know first thing in the

morning. We must get moving right away."

I went home and called one of my friend's uncles, who is the author of a major diabetes book and a respected west coast doctor: "Yes Al, it's a serious drug, but she's only got you taking it for three weeks in a tapered dosage. The

continued on page 144

*I sat there stunned.
Never for a moment
did I consider permanent
sight loss and
yet, right off the bat,
here it was. Two thirds
of the vision in one
eye — gone forever
in one terse doctoral
paragraph.*

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Tom Rothrock and Rob Schnapf



PHOTO BY ED FREEMAN

The trailblazing producers/engineers talk shop

BY MR. BONZAI

Bonzai: What did you do with the Foo Fighters?

Rothrock: We mixed their first album at The Shop, our studio up in Humboldt in a 100-year-old barn. It was the first music heard from the band after Curt Kobain died and Nirvana ended — lot of attention on that record.

Schnapf: The studio is state-of-the-art '70s gear: API DiMedio from Wally Heider IV, and a Stephens 24-track.

What did you do with Beck?

Rothrock: I asked him if he would like to mix some rap with his folk music — this was when he was the quintessential Bohemian folksinger. So you created Beck?

Rothrock: No, Beck was Beck. We just took a straight-up folkie and put some beats to it. We tried it with another folksinger a year before and it was a disaster. She was crying because we had destroyed her songs. When we suggested it to Beck, he grinned and said, "You mean we can f*ck stuff up? Take little pieces and repeat it, turn it around?"

Schnapf: "Loser" was the first song we did with him — it took a total of six and a half hours.

What did you do with Moby?

Rothrock: Did some mixes this year,

here in Studio 1 at Sunset Sound.

Richard Thompson?

Schnapf: Recorded, mixed, produced *Mock Tudor*, his latest.

Elliot Smith?

Rothrock: We're mixing now, and we've been recording on and off for a year and a half.

Schnapf: This is our third record with Elliot.

How long have you two guys been working together?

Rothrock: 11 years.

Didn't you both start as lowly studio runners?

Schnapf: Janitors at Record Plant.

Rothrock: Rob had engineered at a studio in Washington, DC before that; and I had worked at Cherokee. We met at Record Plant.

And then you both made the move up from assistant engineers?

Schnapf: We were never assistant engineers. It didn't make sense to me. I was an engineer — am I supposed to patch something in for somebody else?

Suspects: Tom Rothrock and Rob Schnapf

Ancestry: Rothrock: German; Schnapf: Austro-Hungarian.

Occupation: Tag-team engineers/producers. Both do both.

Birthplace: Rothrock: Manchester, UK; Schnapf: Bronx, US.

Residence: Los Angeles & Humboldt, CA.

Vehicles: Rothrock: 1950 faded green Chevy pickup; Schnapf: '76 Pinto.

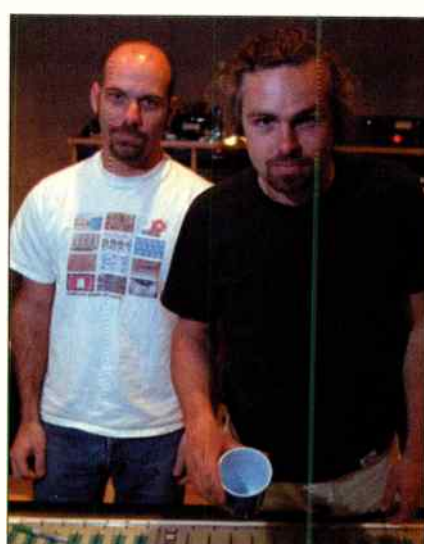
Diet: Deli or Mexican — "Greenblatt's or Los Burritos."

Identifying Marks: Rothrock has a 12-inch scar on abdomen from a barbed wire accident; Schnapf has a 4-inch scalp scar from where a tree fell on his head, which allegedly enables him to hear higher frequencies than normal humans.

Credits: Foo Fighters, Beck, Moby, Elliot Smith, Richard Thompson.

Location of Interrogation: Sunset Sound

Location of Photos: Extasy South



ROTHROCK AND SCHNAPF PHOTOS BY MR. BONZAI

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Rothrock: I just wanted to be an engineer because I wanted to work with bands. But I saw that the engineers got a lot of crap from the producers, so I figured I would be a producer, too. We skipped a few steps.

What was your first job together?

Rothrock: Doing a record with Brett Michael's girlfriend. He was in Poison and wrote a song for Stevie Nicks, which we

recorded. One thing leads to another.

Can you tell me about some of your favorite gear?

Rothrock: We like Studer tape machines, 800's and 827's.

Schnapf: API consoles.

What gear do you haul around with you?

Rothrock: We have a mountain of gear. We always travel with "The Device" — here it is, a Philips tape echo device with one

record head and four movable playback heads. It erases, records, and then plays back at four different intervals. It's '60s tube technology, and it's the only one we've ever seen. If you want that great echo sound, like on a Rockabilly record, this is it.

Schnapf: Fat and warm, works for everything.

Rothrock: We like compressors and echo devices, so we always travel with



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Schnapf: And here is a nice tube microphone built into the body of a Maglite flashlight. We call it the "Mag-mike." Jeff McLean built it.

Rothrock: We also have a lot of mics built by Dave Royer before he started manufacturing. We knew him when he was building them in his mom's kitchen. Favorite studios?

Schnapf: Capitol "B." Abbey Road. Sun-

set Sound, 1 and 3.

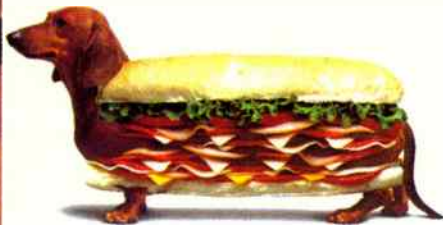
Rothrock: Ocean Way, Cello, NRG, and it was nice mixing at Brooklyn [now Extasy]. Bill Dooley, who was at Record Plant when we were janitors there, does an excellent job running the Extasy compound.

What's wrong with the music industry?

Schnapf: No more artist development.

Rothrock: There is always a search for the great talent, and it's always in short supply. From the corporate viewpoint, there are never enough high paid executives.

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What music would you like played at your funeral?

Schnapf: Albert Ayler, "Holy Ghost."

What do you listen to while you're driving?

Rothrock: Britney Spears.

What is the first music you remember hearing?

Rothrock: Sgt. Pepper's.

Who were your heroes when you were getting started?

Schnapf: Bob Ezrin. Jimmy Page.

Rothrock: Mutt Lange. I bought the AC/DC record, I bought the Def Leppard record — hey, it's the same producer.

Do you know any interesting business tricks?

Schnapf: Well, yeah — you are being billed right now.

Rothrock: Keep it real. Don't get too detached. Don't let too many people carry your guitar.

Schnapf: 'Cause at some point, you are going to be carrying it again.

Who is the most amazing artist you've worked with?

Rothrock: You can learn a great deal from a bad recording experience.

Schnapf: How to do something never again is a great lesson.

Rothrock: And the sessions that are the most fun — are they the greatest?

Working with Richard Thompson was one of the greatest recording experiences we've ever had, but is that ultimately going to be more rewarding than this Elliot Smith record? It feels harder because we started and stopped so many times, instead of just knocking it out in a month.

Schnapf: Both different — and reward-

continued on page 140



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Taking it Hard

Mike Clink, the man behind some of the world's most popular hard rock tracks, reveals his secrets for getting a good mix

BY HOWARD MASSEY

If you bumped into Mike Clink on the street, you'd never guess his occupation. Soft-spoken and thoughtful — even (dare we say) clean-cut, he looks more like your local shopkeeper than the man behind the powerhouse

sound of hard rock stalwarts Guns N' Roses, Whitesnake, Triumph, Megadeth, and Sammy Hagar. A self-described frustrated guitarist, Clink paid his dues assisting and engineering at L.A.'s Record Plant in the '80s for pop artists like Jefferson Starship, Eddie Money, and Heart — experience that he says, "helped me to be able to add some musicality into the hard rock bands I now work with." Today he is a popular and well-respected producer, and, after talking with him, it's easy to see why.

You've established your reputation producing hard rock bands like Guns N' Roses, yet you're such a laid-back, mild-mannered guy! Is it a case of opposites attracting, or are you really a wild man when you get into the studio? If I was as wild as some of the bands I've worked with, nothing would ever get done! I don't know about opposites at-

tracting, but they actually work really well together. When people are going crazy, I'm the center, I'm the hub. I can keep it together when everyone is scattered and moving in different directions. I think that's one of my strengths.

Did your experience as a guitarist help you when working with people like Slash, people who are very fussy about their guitar sounds?

It definitely helped because I really was able to understand what he wanted and I understood the little nuances that guitar players can add into their playing. Because of that, I know when someone can do it better and I know when they can't do it better. It also helped in getting sounds; in knowing what worked and what didn't. In the case of the very first Guns N' Roses record, we were developing the sound. They didn't have any gear. I think Duff may have had a bass and a cabinet with no head; with Slash, we went

through 40-some amplifiers trying to get the right sound for him. We actually went through that same process on the second album also, because he didn't have the amp that we used on that first project.

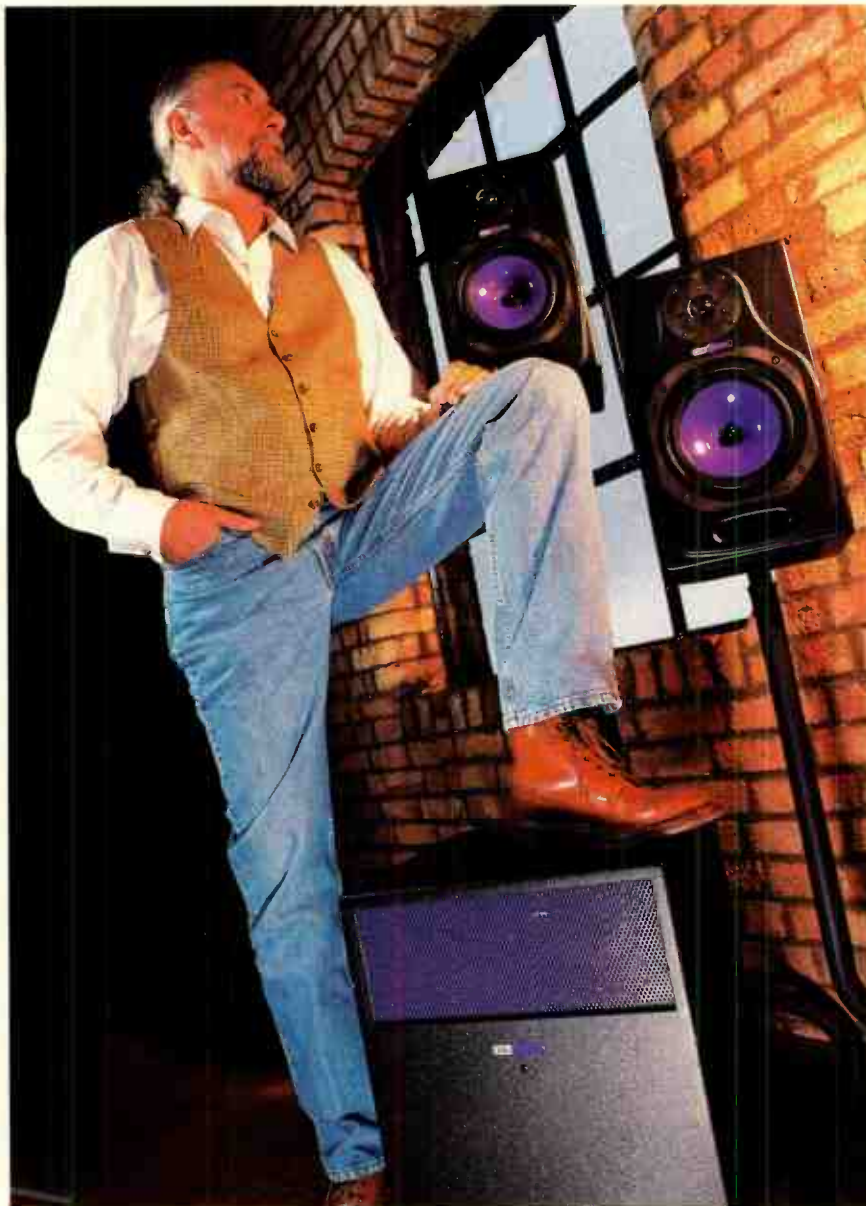
Some producers view their role as simply capturing a band's sound. Yet you're saying that, at least with Guns N' Roses, they really didn't have a sound and you had to work with them to craft one.

Well, they had a sound — they just didn't have the means to accomplish it. Guns N' Roses were who they are and that never changed, but we worked on getting the right sound for Slash and Duff. It was very deliberate, and, when we got it, it was amazing. For the



PHOTO BY EDWARD COLVER

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Left: Mick Fleetwood with HHB Circle 5 active midfield monitors and Circle 1 powered sub-woofer.

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drums, Steven [Adler] didn't own a kit, so I rented a kit that I thought would be appropriate. That became the sound that we used on the first record. I would say it's 50/50 as far as bands having their own sound; I did another band called Pushmonkey and they definitely had their own sound. They had integrated a lot of effects into their guitars, and it wasn't so much me changing their sound as it was stepping it up a little bit and maybe changing the songs a little and making it work together. **But with Guns N' Roses you had a very definitive idea in mind before you started and you worked towards that.**

I think we all wanted to make a classic record, and I knew what that entailed. So we worked together to make sure that the sounds were not contrived, that they were real, and we worked towards that end. I knew there were certain amplifiers that weren't going to cut it and I knew the kind of guitars to use. When I first started working with Slash in rehearsals, he had a Jackson guitar and it just wasn't right for what we were trying to accomplish, so I said, "How about a Les Paul?" We got him this Les Paul and he fell in love with it and that's the guitar he still uses.

After the record was made, then the band had to set about replicating the studio sound on stage.

They could do that — they definitely had that sound, once we went through that process. That's the beauty of being able to do this — once you develop the sound, you incorporate it and it becomes your sound. When they went onstage after the record was done, that was their sound. It wasn't that they had to grow into it — they had to grow into some of the performances, but they didn't have to grow into the sound because it was there. We had taken it and developed it, and when they hit the stage and Duff plugged into his bass cabinet, that was it, it sounded like the record.

Do you have a tried-and-true formula that you use when recording electric guitar?

My basic approach on electric guitars is to use a [Shure SM]57. I'll point it exactly dead on, though I might move it an inch or two to get the right sound. I'll also listen to each individual speaker; any time there are multiple speakers, I'll move the microphone to hear which is the most pleasing of the speakers. But I'm also open to suggestions if a band has recorded something on their own and used a microphone that they like and that may be exactly what you're talking about, part of their sound. I won't say no, I'll listen to it and, if it's better than what

I'm doing, then we'll go that route or else maybe use a combination of the two.

And I change microphones on acoustic guitars. My tried and true is an [AKG] 452. When I recorded all those acoustic numbers with Guns, that's what I used; I used a ton of them. But I just did a record with Sister Hazel, and Ross Hogarth was one of the engineers that worked with me on that project. He brought in some B&Ks that he owned and, oh my goodness, the sound that we got from those was completely unique and crystal clear. It may not work for every single artist, but, in this case, it was perfect — the shoe fit. So everything is not etched in stone. But you have to have a starting point, you have to start somewhere. You take a left, you take a right, and sometimes you go back to the starting point because that's the thing that works out. But that's my philosophy: have a place to start and then experiment.

What's the craziest guitar miking technique you've ever used on a record?

I think it was probably with UFO. Michael Shenker was playing through a Marshall stack, and we had that miked in a traditional way with 57's, but then we also put a Pignose in the room and put one of the Anvil cases over the top of it and dialed in a sound and put a microphone on that. It kind of picked up the rumble in the room, and we got a nice blend between the Marshall and the Pignose.

Do you typically use room mics when you do guitar overdubs?

No, I use close miking. You know, years ago, room miking was *the* thing to do. But with the advent of better reverbs and better sounding delays, close miking has come back. We were limited as to sonically how good a delay would sound with those old Eventides. They were good, but they weren't great, and they had a particular sound, but you knew you could get a better sound by moving the mic away from the cabinet. With the advent of better gear, I found that I didn't necessarily

need to do that because you could add all these different effects and you weren't limited by how far away the microphone was. By changing the different parameters of the outboard gear, you can get a multitude of sounds and get it just right for the track. **Do you typically use limiting when you record a guitar?**

Yes. I'm a big fan of dbx 160's, the old-style original ones with the VU meters.

What sort of ratios do you use?

Four to 1. Maybe we'll have a gain reduction hit, just tap it, maybe 2, 3 [dB], something like that. I don't want to take away anything from the sound, I don't

want the guitar player not to be able to feel exactly what he's doing. Used sparingly, I find that it does add to the sound.

Do you ever mic the strings of an electric guitar?

Yeah. On the Fuzzbubble record, I miked the strings on the electric in the intro and outro to one of the songs. It's just an electric guitar with a faint amp sound, and most of it is the actual strings of the guitar. But it's got to sound good acoustically, so you've got to have the right guitar and the right guitarist. In that instance, we used a [Gibson] 330; it had a really nice sound to it and so it worked. For the microphone I probably used a 452, or I may have used a [Neumann] U 47 tube.

What other acoustic guitar tricks have you come up with?

I think that the biggest issue with acoustic guitars is the guitar itself, making sure that you have the right one. Some guitars sound great for picking, some sound good for strumming. Then the next process I go through is selecting the pick. The pick determines quite a bit of the sound when someone's playing, so I'll experiment with a soft, medium, and heavy pick and make that choice. You can even tape two picks together surrounded by a dime or a nickel so you actually get two plucks on a string — that's kind of a neat effect. Another thing that I've used on gui-

"If I was as wild as some of the bands I've worked with, nothing would ever get done."

tars instead of a pick is Q Tips — those long swabs they use in the studio to clean the heads on the machines. I use them to tap on the strings. It gives a neat little sound, almost like a dulcimer kind of effect.

What about mic selection and placement on acoustic guitars?

My tried and true is the [AKG] 452 and I'll also try a tube mic like a 47 or a [Sony] C24 or C12 or Telefunken — or, after working on that Sister Hazel record, the B&Ks. Because every guitar sounds different and everybody plays the guitar differently, I move my head around to see where the best sound source is. Before I ever place a mic on an acoustic guitar, I've got my ear moving around a radius trying to find out where the right sound is coming from. Sometimes I'll use multiple microphones, a blend, using one to get more of the strings and one that will get more of the whole experience.

Do you tend to use bass amps in the studio or just the DI signal?

I always use an amp, with the choice of amp determined by the sound of the band. There are so many great new bass amps. I've used the SWR system quite a bit on the last couple of records I've done; I really like those amps. The Trace Eliots are great, too. I think you can get so much more out of an amp — you can get a bit more grind out of it, a bit more dirt out of it — than you can from just plugging a bass in directly. Even trying to use pedals doesn't accomplish what an amp is doing, it doesn't move the air. But with an amp, you can really tap into the strings and into the low bottom.

Will you ever use it to the exclusion of the DI or always both together?

I favor the amp. A lot of people will do a rough mix for me and I'll see that the DI fader is louder than the amp fader, and the first thing I do is switch it. I just like the sound of bass amps.

The hardest thing for many engineers is getting a tight low end; getting it punchy instead of flabby. How do you accomplish this?

I'll always listen to how the bass sounds with the drums. I never go for a great bass sound on its own because that doesn't work. It's got to be able to work within the constraints of what you have drum-wise and, to some degree, guitar-wise — but especially that relationship between the bass and kick drum. That goes for almost everything you're working with — you can't just get a great guitar sound and expect it to work in a track.

You've got to listen to everything around it to see how it's going to work. I think that's one of the keys.

When you line the faders up [to do a rough mix], you should actually be able to hear the bass. If you have to push the bass up high, then you know that the sonics of what you are trying to accomplish are not quite there. Not that everything should be in a perfect straight line, but when one instrument's fader level is so much higher than the others, you know that something is out of whack, that the sonics of it are not able to compete with what's going on in the track. I'll listen to multiple speakers. I'll listen to see how it works with the NS10's, to see if they fold if you push the bass signal up. That's telling you that you've got too much low sub on it; you'll have to filter that and get a little string sound in there to get it to cut a bit.

Do you typically compress the bass as you are recording it and then again as you are mixing it?

Yes, though I never recompress everything through the same set of compressors. I always record with my [dbx] 160s — I have quite a few of them because I find that they are fast and quiet — so when I'm mixing, I'll put the signal through a different compressor like a [UREI] 1176 for guitars or bass or an LA-2A for the bass.

Why do you use a different set of compressors?

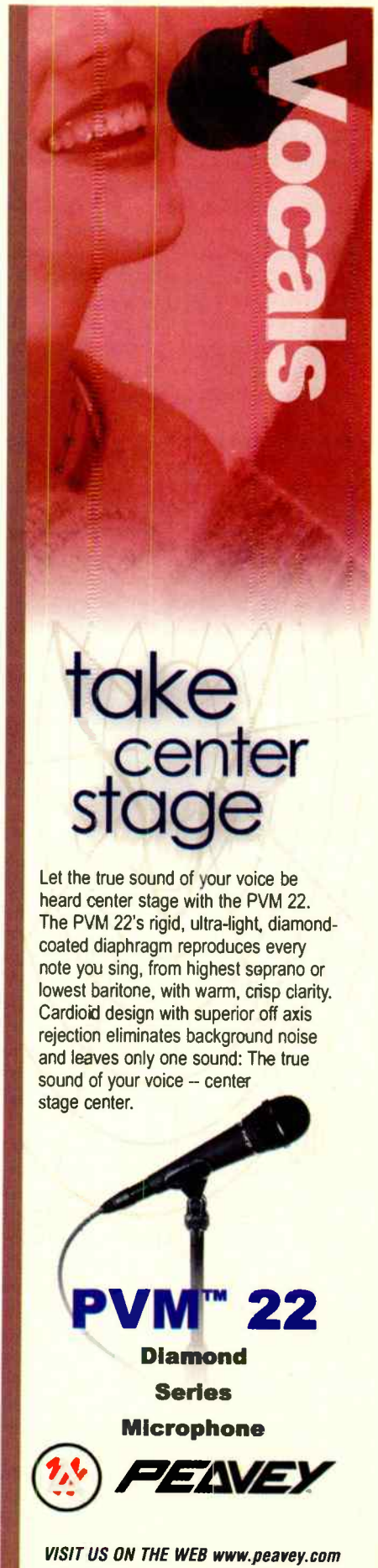
Because it's almost like adding a different EQ. When I mix, I rarely run [a signal] through the same EQ that I recorded it with because each circuit has its own sound quality, so it adds a little different flavor.

So the concept is that you use one set of equalizers and compressors on the way in and a different set on the way out.

Exactly. One of the compressors and EQs that I've fallen in love with is the Avalon 737. Brilliant piece of gear, really nice. It sounds clean, it's punchy, and the EQs on it are amazing. So I'm starting to use more of the Avalon stuff now, even though I have Pultecs and Langs in my rig.

I gather from this equipment list that you are very much an analog person.

I'm an "analog in" kind of person, but as far as the actual storage medium goes, I'm kind of changing my thinking. The fact that everybody uses Pro Tools now raises the standard on the playing field a bit. Whereas you used to have drums that would move around a little here and there, now what you do is you throw



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them into Pro Tools and tighten them up. I like the sound of drums to tape, but the logistics of going from tape to Pro Tools and then back to tape gets a bit complicated with sync issues, so it gets a little more time-consuming. I'm still grappling with what the exact way that I'm going to do things, but I'm thinking that probably what I will do is go into Pro Tools and, once I get everything chopped and cut and edited, then put it back to tape so I have that sound. I love the sound of analog; people use tape like a piece of outboard gear. I think that you get less fatigued listening to analog all day than when you listen to digital. Digital won't play anything until it's processed all the numbers, while tape kind of has a gentle slide as it starts and it doesn't just hit you. I've noticed when I'm working on digital all day, it's like taking a pounding. It's like the difference between working under fluorescent lights versus incandescent lights.

Right, that's a pretty good analogy. So, yeah, I'm an analog guy, but I see the beauty of Pro Tools and digital editing systems. I have a little Pro Tools rig in my office that I use to edit things.

What do you think of digital compression and equalization?

I like my [analog] EQs and I like my compressors; I haven't found any great compressors or EQs in Pro Tools yet. I do like some of the plug-in effects they have, like Amp Farm, being able to take the drums and put them through Amp Farm to make it sound a little smaller. It's funny, because in the old days we'd try to make the drums sound bigger; nowadays, we try to make the drum sound smaller. There are a lot of bonuses to going into digital editing systems; they can do things that you just physically cannot do in analog, or if you can do it in the analog world, it takes forever. The downside is that I get frustrated when a musician comes to me and says, "Well, you fix it." My attitude is, "I know I can fix it, but I know you can play it, too, so if you can't get it now, practice it overnight and come back and we'll do it." Because your job as a musician is to be proficient in your playing and to write songs. So by at least not trying, you are selling yourself short. If you can't get it right the second or third time, I'll use the technology to enhance it, but I want everybody to at least try to get it on their own first. Also, there is a lot to be said for vibe. **On basic tracks, do you prefer getting all the musicians in a room and playing off of each other?**

That's how I start; I'll get everybody in a room playing together. If there's a problem with someone nailing a part or if one person's kind of pushing a track or dragging it, I'll eliminate that element or put it down in the headphone mix so much that it's not really a consideration. People play differently when they're playing together; I've proved that point time and time again. When someone comes in and says, "I don't want to hear any of the other guys — I want to play on my own and then you can add in the other guys," I'll have him play the track by himself and then I'll have him play it with the band. Then I'll play it back, and 10 out of 10 times they'll like the track that they are playing with the other guys. One of the things that still keeps me excited about recording is that I love a great performance. I love it when the hair on my arms stands up on end — it's magical. It's happening less and less now, but when it happens, it's wonderful

Perhaps the single most important role of the producer is to be the one person who can identify when something is nailed and it's time to stop. Often the artists themselves don't even know it; I've heard many stories of magical takes when people in the control room are blown away, but the band's saying, "Let's do another one." **What sort of criteria do you use to determine that?**

That's why people hire a producer — that's their job, to be that outside influence. I'm convinced that bands working on their own always want to outdo the last take. They're always grasping for that carrot, always thinking, "The next one's gonna be better than the one I just did." I think artists go past that point many times, so your job as a producer is to know when to say no. And in order to be a good producer, you need to be able to know when that happens. That's something that starts to happen all the way back in rehearsals. You kind of walk around the room and you learn what the strengths and weaknesses of the band are. It becomes even more apparent when you start cutting your first tracks. So it doesn't take me more than a day to figure out how hard to push each musician. At the point where I feel that it's a great performance and it's not going to get any better, I'll make the decision to stop. If the artist wants to try another one, I'll definitely try it, but I'm not going to lose what I have because I'm usually right.

Having to erase tracks is pretty much a thing of the past, unless you're working with analog tape under severe budget restrictions.

Right. With digital you save everything, and that's a problem, too. I've learned that, in the Pro Tools world, less is better. You don't need ten performances of a drum track in order to edit it. You just make notes and say, "OK this is good, that's good, the verse is good, the chorus is good," and that's how you assemble it. You don't need track after track after track to put it together; that just makes things worse.

What psychological gambits have you come up with for eliciting the best performance from a singer?

The number one pointer that I can give is to visualize what you're trying to say. When I'm sitting in the control room during vocal takes, I always have the lyrics in front of me. If I close my eyes, I'm trying to see in my mind if the singer is telling me the same story as what he's written down lyrically. If you can do that, that's the biggest hurdle to overcome. A vocal can't just lay there in a linear manner; it's got to take you up and down, depending on what the lyrics are trying to say. If it's sad, you want it to bring tears to your eyes, to make you a little misty. If it's "F*ck you," you want to hear that energy and emotion. If you can do that — if you can look at your lyrics and listen to your vocals and say, "It's telling the story and it's taking me on a journey" — then you've accomplished a great performance. If I'm not feeling it from a vocalist, I'll tell them so. I'll get them to draw from within, to tell that story. There has to be emotion behind the words, no matter what you're saying — I think that's the key.

How do you get a problematic vocal track to sit in a mix?

I try to get it to sit right as I record it. It gets back to my thinking that, if you have to push the bass up too high, it tells you there's something wrong with the track. The same thing goes for vocals. When you're actually recording them, there are certain warning signs that tell you, previous to mixing, that something's not right. You either don't have the right microphone or your compression ratio is incorrect, and you need to rethink what you're doing in that respect. Or you don't have enough gain going into the compressor, or too much gain. These are all the tell-tale signs of what makes a vocal track work.

I think one problem with home recording is that people tend to get a sound and just leave it — they think it's going to work for every song. And it doesn't, because, in a ballad where you're projecting a lot less, you're going to have to crank things to hear all those deep breaths. It's all about being able to work the microphone, your proximity to the microphone, the air that you're pushing, the settings of the mic pre, how much you're sending to the compressor.

I also ride the faders as I'm recording; when the guy is singing the vocal, I don't just sit there and listen to him. I'm feeling the emotions in my fingers, so to speak. When he's down, I'm pushing him up so I can hear every single syllable. It's kind of a performance. As you do multiple takes, you actually learn the moves as you're recording it. And I'm following where he's going as far as how much he's projecting. So by the time I get to the mix I've done a lot of that fader riding. My chain is usually a [dbx] 160 when I record the vocal, and an 1176 when I mix it, because it adds that bit of brightness and it almost makes a vocal sound a little more alive.

Do you typically record vocals with EQ or do you record flat?

It depends on the microphones that are available and on the vocalist himself. I might add a little bit of EQ just to bring out some presence, maybe around 7k, or maybe even some top at around 12k to add a little sparkle and clarity. But I don't over-EQ on the record side; I tend to add more EQ when I'm mixing.

So your advice is to do the work as you're actually recording it.

Exactly. When your rough mixes are sounding amazing, you know that you're onto something. If your rough mixes aren't sounding good, something's not right. So before you get to that process of mixing and trying to figure out where the vocal is going to fit in, you should know ahead of time, yeah, that's right, this is good.

How long do you typically spend on a mix?

I tend to start around noon. By maybe 10 o'clock at night, I'll have it done. But we'll leave it up overnight so we can listen to it with fresh ears and fix anything that needs doing in the morning. Hopefully it will only need minor changes and we'll move on pretty quickly.

How do you usually build your mix?

If we're in the analog world, it's important to get things as quiet as possible, so I start by doing the mutes. Then I'll start

working on the drums first and then the bass, but I'll always bring things in and out to hear the song because I get bored listening to just one instrument on its own. So I'll be working on the drums and then I'll put the guitars up and I'll try to see how they're working with the EQ that I've put on the drums. Same thing with the bass: I'll put it in next to see how it's working and then bring in the guitars and vocals to see how that's sounding. I know there are people that start with the vocal and then bring everything else around it, but I just don't know that technique; I don't have a clue how to do it like that. So I start with the rhythm section and then bring the vocals in.

How do you set up effects during a mix?

I usually start with a couple different standard reverb and effects settings, though I'll change the parameters if they're wrong. First thing I'll do is change the delay times to match the tempo of the song. Sometimes I'll change reverb lengths, again depending on the tempo of the song. But I tend to use less and less effects and reverbs as it goes. I think we only used one or two reverbs on the whole [Guns N' Roses] *Appetite For Destruction* record. A lot of times people add so many different reverbs that they compete with each other and it sounds incongruous, it doesn't seem to jell together. I think the reverb has to be the glue that makes everything sound like it was recorded in one setting, so I'll feed multiple instruments into one or two reverbs.

Do you think there's too much emphasis placed on technical skills these days?

You know, whenever I record a project, I make a book. In it I write down every single thing I do, down to the microphones used, the compression amounts, everything. I give it to the band when we're done — I don't want it, because I do things differently each single time. Inevitably, they'll call me up a year later when they decide to do their next record on their own and say, "Hey, this doesn't work even though we're doing everything like the book says." That's because it's all about subtleties. If something doesn't sound right, I'll go out to the studio and move the mic an inch, and that can make all the difference in the world.

This interview is excerpted from Howard Massey's new book, Conversations With Record Producers, soon to be available from Miller Freeman Books.



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Surround Solutions

Tips and techniques
for dealing with all those
new channels

BY MIKE SOKOL

Since I've been mixing in surround for the last year, as well as tracking with 5.1 in mind, I've learned a few lessons along the way that might be of help. Here are some new products and techniques I've been playing with that can help make your life easier when dealing with 5.1 surround issues, as well as plain ol' stereo recording and sound reinforcement.

EVERY BREATH YOU TAKE

Watch those 'plosives in the studio. It's never been more important than now to clean up your audio tracks. Since I've put a big M&K subwoofer in my studio, I've found dozens of mixes from both major label CDs as well as my own projects that had serious subsonic information. I'm talking the "Rumble in da Jungle" sort of thing, where you can feel the truck traffic going by in the street outside the studio. While many of the new breed of affordable condenser mics come packaged with reasonable shock mounts, few have anything that works properly as a pop filter. Moreover, since the LFE channel in Dolby Digital AC-3 is rated to pass audio down into the single-digit frequencies (as low as 5 Hz) anything you put in a surround mix is des-

igned for infrasonic examination by the consumer's subwoofer in their home theater system. So not only do you have to watch for air conditioner noise and traffic rumbles, but vocal blasts, and any other infra-sonic garbage as well.

Breath blasts from singers that don't quite bottom out a condenser mic may not be noticed on a set of small speakers, but when the track is mixed into a song destined for a DVD or DTS project, those blasts of air get routed to the subwoofer automatically via the bass management filters in the receiver. This even happens with relatively tame instruments like acoustic guitars, which can produce rather large "whoofs" of air. That sort of thing is what makes a subwoofer in the living room try to jump off the floor with every infra-sonic "plosive."

What to do? Glad you asked! You could put up a traditional pop filter that looks like panty-hose stretched over a darning hoop, but that may not be the best solution. For one thing, it can accumulate all sorts of oral by-products (that's *oral*, not *aural*) that we don't want. Secondly, putting up a piece of cloth between the talent and your lovingly crafted condenser mic can cause coloration of the sound. I've been playing with an alternative to panty-hose for the last several months (and please, no snickering from the back of the room). It's a unique pop filter from Stedman called the Proscreen 101. Its all-metal construction means that it can take a run through the dishwasher for hygiene

control, but, more importantly, it's got to be the most transparent sounding pop filter I've ever laid ears on.

The basic physics is as follows.... Instead of a bunch of small holes in a piece of cloth to disperse a direct wind blast, the Proscreen 101 is made with hundreds of tiny air-foils that redirect the air blast downward while still allowing a direct path for the sound to reach the mic. It's really quite clever in that you can literally blow at the windscreens and never feel your breath on the microphone side. In addition, the price with a gooseneck mount is a very reasonable \$59. Check it out at www.stedmancorp.com or call them at 888-629-5960 for more information. Incidentally, I'll be doing a full review of a number of pop filters and shock filters in an upcoming issue where I'll rate them all for effectiveness and ease of use. So stay tuned.

MURDER BY NUMBERS

I really like getting the gain structures of all my gear matching properly. This not only makes for having all the knobs and faders pointing in similar directions, but it allows you to optimize headroom and signal-to-noise ratios for your entire signal path. But what about connecting consumer gear into a pro-sound system? This situation reared its ugly head for me on my last Surround Sound Tour where I wanted to use the output of a consumer surround decoder to directly feed a Martinsound MultiMax Monitor controller. And, as you've guessed, the little Panasonic decoder had a -10 output, while the



MURDER BY NUMBERS: The Ebttech Line-Level Shifter.

Multimax wanted +4 (plus four) coming in. This not only meant I couldn't get enough monitor gain to shake the roof, but when I switched sources back to my console output, there was a horrendous 14 dB jump in volume level. Talk about wake the dead!

Lucky for me I had been in contact with Ebtech, who makes the Swizz Army Tester I reviewed last month. They had a little rack-mount product called the Line-Level Shifter. Basically, this is a box of high-fidelity transformers with TRS jacks that can be used to make -10 signals into +4 and vice-versa. I just plugged the six analog outputs of the surround decoder into the -10 jacks of the LLS, plugged the +4 jacks into the wiring harness going into the Multimax, and I was in gain city.

Ebtech also makes a 2-channel stereo version of the Line-Level Shifter as well as a 1:1 ratio matcher called the Hum Eliminator in both sizes. Both products can be used to break those nasty ground loops between different pieces of gear, as well as give you a for-real transformer-isolated balanced output and/or input on any piece of gear. I've requested an 8-channel version of the Hum-Eliminator to try on my FOH console and crossover for when I rent in racks and stacks that don't have transformer-isolated inputs on the amplifiers. Usually it takes hours of chasing ground loops until we hit upon the right combination of grounds and lifts. But I think this box, hung on the output of my FOH drive rack, may make all the hum-business just go away. I'll let you know how it all works out in a few months. Check out their site at www.cymantion.com for more info or call 858-271-9001. The retail prices start in the \$75 range for the 2-channel boxes, up to around \$285 to \$345 for the 8-channel versions. In addition, since all these boxes are passive, there are no batteries to wear out or power supplies to fry.

MY SECRET DECODER RING

In last February's *EQ* magazine, I wrote an article on how to put a Dolby Digital Surround file on a Red-Book CD-R, and get it to play back from a CD player hooked to a Dolby Digital decoder. While that was a little ahead of its time last year, now it seems to have taken off like my kids in the Crayola Factory. Check out my Web site at www.soundav.com for the latest information on the subject and a test Dolby Digital AC-3 file you can download and try yourself. It really is a blast to hear something you've mixed played back through a proper surround

decoder, and, while it's not complicated technology, there are certain brands of gear that seem to work with everything I throw at it. So since I've gotten dozens of inquiries on what I'm using for a surround decoder, here's the scoop.

I've had the best luck with an inexpensive consumer decoder from Technics called the SH-AC500D. This little \$200 beauty not only decodes Dolby Digital and DTS format surround files, it will also pass through six channels of analog signal. There's a simple bass management controller, and multiple S/PDIF inputs in both optical and coax flavors. In addition, it has a volume control for the digital inputs, that, unfortunately, doesn't control the level of the six analog inputs. Oh well, you can't have everything for \$200. This is the least expensive way I've found to test your DTS and Dolby Digital surround mixes. I've also discovered that I can put all three file formats (PCM, DTS, and AC-3) on the same CD-R, and the SH-AC500D will play them back, properly recognizing stereo, DTS, and Dolby Digital formatted data streams.

Oh, by the way, did I mention that DTS is now licensing their encoder as a software product? Available from Minnetonka Audio as part of their SurCode product line, with it you can do the full 5.1 mix and surround encode in your own computer without your digits ever leaving your hands. You just use Minnetonka's Mx51 surround mixer to pan the audio into the proper speakers, put this 6-channel output into SurCode to make either a Dolby Digital or DTS encode file, then burn a surround CD and play it back through the SH-AC500D decoder to hear how your mix sounds on a home system. It's really is that simple! Go to their site at www.minnetonkaaudio.com to test-drive Mx51 or check out the latest information on SurCode. Or call them at 612-449-6481.

BLINDED BY SCIENCE

One of the biggest challenges for me with this whole surround sound on a CD-R thing is that most DVD players won't recognize all brands of CD-R media. Moreover, while you can burn a CD-RW disc that will read in most DVD players, it won't play in regular CD players. Gaaaaaaa! This has to do with the dye formulations not being "seen" by the laser beam frequency in the DVD player. And if you've ever looked at the color of CD-R media, you'll see several different dye and reflective layer colors. I don't have a

continued on page 144

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Adventures in Sound Design

Jason Rubenstein makes music out of some pretty strange sound sources

BY STEVE LA CERRA

Here at *EQ* we've heard about some pretty strange recording techniques and sonic adventures, but Jason Rubenstein has used some of the oddest sound sources on his CDs *Cathedral* (available from Gearhead Music) and an as-yet untitled project (to be released in the spring of 2000). From kitchen doodads to radio static, Jason and co-producer/musician Roman Morykit have turned some very interesting noises into music.

NO STATIC AT ALL?

Even without music on-air, the AM and FM radio bands are capable of emitting interesting sonics, so it was only natural that Jason and Roman took advantage of the

various squeaks and squawks that could be coaxed from the dial. "We actually used sounds from the radio in a couple of different situations," begins Jason. "One was scanning the AM or FM radio band (fast enough so we couldn't get into any copyright trouble), and using it in a musical context. Instead of adding a shaker or other traditional percussion instrument to lift a section of a song or to occupy the high end, I'd add radio noise. In addition to covering a part of the spectrum that the arrangement required, it also gave a feeling of ambience to the track. It's a bit of isolation, a darker mood. Most people associate the radio with being by themselves, maybe in a not-so-well-lit room. Glenn Gould used to say he'd put himself in a room and scan the radio dial to get a complete sense of distance and isolation. I didn't want quite that intensity, but I wanted a sound that would give a taste of that feeling. In the song 'Image III,' it's a huge, expansive bed for a processed Wurlitzer sound. In 'Image V,' it's placed in the arrangement where somebody might have put in a muted trumpet.

"In the bridge section of 'The First Day,' we used it as a percussive kind of a thing. You hear this chopped up sound that could have been a shaker. It's essentially the same part, but with a different sound."

"In the song 'Iceland,'" Roman continues, "we went a little further with the concept of radio ambience. We actually took bits of words, put them into Bias Peak, and then edited out any large gaps of silence or the parts we couldn't use. Some parts were turned backwards, so it was in the spirit of using a sample without using the actual sample. After it was edited down to a reasonable size, we put it into Cubase, which was sync'd to ADATs. If you listen carefully, it almost has a lyric content to it."

APPLE STOCK

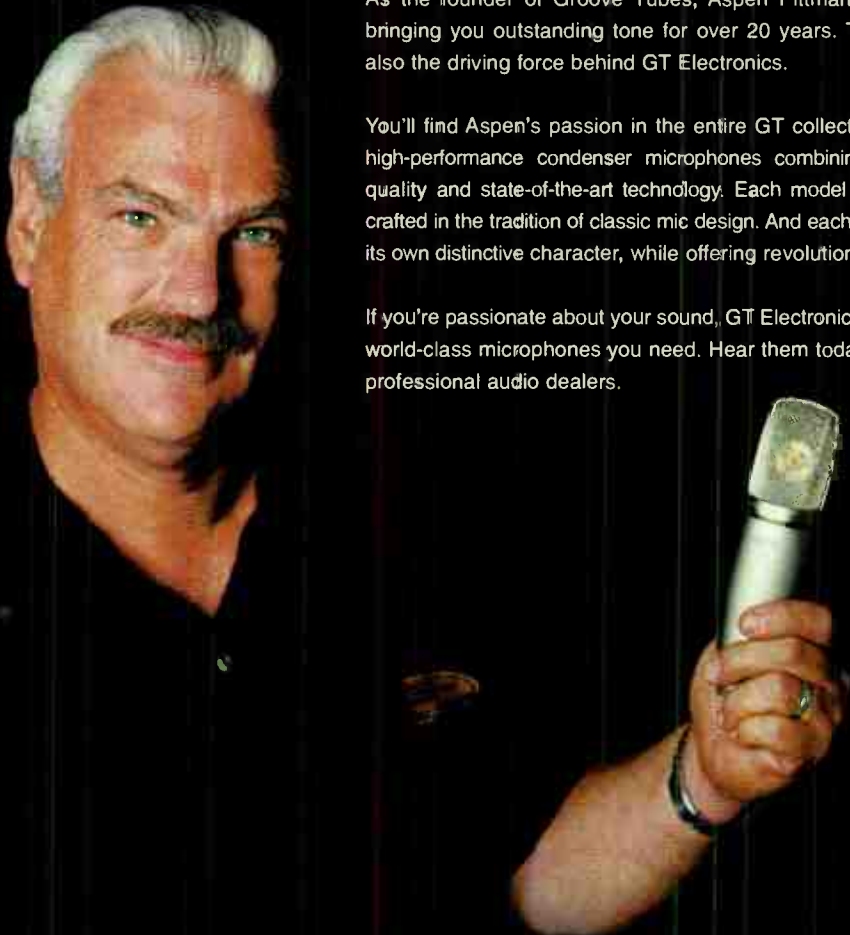
Cubase and Peak are run on an Apple G3/266 MHz in Jason's studio, and Jason admits that the computer recording is down-and-dirty. "You have to use your gear to its maximum advantage. We're using Apple's stock, 16-bit, consumer audio interface. The Apple



HOUSE MUSIC: Jason Rubenstein (seated) and Roman Morykit have found a creative way to add sounds to their songs using common household objects.

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folks put in such a good card that the only limitation we've hit is that we can't have a ton of tracks running simultaneously. But one or two tracks at a time with effects is not a problem. It was a question of taking our monetary resources and applying them in the best places. It works because we dump everything to ADAT for mixing, so the G3's built-in converters do what we need them to do."

Throughout the recording of both CDs, old recording techniques used in the '60s came together with sampling and computers for songs like "Wired Angel" and "Siobhan."

"Take, for example, the 5-gallon water bottle," reveals Morykit. "We played it like a conga and miked it with a Shure SM81. On *Cathedral*, it was played as an instrument, though on the new record we sampled and looped it for eight bars. I tucked the bottle under my arm and we pointed the '81 right at the middle of the flat part, about 4 to 6 inches away. If you hit the bottle with just the pad of your thumb, it produces a really warm, resonant sound — which is amazing. At times when you smack the rim of the water bottle, you almost get a tabla-type of sound. These were instruments we wanted to use, but didn't have on hand, so we went around the apartment smacking things and listening to them."

When Jason further explored recording the 5-gallon water bottle, he came up with some interesting observations: "If you mic the water bottle with an SM81 at a 30- to 45-degree angle from the top (i.e., the flat part) you get a very strong signal — a lot of volume, a very throaty sound with emphasis in the 200 to 300 Hz range. If you place the mic perpendicular to the mid-section of the bottle, you get more top end and less weight. Once you place the sound within the context of a song and play a conga rhythm, the listener thinks, 'Oh, that sounds like a conga. But wait... it's not quite like a normal conga...' In the context of another song, it feels like a tabla part, but it's the same blue plastic bottle."

CRATE AND BARREL?

On their forthcoming CD, Jason and Roman used a 6-ounce wine glass from Crate and Barrel to create a synth pad. "You know that trick you do at a wedding where you rub the edge of the glass?" muses Jason. "It's an incredible sine wave-based sound and it's loud as hell. What I wanted conceptually was to sample it three times and loop each one: one

hard left, one center, and one hard right. The oscillations vary depending upon how you play it, and you'll never get the same set of oscillations or phasing twice. It would have taken forever for the three to come back to one (i.e., the downbeat).

"I recorded that using the SM81 with the pad at -10 because the glass was so loud. The mic was 4 inches from the glass at an angle of about 45 or 50 degrees. I had to put a bit of water on the tip of my finger to get it going when I rubbed the edge. If I put the mic perpendicular to the side of the glass, the gain was maybe 12 dB less than it was at the off-axis spot, 3 to 4 inches away. I moved the mic around to see where I'd get the widest frequency response. Then I'd just let it go.

"I did that three times, and what we wound up with is the most amazing pad sound, which also doubles as a melody. I used an Ensoniq ASR-10 to sample it, and I could play it from about G above middle C down to about two octaves below middle C. Because we sampled three layers, you don't hear the ultra-low, horrible gasping sound that samples can have when they are phasing in and out. I used the ASR-10's internal effects for a very mild chorus to thicken it up a hair, and also a delay to bounce it around. It's almost like something you'd hear on a freaky sample CD."

OPEN SESAME

While the wine cellar may have been one place for Jason and Roman to get sounds, the kitchen was another that proved just as resourceful. According to Roman, their studio has "many different kinds of shakers, such as the avocado or lemon from Remo, and we have the eggs as well. The shaker would sound great in the room, but in the track it's this huge 'shhhh-kkk-aaaakkkkaaaa.' You have to gut so much out in order to get the right kind of shaker you want. So we came up with the sesame seed canister — which you can buy in a grocery store for about \$2. On its own, it's barely audible in the room, but mic it with a Rode NT2, and it's perfect. We'd use the low-cut on our Mackie to take off 80 Hz and maybe a bit of cut around 380 Hz to reduce the room ambience. Add a bit way up top and you get this beautiful transparent shaker. I've used it twice, and there's maybe 1/4-inch missing from the top (of the canister). No one is allowed to touch it!

"I opened up a kitchen cabinet and looked at the spice rack. There was a plastic bottle of peppercorns, so I'd shake it, pour some out, shake it again, take some

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out... I imagine that if you had a shaker that needed a slightly raspier sound, you could add a couple of peppercorns till you had the right feel and frequency response! If you're on a budget, no one will know, and it really comes down to using your ear and what's available. Even if I had a studio full of the latest and greatest gear, I'd still go back to the sesame seed shaker or peppercorns!"

GATING THE TRACK

Jason recalls living in a building "with an ancient, squeaky iron gate in front, which I recorded with a DAT machine. By itself, the sound can make your hair stand up. But when we were doing the song '8-Inch Tacks,' we needed a sound that would be in the midrange like a guitar or voice. We were looking for a lead instrument, but wanted it to be strange and somewhat deranged. The record is somewhat dark, so we wanted something voice-like, but not really. Vocal-synth pads are too overused for my taste. So we sampled this iron gate and it sounds very sinister — like someone screaming and wailing. It has a very middle-eastern flavor, especially since the scale was sort of a bastardized Spanish Phrygian. It

gives the song quite an exotic vibe. I had to do a bit of filtering because it had such a wide spectrum of sound that it would step on the other instruments."

THE ULTIMATE STUDIO SYNTH

Although Jason and Roman have become adept at manipulating sound, Jason maintains that "having better gear doesn't make you write better music. In fact, it may work against you because you'll stumble in the technological minefield while trying to get your point onto tape. You do have to learn how to use the gear, but when you're writing, it's not the time to be learning a new gadget.

"It comes down to using the studio itself as a synth, but in the context of the song — not using odd sounds just for the sake of having an odd sound in the track. It didn't occur to me until later on but we might start the signal chain with an SKB drum machine case with no foam inside and then throw some ball bearings into it. You have a person playing this 'instrument' instead of an oscillator. Add a mic, mic pre, compressor, and the computer, and what you have

created is a sampler. If the console is in the signal path, then you have very basic filters (i.e., the EQ section), but if you run the sound into Cubase, you'll have 4 filters: 2 high and 2 low. This is an amazing electronic instrument that you cannot go out and buy. The studio has become an instrument in the same way a drummer uses the entire kit as a single instrument. You can take a sound and make it unrecognizable so that, at the end of the signal chain, we have something completely synthetic, constructed through using the entire studio as a method of subtractive synthesis. You're using it every time you record a sound — it's the ultimate patchable synth."

Jason Rubenstein and Roman Morykit may be reached at Off The Beaten Track Recordings, 323-860-0891. Their CDs are available through backroads.com, amazon.com, songs.com, and echoes.org. Senior editor Steve La Cerra's latest CD, Flight, is available on amazon.com, cd-now.com, and by calling 800-448-6369.

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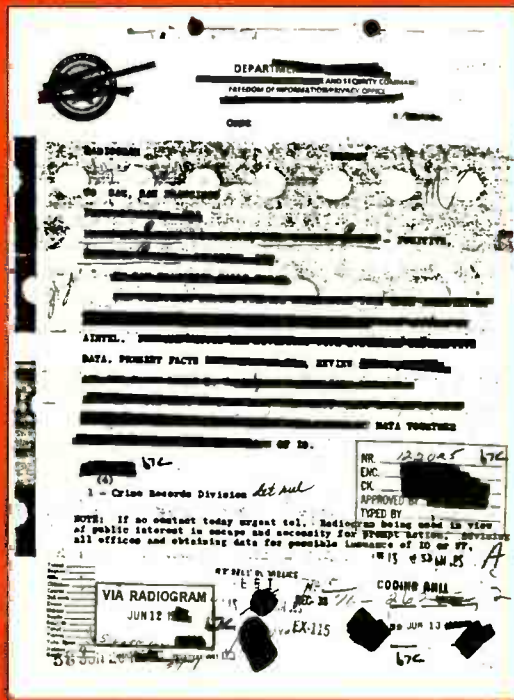
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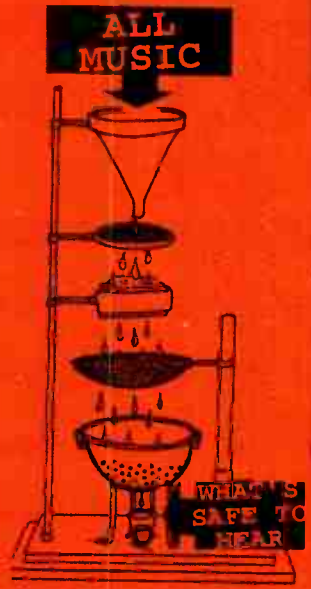
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Wrong for America 

The Trials of

WEDNESDAY

**Jason Miles takes on
the daunting task of
assembling some of
today's finest musicians
for a Weather Report
tribute disc**

Story by Steve La Cerra
Photos by Eleonora Alberto



The Trials of

There are some things in music that really shouldn't be attempted unless you know that you're going to be able to pull them off right. The rash of "tribute" records produced over the past few years has proven that some music is — shall we say — best left alone. Lucky for us, that is *not* the case with Telarc's forthcoming release *Celebrating The Music Of Weather Report*. Masterfully produced and arranged by Jason Miles, this wonderful CD treads respectfully on what many musicians and producers consider sacred ground, while at the same time bringing a fresh perspective to songs that have been with us for more than 20 years.

Jason Miles explains where the idea for *Celebrating The Music Of Weather Report* came from: "I was doing some work with Jay Beckenstein [*founding member and sax player in Spyro Gyra —Ed.*] for his upcoming solo record, and I worked up a template arrangement for the song 'Black Market.' Jay really liked it, and he mentioned to me how no one has ever done any modern arrangements and recordings of the Weather Report material. So I started thinking about it and began doing demos here at the studio. Most record companies reacted with, 'Who cares? Weather Report? It's old..,' but, fortunately, Telarc was interested in the concept.

"These are amazing songs," continues Miles, who has worked in the industry with notables like Miles Davis, Luther Vandross, Michael Jackson, and Marcus Miller. "You can't forget them because the melodies are imbedded in your brain. We have to bring them into the next century and the next generation. Now that all this time has gone past, you have to listen to them, understand them, and say, 'How do I view these songs today? What's currently happening in music that I can bring to these songs?' Well, I appreciate where today's groove is coming from, but I also appreciate that the dominant force in music should be melody and lyric. If we can bring those things together with synths and great musicians, we can show people that great music doesn't die. Weather Report were visionaries, and they should be recognized constantly — not just when they're actually doing the music."

For this labor of love, Jason recruited a cast of players that reads like a who's who of modern day instrumentalists: Chuck Loeb, David Sanborn, Randy Brecker, Will Lee, Dennis Chambers, Dean Brown (guitarist), John Patitucci, Vinnie Colaiuta, Marcus Miller, Joe Sample, Michael Brecker, Omar Hakim, Victor Bailey, Marc Quinones, Andy Narell, Cyro Baptista, and, of course, Jay Beckenstein — and the list could go on. Assembling a list of suspects of this caliber into the same room at the same time would be a daunting task — both in terms of scheduling and finances. That's precisely why Jason produced the record in the manner which he did — using EMU/Ensoniq's Paris hard-disk recording system as the technical nucleus of the record.

Before the actual recording started, Miles carefully worked out charts and arrangements in his studio, sequencing parts on his Akai MPC3000. For each song, he spent roughly "3 or 4 days, working 12 hours a day to create templates for the musicians to follow. I programmed some pretty intricate parts. Like, if I knew



Steve Gadd was going to play on a tune, I tried to program the drum part the way Steve would play it. I was showing the direction I wanted to go in, but I also left room for the musicians to be creative. I might give a song to Dean Brown, and say, 'Give me some of that Dean Brown-raga-funk.' And he'd do his thing within the structure of the tune."

According to Miles, creation of sonic timbres went hand-in-hand with development of his arrangements: "I'm tired of preset sounds. Everyone uses the same presets. You have to layer the instruments to make it interesting and give it dimension. So many sounds are linear. I think my recordings have a lot of depth, whether it was synth programming with Luther or Miles, or for my own productions. I use EMU samplers — mostly the Emulator 4, though sometimes I'll use my Ensoniq ASR-10 for sample playback. Besides the samplers, I have four main instruments: the Generalmusic Equinox, the (Roland) JP8000 and JD990, and the (Korg) Z1. Those are separate from my piano and Rhodes sounds, which I layer using a Generalmusic Pro 2, the Kurzweil K2000 and K2500xs (the '2500xs also serves as my master keyboard), and the Roland MKS20 — which gives me a solid bottom end. Sometimes I put a phase shifter on the Pro 2 and blend that in for layering a Rhodes sound. Some of the low-frequency synths you hear on the record came from either the JP8000 or the miniMoog. That miniMoog used to belong to Mike Brecker. I bought it from him and had Studio Electronics put it in the rack box and MIDI it."



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The Trials of

In addition to the keyboard and synth sounds, Jason also used some percussion loops on the CD, noting that one of his favorites is the *Raphael Padilla Percussion Slam*. "I love that CD because not only do you have Raphael playing the grooves, but it was engineered by Eric Zabler, so it sounds great. I also like *Liquid Grooves* from Spectrasonics and *Latin Groove Factory* from Q Up Arts. If the groove is coming from an audio disc, then it's an analog transfer into the Emulator, but if it's a CD-ROM, then I import it digitally.

"Either way I'm always time-compressing or time-expanding because the loop is never at the exact same tempo as the one I'm working in. I can't sacrifice the feel of the song just because the tempo of the loop is a certain BPM, but, at the same time, I'm not going to pull a loop that's at 80 BPM and try to use it in a song that's at 96. That's insane. It's never that far of a stretch. More like 85 to 89 — something like that. I usually trigger the loops from the MPC.

"Before I even started a song, I'd put together

sounds and loops first. I might go through 25 loops before I picked one to use in a certain part of the song. Deciding which sounds and loops to use is another entire process. There's a lot of mistakes you make, like getting the wrong sounds or realizing the ones that you were using suck! And you start all over again. Let's get real — it's not like, 'Oh it's been perfect from the beginning.' There were times when I was working on an arrangement and the sounds didn't work in it. At that point, I go back to the beginning and say to myself, "The most important thing in the song is still the foundation and the structure: the bass, rhythm section, and the drums." Groove and chord progression make the song what it is. Whenever I start messing around with a song and put all the other crap in it before the song is done — it sucks. But when I finish a song with a strong arrangement and foundation, and then start adding stuff on top, it always works. you have a great rhythm

track, you can do anything you want on top. But if that foundation is not right, you cannot save it."

There's a lot of mistakes you make, like getting the wrong sounds or realizing the ones that you were using suck! And you start all over again.



Once the arrangements were completed, Jason started laying parts down in his Paris system, which is run with an Apple G3 computer and includes two Glyph 9 GB hard drives, the Paris Modular Expansion Chassis (AKA MEC) interface with EDS-ADI, EDS-A8oT-24, and EDS-A8iT-24 expansion cards (more about those later), and the Control 16 Hardware Mix Surface. Analog keyboard sounds were often patched into an ART Pro MPA tube preamp ("for a bit of attitude") and recorded into Paris via the MEC's 1/4-inch analog inputs on the EDS-A8iT-24 (24-bit) card. Quarter-inch analog outputs on the EDS-A8oT-24 card allowed Jason to run reference mixes to cassette and monitor on Event 20/20's while working on the tunes (more recently, Jason has been using KRK Exposé E8 monitors in his room).

ADAT 'N PARIS

While a large portion of the recording took place at Jason's project studio, some of the recording — drums for example — was done at Shelter Island Sound (NY). Moving the Paris MEC and computer to another studio was simply "not an option," says Jason. "This is delicate equipment, and moving it around is asking for trouble." Miles' solution was to use an EDS-ADI (ADAT interface) module installed in the MEC to provide ADAT Lightpipe I/O. This allowed him to digitally send a stereo reference mix to two tracks of an Alesis XT20 for creating a work tape. Since the EDS-ADI also provides an ADAT sync interface, Paris acted as a master to the XT20 machine during the transfer process — so the reference mix on ADAT was locked to the "master session" in Paris. When recording at Shelter Island Sound, Jason would bring the ADAT tapes with reference mixes and record the drums on the remaining blank tracks of the tape.

Once the drums were recorded, Jason returned to his studio with the new tracks where he would re-sync the ADAT to Paris and digitally transfer the tracks back into Paris via Lightpipe. Jason notes that, although the ADATs store 20-bit digital audio words and Paris stores 24-bit words, there were no problems in the transfer process.

There were instances where (due to scheduling difficulties) Jason built the entire song in the manner described. He might send a cassette and chart of the song to a player ahead of time, then bring them into the studio and record their part onto ADAT. When the session was done, he'd

take the ADAT tape(s) back to his studio, dump the new instrument into Paris with the rest of the "master session" tracks, and then create another updated ADAT work tape — perhaps to be brought to a different studio for an additional instrumental overdub.

On one occasion, Jason sent a reference ADAT to Marcus Miller, who was working in Los Angeles at the time. Marcus recorded his part on the multitrack tape and sent it back to Jason. Once Jason had the tape, he locked his ADAT to Paris and transferred Marcus's part into the project.

THE SUPER BOWL

John Scofield was one of the musicians who played on

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The Trials of

the song "Cucumber Slumber." Jason set up a date at his house for the session, "knowing that Scofield would be bringing his guitar amp. I started looking around my house, thinking, 'Where can I record this guitar amp?' That's when I started going into different rooms, clapping my hands to hear what the acoustics were like. I clapped in the bathroom and it sounded good, so when John brought up his Mesa Boogie amp we put it in the bathroom and miked it. It was a killer. Nice-sounding bathroom. John'd tell you, if there was a bathroom to go in, that's the one!

"At the time, I was using a Mircrotech Gefell UM70S, which is a really nice mic. I plugged that into a DW Fearn VT-2 mic pre, which is absolutely fantastic. I was looking for a preamp that would warm up the Paris and add a little character, and I think the VT-2 made a big difference in the sound of the recording. We also used it for overhead mics on Gadd and (drummer Vinnie) Colaiuta. Anyway, for Scofield we recorded straight to ADAT because I didn't have the whole song ready to put into Paris just yet.



The dominant force in music should be melody and lyric. If we can bring those things together with synths and great musicians, we can show people that great music doesn't die.

The arrangement wasn't totally there yet and I was running some MIDI tracks live, so we went to ADAT for speed. Then I transferred the parts into Paris later. A lot of times I'd finish the song on the ADATs, bump the whole song into Paris, and then stay in Paris for the mix."

Marc Quinones's percussion was recorded "right here in front of the fireplace," says Jason. "We used two Shure Beta 57's into the DW Fearn preamp. Some of Marc's parts were recorded live into Paris and some went to ADAT, depending on the song. We just set it up — all of us in the same room — and listened to it coming back off tape to make sure it sounded good. The whole thing is in getting the sounds down on tape the right way. We monitored with headphones to avoid leakage from the speakers. Plus it made communication so much easier, being right in front of each other."

When it came time to record John Patitucci's bass, Miles used a Hardy M1 mic pre, which he describes as "very different from the Fearn because it's solid-state. The Hardy has a very neutral sound. I recorded John without any compression and added that later. I'm hoping to get a digital console later on where maybe I'd put the compression on tape or use some of the Waves plug-ins, but, for the Weather Report project, I was more concerned with getting it right to tape.

HEY, BACK UP JUST A MINUTE...

In addition to expediting the recording process, transferring tracks to and from the ADAT tapes provided Jason with something very important: backup tapes. "I went through a few crises," admits Miles, "like a hard-disk crash. I panicked a bit, but the guys at Glyph were great in helping me out. They have their sh*t together. It wasn't so bad after all because I had been backing up the new tracks every day. That's how you build the library. Initially, I'd back up the entire song, but then I realized it's redundant. I've been hearing a lot about digital dropouts on some of the formats like digiDAT and CD-R, but what are we going to do about it? You can only do so much. By the end you have to give it up and let it go.

"I didn't do any backup to CD-R because the songs were way bigger than a CD-R could hold. I'm not a big proponent of using CD-R for backup during the process, but, at the end of the project, it's a good idea for archiving. I have about 30 ADAT tapes in the studio with backup data for this project. When I did a session with drums, I recorded it to ADAT three times: a master, a safety master, and a safety II. It's Steve Gadd, or Marcus, or Chuck Loeb. I'm not going to spend an extra eight bucks on another ADAT tape? If you get a

continued on page 142

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Blue Ribbon

The people have spoken — and here is what you think were the coolest new products introduced at the AES Convention this past September. Thanks to everyone who visited www.eqmag.com or mailed their picks to us. Our editors' choices also appear on this page. And if you disagree with anything here, that's why we have a letters page.



Best Software Interface:
Sonic Foundry Vegas Pro



Best Console:
Yamaha's PM1D Live Console



Best Recorder (Tie):
Fairlight Merlin



Best Recorder (Tie):
Mackie HDR24/96



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Best Software Recorder:
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Editors' Picks

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State of the

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mini report

The Battery Park festival in Cologne, Germany reveals the current trends affecting the performing engineer

State of the Performing Engineer

Today's Performing Engineer

The latest performing engineer trends revealed

By Craig Anderton

If you want to know what's happening with performing engineers, DJs, and electronic musicians, there's no better place to tap the pulse than the Battery Park festival in Cologne, Germany. This 10-day festival, held every October, has evolved over the past three years to become the premiere event that ties together the dance/electronic music culture. Featuring artists from Germany, France, the United States, Austria, Great Britain, Switzerland, Sweden, Russia, Spain, Argentina, and more, it's truly a state-of-the-art melting pot of the latest musical trends. Events include DJs, workshops, live bands, videos, and label parties.

The festival was held in four clubs (Liquid Sky, Roxy, Blue Shell, and Six Pack), with special events at the Kunstwerk hall (which holds several thousand people) and, for the first time, an ambient-type DJ event at the Cologne Aquarium, which was pretty amazing — music floated through the air as easily as fish floated through their tanks. Many events were going on simultaneously; on a typical evening (morphing into morning, of course) you could catch a dozen live acts, a dozen DJs, a workshop, and several parties. If you wanted to see it all, you simply couldn't. But you were never bored.

With Cologne being groomed to be a major media capital in Germany, even the city's Kulturamt Koln (part of the city government) was behind the festival, realizing that attracting a computer-savvy, highly artistic crowd would help bolster the scene. Other sponsors ranged from software manufacturers, to synth manu-

facturers, to Heineken beer.

So what were the trends? Several stood out.

- "Tag team" DJs.

I saw more groups of DJs and fewer individual artists this year; one particular group of DJs from Austria consisted of about a half-dozen madmen (and madwomen!) spinning vinyl as fast as they could cue it up. Far from being chaotic, these teams are quick on the draw, shuffling rapidly through discs, making quick cuts, and generally rocking the house in an energetic fashion that individual DJs are hard-pressed to duplicate.

- **Female DJs.** Women DJs may still be somewhat of a novelty in the U.S., but at Battery Park, there were plenty of DJs providing the female perspective (see the picture of DJ Rebecca above for proof). They can rock just as hard as their male counterparts, but there's no denying they bring a different flavor to the proceedings. There were also several male/female duos, creating a sort of yin/yang vibe to the proceedings.

- **More groups.** There were still solo artists hunched behind computers, but I saw many more 3-, 4-, and even 5-piece bands compared to last year. For example, Rei\$\$dorf Force, the headlining band for the opening night party, not only had three synth players, but a bassist, guitarist (yours truly), a DJ, and two MCs. And the mixing board has graduated from a signal combiner to a musical instrument, as detailed in Dr. Walker's article on "Rocking the Mixing Board" in this section.

- **More traditional instruments.** In previous years, it was a rarity to see instruments with strings; this year, not just Rei\$\$dorf Force, but other bands were integrating more traditional instruments (although not necessarily in traditional ways — see Peter Gorges's article in this issue on how he mutilates a Hammond organ).

- **The laptop breakthrough.** What a difference a year makes: last year, there were quite a few groups who lugged their tower or desktop computers on stage. This year, laptops ruled — often running Sonic Foundry's Acid, which frankly was never really intended for live use. As a result, individual players often had more compact setups, which was important



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CIRCLE 14 ON FREE INFO CARD

State of the Performing Engineer

given that there were frequently more people on stage.

What's coming next year? I can hardly wait to find out. Meanwhile, enjoy this year's Performing Engineer special. Electronic music continues to heat up on the other side of the Atlantic, and we're starting to feel some of the heat over here.

The Performing Engineer's Perspective

A look at the role of EQ when doing crossfades between tunes

By DJ Snax

Much of a DJ's technique involves smooth transitions from one track to another. But when you're trying to do a slow crossfade, it's easy to run into situations where the tracks work against each other — playing both hihats together might produce an overpowering high end, the kicks might be doing different patterns, or two bass lines might even be in different keys. We're not talking multitrack source material here, so you can't just pull down, for example, the bass or hihat track. But there is a solution: EQ.

The role of EQ in a DJ mixer is very important, especially if you're spinning "4 to the floor" house as I do. Many DJ-oriented mixers have high, midrange, and low EQ knobs for each mixer channel, and one way to use these is to create more seamless transitions when crossfading between two tunes. For example, suppose you're playing a track on channel one. The crowd is grooving, and you have your next slab of vinyl waiting to be spun on channel two. But there's potential trouble in vinyl-land, because the track on channel two has a bass line that's gonna step all over the bass line the crowd hears from channel one. Or maybe the kick drum pattern is too busy on channel two, but you like the vocal sample that comes in and only want to mix that in with the track on channel one. The crowd is waiting...

Never fear. You take out the low end on channel two and start mixing it in. The vocal from channel two mixes perfectly with the track on channel one, and there is no intrusive bass line or kick drum because you've turned down the low end on two. Now, when you're ready to bring in the track on channel two completely, fully mixed, turn down the lows on one and bring in the lows on two at the same time. I usually switch the low ends right on the one of the beat, as this makes for a smooth transition. (It's probably a good idea to boost the volume a little on whatever channel doesn't have the low end so it doesn't get drowned out; besides, that's another excuse to keep turning things up, which is always fun.)

Now you can get real crafty with the mid and high EQs as well. Take liberties with the records and make your own mix. Bring the highs up to ear-splitting levels, then turn them down completely and boost the mids so it all sounds like it's underwater — which can make for a very psychedelic sound. Or work the midrange rhythmically on the beat to emphasize the snare and other backbeat elements. The main point is to be creative with the EQ knobs; they're not just set-and-forget controls.

Well, I hope you liked my little DJ lesson. But, remember, there's only one rule on technique for DJ'ing and that is *make up your own rules!* See ya' in da house. *DJ Snax is a fixture in the New York City and Cologne music scenes. Check out his latest LP with TJ Free, Bedroom Productions, on the El Turco Loco record label.*

The Making of a Monster

Reform that pawn shop reject into a productive member of society

By Peter Gorges

Ponder a Hammond belching out filthy sounds: images of hirsute prog rock heroes, stages obscured by impenetrable fog banks, and classic rock concerts immediately come to mind. In short, you're reminded of your parents.

Any mention of hardcore techno evokes images of the last truly angry young men decked out in improbable sunglasses with women in little else, spinning wax and concocting truly nasty sounds on suffering synths — in a nutshell, your kids.

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State of the Performing Engineer

what this odd little tale is all about.

Encouraged by the judgment-impairing properties of Koelsch, Cologne's trademark lager, some friends convinced me to appear on stage at the Battery Park festival with Cologne remix hotshots Dr. Walker and Reinhard Schmitz on beatboxes and mixer, Thee Joker on bass, and Craig Anderton on drumcoded guitar.

When rationality returned, so did some uneasiness: my last live gig occurred six years ago, backing up, of all things, a soul band. So I figured I better come up with some truly grand gesture — a unique and monstrous instrument that would blow the minds of my more seasoned bandmates, as well as the most jaded audience. Luckily, a late-night inventory of my keyboard storehouse provided the solution. But even if you don't have the same instrument, what we'll cover applies to a variety of unloved instruments...perhaps like one or two you have in your own sonic arsenal!

THE UGLY DUCKLING

A few months earlier I had unwisely purchased a '74 Hammond B3000, an electronic successor to the B3. Its line out and the included transistor Leslie sounded dreadful, but you know how it goes with gear lust. This beast seemed so enticing; it was loaded with drawbars, transpose and sustain switches, gate effects, key click, percussion, and glissando. Essentially, I had acquired a colossal oscillator bank without filters or envelope, but on the upside it had dozens of buttons and knobs suitable for demented live tweaking.

Coincidentally, I had also found (after two decades of searching) the answer to that trademark tooth-and-nails, biting-and-scratching Hammond sound: a Motionsound R3-147. This 4U rack box, with a horn mounted in a polystyrene capsule that rotates past two pairs of mics, delivers the best "Lezlie" sound per cubic inch on the planet. As a bonus, it provides consummate tube distortion.

LET'S GET MODIFIED

While functional, my setup lacked the modulation possibilities needed to aspire to true greatness — enter the Nord Modular, which happened to be perched atop the Hammond. One of the Modular's outstanding features is that it can process as well as generate sound, so patching it between the Hammond and amp seemed appropriate. Furthermore, Clavia had just released a Mac editor, so placing my PowerBook on the Hammond allowed some useful control. (Yes, Hammonds also make great tabletops for putting gear.)

Here are some examples of the sounds obtainable by processing organ (just try getting these sounds with synthesizers!). You haven't lived until you've heard a helpless organ piped through a ring modulator, a resonating filter, and, finally, Leslie-driven tube distortion.

- **Scream Lead:** This uses the 8' and 4' drawbars along with key click, and the signal goes through a normal Modular synthesizer voice. The Leslie remains stationary for a more focused sound, while pitch bending also controls ring modulation. The Modular is set up to allow varying the filter frequency and ring modulation amount in real time. Yes, it really does scream!

- **Trance Pad:** For this, hold chords on the organ, blend them in via pedal while manipulating the drawbars, and set the Motionsound for slow rotation. It sounds like spectra modulations on an additive synth.

- **Biting Bass:** This results from sending only the 16' drawbar through the Modular's Waveshaper, a processor that can turn even the most mundane sound source into an extremely annoyed T-Rex. This then feeds a phaser with a mod depth of 0, which adds a very nasal tonal quality. Rotating the phaser frequency knob grinds the bass through a galaxy of spectra, all of which sound considerably heavier and browner than a normal synth bass. Finally, some Motionsound treatment adds a dab of edgy distortion.

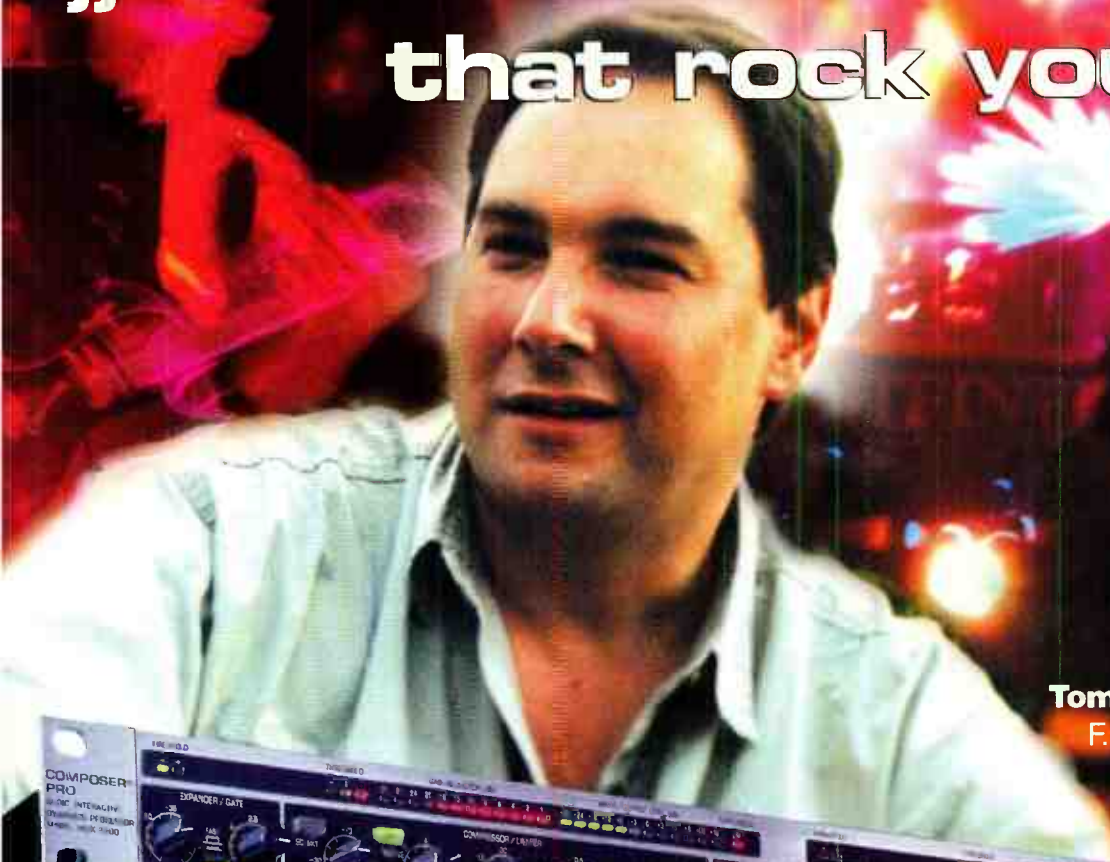
- **Space Drops:** Use two slightly dissonant drawbars, for example 4' and 1-3/5', add 2-2/3' percussion, and shoo this foul sound into a ring modulator. Adding sustain is even more unnerving: unlike an electro-magnetic Hammond, the B3000 comes with a sustain function, but it provides only one envelope for all notes. Thus you can play a chord up top and trigger its sustain by playing lower notes. The Leslie is set to "nervous" (i.e., fast), all of which renders bell-like limestone cave sounds that perfectly underscore techno's tribal vibe.

- **Sequenced Chords:** This is great for a couple minutes of automated sound generation, allowing a quick trip to the bar. The key is the Modular's sequencer modules, which can trigger amp envelopes rhythmically.

The B3000's bottom keyboard offers a couple of sawtooth drawbars. Embellish this overtone-rich, pad-type sound with the Modular's "ensemble" (chorus) effect. Next, tack a filter and amp envelope onto a step sequencer, which controls filter cutoff and resonance; the amp sequencer triggers the amp envelope in a programmable pattern. Just hold down a bunch of keys (a paperweight or innocent bystander will do), and the rig pumps out a complex rhythmic carpet of sound, which I also sync'd up to my buddies' Jomox and Roland TR-XOX drum machines via the Modular's MIDI In.

These are just some examples of how flexible this type of setup can be. Thus primed with cool patches, I made my way to the Liquid Sky club — with some trepidation, I might add. There was no rehearsal or sound-check (sort of a real-life version of "plug-and-pray"); the other musicians had worked together before and were used to this style, but it was something different for me. Yet, happily, we all had a ball, as did our audience. The sound coming from my Frankensteinian monstrosity of

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If you think you need an extra pair of hands to do all this, well, I would certainly love to have some extra hands! But you can do a lot with just being fast. The more you jam around, the more you instinctively start making the right moves — just like playing any instrument. Best of all, you can totally react to the crowd; if they like your breaks, play with that for a while. Minimal changes in the music will keep people entertained, as long as the beats are rocking.

PERFORMING LIVE WITH OTHER MUSICIANS

When performing live with other musicians, decide who is the “master of disaster” — the person who decides about the live arrangement, the overall sonic character, and whether someone is “on the air” at a given moment (or free to go get a beer).

Musicians should understand that it’s nothing personal if a player gets muted for a while; performing live isn’t about putting individual artists in the spotlight, it’s about supporting the music. It’s not a good idea to start an on-stage discussion with the band about who should be in the mix at any given moment. Ego problems are a subject for the backstage area, or another day.

AUGMENTING THE SETUP

In addition to my MPC, I program at least one other drum computer on the fly. My current favorite is the Jomox Xbase09, which kicks the party crowd hard as phunk. The Korg Electribe-R is also great, as are the classic lethal weapons, the Roland TR-808 and TR-909. I also play one or two synthesizers live for pads, lead synths, and sometimes for synth bass.

Often the “band” comprises other musicians (synth player, DJ, guitar player, bassist, etc.). Now the real fun starts: the more new material and unexpected sounds and riffs come to the mixing board, the better a time you’ll have doing the mix. This is why I also highly recommend using different machines as often as possible. The more you surprise yourself, the more fun you have, even if you’re performing 60 times or more a year.

My secret weapon is a pair of Lexicon JAMMANs. These little rack boxes, unfortunately out of production, can sample in real-time, then play back the sampled loop in sync with MIDI clock signals. If someone plays a really good riff or sound, you can just sample it as it happens and bring it back in later on, as appropriate. You can also sample the groove-variations you create on the board, or even the entire mixed output for a few bars, which you can play back to cover yourself when you need to change over to different sounds, sequences, or patterns. The JAMMANs are always fed from aux sends, and return into normal mixer channels in order to use the EQ.

Above all, never forget that the most important and useful equipment on stage is a set of ears: it’s by listening and reacting to the moment that you can make music that really rocks. Sometimes the best thing to do is to just let a really great riff go on for as long as you enjoy listening to it, because surely the audience is enjoying it as well. And, if you’re a musician playing into the mixer, listen to the overall mix, not so much what you’re playing. If you’re listening carefully, your hands will instinctively know what to do.

Dr. Walker is member of the electronic music groups Air Liquide, Dr. Walker & M. Flux, and Rei\$\$dorf Force. He has recorded more than 500 different records and performed on more than 1000 gigs in the last nine years. You can reach him at: dr-w@dr-w.de.



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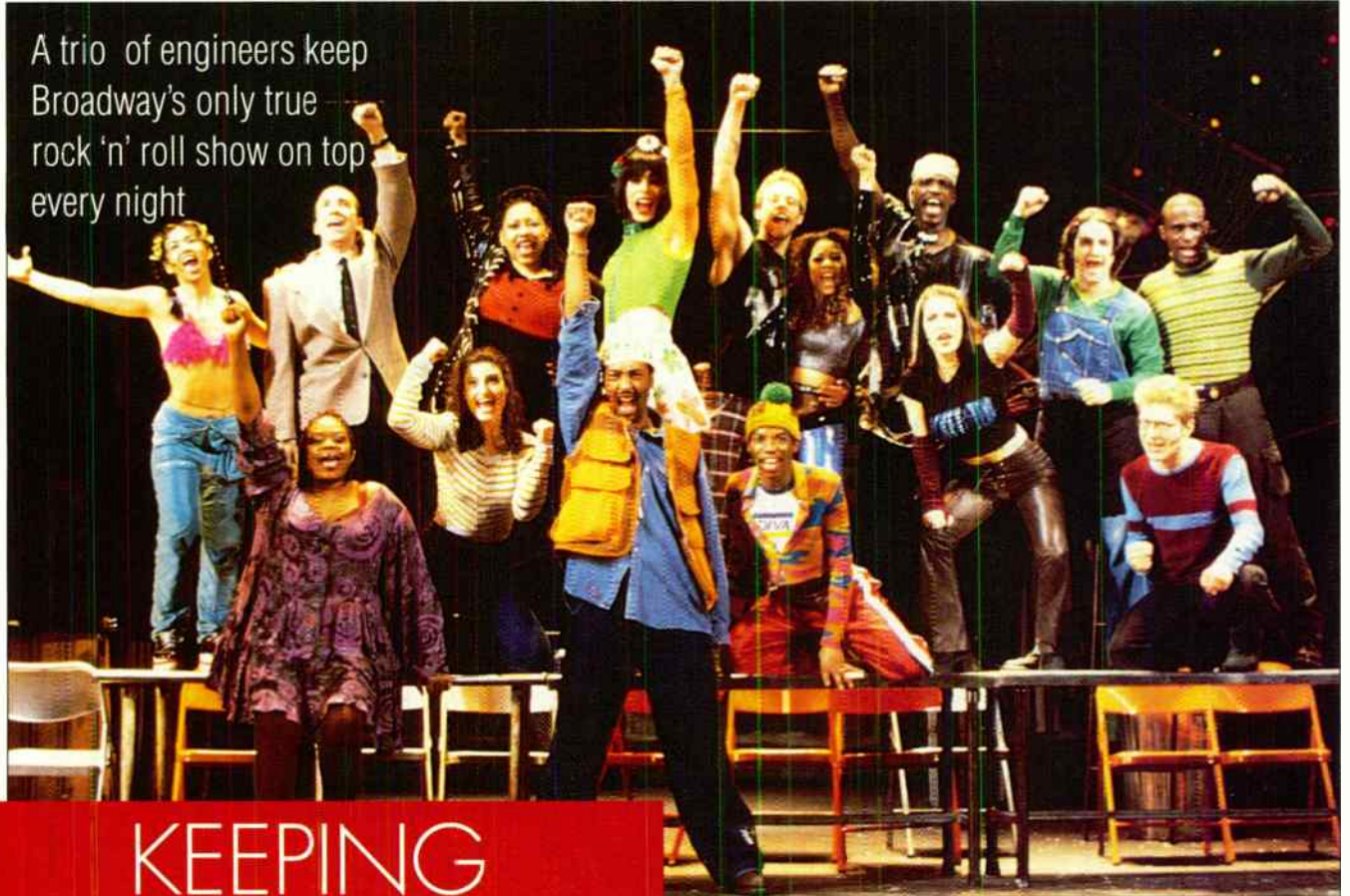


PHOTO BY JOAN MARCUS/CAROL ROSE/EG

KEEPING RENT ROCKING

BY CHRIS CELAURO

Rent started in a playhouse located in downtown Manhattan, many blocks away from the center of all the orchestra pits and showtunes. Four Tony Awards and a Pulitzer Prize later, *Rent* has become a true theatrical landmark. It stands among Broadway's finest, and its tours have touched audiences all over the world. But there is something special about *Rent* that separates it from other musicals and distinguishes it as Broadway's audio rarity: *Rent* is a rock 'n' roll show.

BAND STAGE RIGHT

The musicians are not sunken into an orchestral cavity in front of the stage. The band, made up of guitar, bass, drums, and keyboards, is stationed alongside the actors, at stage right. Conductor Tim Weil doesn't don a tuxedo and stand in front of the band and wave a baton for two hours; dressed in jeans, Weil sits behind a Roland D50 synthesizer and a Kurzweil PC88, occasionally lifting a hand to lead the musicians. The guitarist, who relies on a Leslie-sounding Motion Sound Pro 3/Low Pro, is placed nearly center stage and drives the musical energy. Every time one of the lead actors speaks, the crunch of the guitar is heard. Very rock 'n' roll.

Pumping the sound out to the audience was the job of sound designer Kurt Fisher, who chose EAW speakers to do the bulk of the work. A cluster of three KF850's hanging from the center of the ceiling, and one on each side of the theater, throws long enough to give the watchers in the front to rear balcony an earful. Also aimed at the upper-level seats are two KF695's and eight UB82's. Two KF650's and eight JF80's bring most of the floor the necessary punch. And to fill in the holes and accurately separate the sounds, eight KF300's are strategically placed. Supplying clear music to the first three rows, the trickiest seats to deliver a balanced mix, are nine Apogee SSM's that line the stage and four bass-booming Meyer UJW1's that are mounted under-

neath. From top to bottom, there are speakers everywhere. Fisher wasn't messing around when he wanted to bring clarity and power to the audience.

One of the first challenges of mixing *Rent* was good old-fashioned volume control, according to Brian Ronan, the production engineer who mixed the show from the start. When *Rent* was in a small theater downtown, the engineers didn't have to worry because the musicians were less likely to crank it up. The music

just flew off the walls of the tiny room and back to the stage. But Broadway's different. The large, "wet" room of the Nederlander Theatre can be a soundman's nightmare, with all of that natural reverb obstructing the mixing process, and the musicians' inclinations to play loud didn't help. Volume was a problem. The musicians in *Rent*'s



RENT CONTROL: James Tomaselli (left) and Francis Elers treat *Rent* as they would any other rock 'n' roll concert.

touring companies put on headphones, taking the pressure off of the engineers. But Broadway's crew decided to employ the sure-fire way to get a grip on the sound. The musicians simply lowered their volume, and the engineers gave the band a little more through their EAW SM200 and SM260 monitors. It worked.

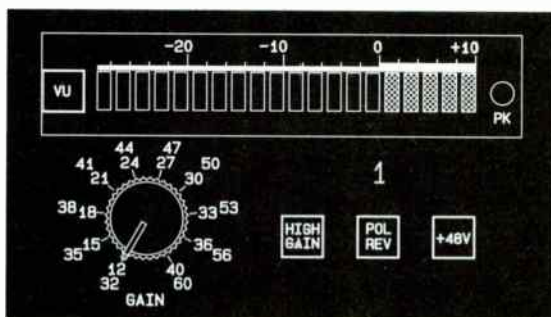
THE TEAM

The current sound team at *Rent* is a focused three-man crew. (Brian Ronan, mentioned earlier, took time off to design the sound for a new show.) The mixing engineers are Francis Elers (*Cats*) and James Tomaselli (*Victor Victoria*). They switch roles often: one show sitting behind the main board, a Cadec E with two frames fully bussed together, 12 subgroups, 12 matrix outputs, 8 auxiliary outputs, and 9 VCA masters; and another show working the monitor mixer, a Crest Century LM with 20 total outputs, four of which can be subgroups. Taking care of the Sennheiser SK50 wireless microphone system with MKE2 red dot mics is Dennis Boyle (*The Scarlet Pimpernel*). In addition to keeping the electronics functioning, Boyle constantly monitors the cast members to make sure their Countryman head-worn frames are optimally positioned. Even if a mic was to fail mid-scene, there are three Sennheiser SKM 5000 handhelds standing stage left—waiting to come to the rescue.

Before each performance, the sound crew shows up early to make sure all systems are a go. From individually checking each mic, to running different frequencies and decibel levels through the loudspeakers, the theater is fully prepped for a night of rock.

Although *Rent* is theoretically the same show every night, it technically isn't.

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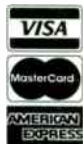


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CIRCLE 37 ON FREE INFO CARD

At times, understudies will replace some of the primary actors, which may create vocal nuances previously unheard by the engineers. And substitute musicians may fill in for the regulars, therefore, changing the style with which the instruments are played — something an engineer must consider. Of course, *Rent's* musicians all read the same score, but the rock 'n' roll feel leaves the attack up to the musician. Replacements aside, the dynamics and energy of the show command the sound team's constant attention, unlike other Broadway musicals that allow the engineers the option of setting the levels and just sitting back while the show runs.

SHOWTIME

Teamwork is key with any large production, and something *Rent's* sound team exemplifies. One evening, Tomaselli is at the FOH controlling the mix, which also includes triggering the sound effects delivered by an Akai S1100 sampler for short-duration effects and Akai DR4 hard-disk recorders for long-duration effects. While riding the vocals and adjusting the EQ, he notices low output coming from one of the lead actor's channels. The volume is pushed to the limit, so Tomaselli contacts Boyle on a walkie-talkie, a major component in keeping a sound team connected. (There is also a phone line that links the FOH and monitor areas.) It seems the low output may be a result of mic placement. Boyle makes the adjustment. Problem solved.

During Act II, Tomaselli gets a phone call from Elers, who reports from the monitor area that one of the actors hears a rattle from a speaker, and it's not one of the EAW JF80 vocal monitors. Nothing is heard from the FOH, so Elers stealthily finds his way to the EAW KF650 and listens carefully as the music screams in his ear. No rattle. A possible cause may have been momentary input distortion only heard by that actor; they'll give the speaker a stress test the next day, just to make sure. The rest of the show rocks on problem free.

The rock 'n' roll approach to *Rent* is not just evident in the powerhouse speakers that blanket the theater and the way the guitar's ferocity fuels the score — it's also in the way the engineers pump their fists in the air when an actor hits an intense note. It's the overall kick-butt attitude that separates *Rent* from its Broadway neighbors, and this attitude will keep it rocking for many years to come. **EQ**



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275 + 275 watts @4 ohms stereo
140 + 140 watts @8 ohms stereo

Keeps on cranking when "wall socket" voltage is as low as 90 volts (due to brownouts or very long, thin extension cords).

Outputs: 1/4" jacks plus 5-way binding posts spaced for standard banana plugs.

Switchable "soft knee" limiter helps maximize SPLs without over-driving your PA cabinets (or the M-800).

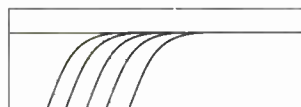
Quick switch configuration for stereo, mono or bridged output.



Inputs: Balanced/unbalanced 1/4" TRS jacks and XLRs plus XLR THRU for easy "daisy-chaining" to M-1400s, M-2600s and other M-800s.

LED display with output level ladder, signal present, overload & channel status.

Detented gain controls calibrated in both dB and volts.

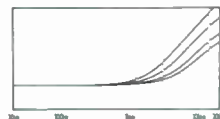


Variable low-cut filters can dramatically improve your PA system's low-end

response by cutting frequencies below the bass cabinets' minimum tuned frequency. 12dB/oct., variable from "Off" (0Hz) to 170Hz.

Built-in variable CD horn EQ.

Constant directivity horns achieve wide dispersion at the price of reduced high frequency response. The M-800 lets you restore lost treble or just add some sizzle to your PA system's top end.



Generous front panel intake gets its cooling air from the room instead of from inside a hot road case.

Other cool stuff that our overworked art department can't figure out how to draw a red callout line to...



- Short T-Design cooling air paths for smoother thermal gradient.
- Mirror-polished heat exchanger maximizes heat transfer & reliability.
- Fast-Recovery circuit design lets you drive the M-800 into clipping without audible distortion.
- 5-Year Transferrable Warranty.



- NEW M-800**
- M-1400**
- M-1400i**
- M-2600**



All FR Series Power Amps have: • Variable frequency low-cut filters • Limiter with On/Off switch • Detented gain controls calibrated in dB and volts • Selectable stereo, mono & bridged amp modes • LED level display with Signal Present & Overload indicators • Balanced XLR & TRS inputs • XLR thru outputs • Superior T-Design cooling • 5-year transferrable Limited Warranty

M-800: 800 watts @ 4 ohms bridged • 400+400 watts @ 2 ohms stereo • Constant directivity horn EQ/Air EQ • 1/4" & 5-way binding post outputs

M-1400 & M-1400i: 1400 watts @ 4 ohms bridged • 700+700 @ 2 ohms stereo • Constant directivity horn EQ/Air EQ • 18dB/oct. subwoofer crossover with 2 selectable frequencies • M-1400i: 1/4" jacks and 5-way binding post outputs; 120V version only • M-1400: Neutrik® Speakon® and 5-way binding post outputs; 120, 220 & 100V models; • Forced-air T-design cooling

M-2600: 2600 watts @ 4 ohms bridged • 1300+1300 watts @ 2 ohms stereo • 24dB/oct. subwoofer crossover with 3 selectable frequencies • XLR thru outputs have selectable full-range, & crossover low / high outputs • Neutrik® Speakon® and 5-way binding post outputs • Forced-air T-Design cooling

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ROAD GEAR

UTMOST OUTPUT

Yamaha's XM Series is a multichannel power amplifier available in two mod-



els — the XM6150 and XM4220. Housed in one 3-rack-space unit, the XM Series is designed for multi-zone applications and the high-frequency of bi- or triamp speaker clusters. XM Series channels can be bridged to

provide increased power.

Combining channels and offering 70-volt system operation, the XM Series can even run at 70 volts as well as 4 and 8 ohms from a single amp at one time. The XM6150 provides selectable 6-channel to 3-channel output and weighs 40 lbs. The XM4220 provides operation at 170 watts (four channels at 8 ohms); and 225 watts (four channels at 4 ohms); 350 watts (two channels in bridge mode). For more information, call Yamaha at 714-522-9011 or visit www.yamaha.com/proaudio/. Circle EQ free lit #118.



all-inclusive loudspeaker management system versatile enough to suit any sound reinforcement, monitoring, or install application. At the heart of the Drive Rack system is the dbx 480, which includes four inputs and eight outputs that can be tailored for any configuration. Including every form of processing necessary to drive the signal from the mixer to the power amps — such as pre-crossover EQ, notch filters, speaker delay, multiple crossovers, speaker compensation EQ, driver alignment delay, and compression limiting — the 480 a versatile box. The 481S and 482S are slave units offering all of the functionality and features of the 480. The 480R is the master remote controller for the entire Drive Rack system. Suggested retail prices are \$2495 for the 480, \$1899 for the

UPPER MANAGEMENT

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- ▶ Presets: 100 Factory/100 User
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- ▶ 24 bit A/D-D/A converters
- ▶ S/PDIF digital I/O, 44.1-48kHz
- ▶ 1/4" Jacks - Dual I/O
- ▶ 24 bit internal processing

SAY YOU WANT TO...

- ▶ Run two of the best sounding Reverbs or other quality effects simultaneously, without compromising sound
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- ▶ Have instant control of all vital parameters right at your fingertips
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D•TWO

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- ▶ Up to 10 seconds of Delay
- ▶ Presets: 50 Factory/100 User
- ▶ 24 bit A/D-D/A converters
- ▶ S/PDIF digital I/O, 44.1-48kHz
- ▶ 1/4" Jacks - Dual I/O
- ▶ 24 bit internal processing

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- ▶ REVERSE — Reverse Delay with the flick of a key
- ▶ DYNAMIC — Set release time and threshold to let the Input signal control the level of Delay — keeping everything nice and tidy
- ▶ CHORUS — Or perhaps you prefer Flanger? Hit one key and you've instantly added it to your Delay
- ▶ FILTER — Increase filtering as repeats decay



481S, \$1995 for the 482S, and \$2999 for the 480R remote. For more information, call

dbx Professional at 801-568-7660

or visit www.dbxpro.com. Circle EQ free lit. #119.

JOIN THE FORCE

The Electro-Voice Force is a high-peak output, high-efficiency two-way stage system. The 15-inch low-frequency driver and the horn-loaded high-frequency speaker incorporate elements of RMD and can handle 200 watts of continuous power and 800 watts of short-term power. The crossover frequency is 1600 Hz with an impedance of nominal 8 ohms and minimum 5.3 ohms. Options of the input connectors include parallel 1/4-inch phone jacks and a parallel Neutrik model NL2MP. The system includes a rugged enclosure covered with industrial-grade car-

peting, complete with steel grilles and EV's styled corner protectors. Other specifications include a frequency response of 60 Hz to 20 kHz and a maximum sound pressure level of 99 dB. For more information, call Electro-Voice at 616-695-4744 or visit www.electrovoice.com. Circle EQ free lit. #120.

SAMSON'S STRENGTH

Samson's UHF Synth 32 system features SAW (Surface Acoustic Wave) filters in the receiver to enhance reception, and PLL synthesized VCO circuitry in the transmitters to benefit users in multi-system situations. Designed for worldwide use, the UHF Synth 32 system provides 32 selectable UHF frequencies in both the receiver and transmitter. The system's R32 half-rack receiver is equipped with a large, amber-colored LCD on the front panel that indicates

Channel, Group, Audio Level/RF Level, Diversity A/B antenna, and Mute. The R32 also includes Noise Squelch circuitry; balanced XLR and 1/4-inch outputs; a mic/line switch; tuned, molded antennas for improved reception; and an optional rack-mount kit for touring and fixed installations. The T32 beltpack and H32 handheld transmitters feature a convenient battery life indicator; a 3-pin mini-XLR connector; detachable guitar cable; and 9-volt battery operation. For more information, call Samson at 516-364-2244 or visit www.samsontech.com. Circle EQ free lit. #121.



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EQ Drive!

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MAC OS X: BEAUTY MEETS BRAINS

BY CRAIG
ANDERTON

Apple officially unveiled OS X (as in Roman for "10," not the letter of the alphabet) at the MacWorld Expo in San Francisco this January. Many of its technical advantages — pre-emptive multitasking, backwards compatibility with OS 9-compatible pro-

grams, and an improved graphics toolbox — took a backseat (at least judging by audience reaction) to the new "Aqua" user interface.

The Mac has undergone numerous facelifts since those cute little black and white icons first stared out at us in 1984, most notably color, a new system font, different "themes," and so on. But Aqua

looks like it was designed by fine artists and, more importantly, serves utility as well as beauty.

Interestingly, some OS X features recall Windows 98, but offer a more elegant implementation. For example, the new "Dock" resembles the Windows Taskbar, but with significant improvements. For example, you can scale the dock size so that as you load it up with icons (which can be programs,

What does Apple's latest operating system mean for those studios relying on their Macintoshes?

documents, pictures, QuickTime movies... whatever), the icons become ever smaller, even to the point of unreadability. But here's where Apple has done its homework: the cursor can magnify an icon as it passes over it, thus — unlike Windows — rendering even the most tightly packed dock usable.

Some of Aqua's features are more "gee-whiz." When you maximize a dock icon, it "grows" into a full-size window, but does so in an animated way, where you can see the little icon literally morph into a window. When you close the window back down, it similarly shrinks. Like Windows, when you drag a window, you can see the contents as you drag. Of course, with Windows, many power users turn off the options that allow menus to "roll out" rather than just appear, or that let you drag the window contents around instead of just the window's outline. If these tricks cause an equivalent performance hit on the Mac, then I'll probably turn them off in OS X, too (assuming I can). But, if not, hey, they look cool.

Aqua also makes great use of translucence. For instance, you can still make out the desktop through inactive windows and drop-down menus. Scroll bar buttons are also translucent (much like the coloration in a jellyfish). But there are many other small tweaks. Instead of using a thick line to surround buttons that can be triggered by hitting the Enter key, those buttons now pulsate, which helps draw your eye to what's really important on the screen. And dialog boxes (e.g., for saving) no longer sit isolated in the middle of the screen, but "grow" out of the windows to which they pertain, making it easier to associate the function with the file. Close, minimize, and maximize buttons have been replaced by small red, yellow, and green buttons, respectively — anyone who knows how traffic lights work should be able to figure out what these buttons mean. Certainly, they're far less ambiguous than the current scheme of little squares located in a particular area of the window.

Judging by the thunderous applause that greeted Apple's announcement that under OS X a program could crash without taking down the entire system, I'd be willing to bet that many of the participants had never worked with a Windows machine. After all, for years, Windows users have been able to just hit Ctrl-Alt-

Del, banish the offending program, and carry on. And the ability to preview graphics files as thumbnails, globally or on a per-folder basis, has been part of Windows 98 since day 1 — now the Mac OS can preview graphics, too, as well as QuickTime movies. But there's no doubt that aesthetically, OS X more than one-ups Microsoft's functional, yet conservative, offering.

MOVIES AND MUSIC

Much was made of desktop movie-making at the show, and I think that Steve Jobs has, once again, identified a "hot button" that will do for the Mac today what desktop publishing did for the Mac in the '80s. Yes, you can do the same thing with Windows, but it's work — an intimidating kluge of hardware and software. Apple has seemingly made the procedure idiot-proof. But in the process, audio seems to be treated more as something you need to accompany the visuals. The onboard audio has not been beefed up; there's no digital I/O, for example. Apple would counter that you can always feed audio in and out via USB, but how come my Opcode USB digital interface works *right now* with Windows machines but not with Macs? Apparently, the drivers aren't perfected yet. Hmm...kind of makes you wonder what the priorities are around Cupertino.

But that may be changing. For the first time, Apple had a major music presence at MacWorld in the form of a music pavilion, and it garnered a lot of attention from both the media and attendees. Mixman, Steinberg, MOTU, Emagic, Digidesign, and several others not only had booths, but gave periodic demos that truly wowed the crowd. Hopefully this will impress upon Apple that audio should be receiving a higher priority. In the meantime, give credit to the handful of dedicated audio evangelists at Apple who continue to agitate on our behalf. Now it's time for them to get more support from within the organization.

INTO THE FUTURE

Yes, people still mention that Apple's market share is tiny compared to Intel. But that's not a fair comparison. In many ways, Apple is a hardware company (hence the demise of clones), but

with the added attraction of a very enticing operating system. A better comparison is to the market share of Gateway, Dell, Compaq, etc. By those standards, Apple is sitting pretty. And with Steve Jobs no longer an "interim" CEO, you can expect Apple to press forward with the kind of zeal and passion that, seemingly eons ago, enabled it to dominate the personal computer market.

I do think there have been some missteps; the iBook may be cute in a Fisher-Price kind of way, but, for me, the look doesn't match the understated, high-fashion elegance of something like the PowerBook 5300CS. And Apple's willingness to break completely with the past, while bold and in many ways commendable, has made it increasingly difficult to keep up with the latest software and hardware — while turning significant investments into scrap metal more or less overnight. (Incidentally, OS X is intended only for "new world" hardware launched since Jobs re-assumed the reins of power, like the G3 and G4. However, some G3 upgrade card manufacturers told me that they thought it likely that OS X would work with G3/4-upgraded PowerPC machines, even if Apple didn't officially support it.) Microsoft has been very careful to ensure backwards compatibility with previous operating systems, and I've been able to keep my old Windows machine current by replacing the odd piece of hardware here and there. However, many would say that this attention to not alienating legacy software users has prevented Windows from breaking through to higher levels of performance.

There's no doubt that the Mac is back, in large part because it is once more targeting the people who made it a success in the first place, rather than trying to be on every desktop of every Fortune 500 company. It has been a remarkable, and well-deserved, turnaround. With Apple's stock riding high, iMacs being sold as fast as they can be made, and the desktop movie-making angle, Apple will continue to prosper...and in the process, hopefully, they'll have the time and incentive to concentrate a bit more on the world of pro audio. For more information, surf to www.apple.com/macosex — you'll be impressed. **EQ**

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PLUGINS FOR STEINBERG CUBASE

BY RICH TOZZOLI

Expand Cubase's functionality to encompass everything you need

The flexible VST plug-in specification offers many software users an open door to the future. Designed by Steinberg Soft- und Hardware GmbH and primarily used in Cubase, it essentially defines a standard for plug-ins that process real-time audio. Although VST plug-ins can be used in other programs such as Vision and Logic Audio, they do not have the functionality that they possess in Cubase VST, which was designed to host them.

Plug-ins for Cubase were first offered in V 3.5, and the SDK (Software Developers Toolkit) became available soon after. This allowed VST users not only to use existing plug-ins, but also to create their own. Steinberg's Fadi Hayek comments, "When a person starts off making a plug-in, they go straight to our Web site (www.Steinberg.net) and select "Learn About Steinberg VST Plug-in Architecture." On it is V2.0 of our SDK, which they can download the toolkit to develop the plug-ins. It is an open architecture, but the body of the license states the developer must put both the VST and Steinberg logo on the plug-in." Fadi informs us that several people have put up their own plug-in Web sites, which users can go to check out new plug-ins or just use as information sources.

VST V2.0, now offered in

Cubase VST 4.1 for Mac and VST 3.7 for Windows, adds additional functionality, including MIDI control of plug-in parameters, as well as allowing the plug-ins send themselves to send MIDI data. V2.0 also includes the functions

to create VSI (Virtual Studio Instruments), which allows the support of software synths, samplers, and drum machines. VSI instruments are fully integrated into Cubase VST's audio engine, allowing sample-accurate sync between audio tracks and the plug-in instruments.

As an example, the LM-4 is a 24-bit VST Drum Module from Steinberg, which appears on your screen as a plug-in. This is a VSI, and the four individual outs (and stereo) are routed directly into the VST host's internal audio mixer. From there, you can add effects and EQ, all with no cables. Welcome to the future. LM-4 includes 20 drum sets, but you can build your own kits from any 16- or 24-bit AIFF or WAV files. Steinberg is offering more VSI plug-ins, such as NEON, a

fully automated two-oscillator synth, and Cubass, a virtual bass synth. Native Instruments is developing Pro 5, which is a Prophet 5 simulator, as well as Generator, a toolkit allowing you to build your own VST instruments. BitHeadz is currently creating a VST version of their Retro AS-1, and are planning to expand more of their products into this new format. VSI has opened a whole new chapter for VST — one that involves synthesizers, in addition to effects plug-ins.

Spectral Designs, in partnership with Steinberg, is offering an ever-expanding array of plug-ins for VST. Some of these new products include Magneto, which is an analog tape sound plug-in using "True Analog Saturation Modeling." There is also the DeClicker for pops and clicks; the DeNoiser for broadband noise removal; the Spectralizer for spectral enhancement; and Qmetric, a 7-band parametric equalizer plug-in. The diverse Steinberg Mastering Edition contains a Loudness Maximizer, Free Filter, Spectralizer, ME Compressor, ME Spectrograph, and ME Phascope, all in one complete package. REDVALVE IT emulates valve tube modeling, and



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VoiceDesigner is a pitch transformer plug-in. Steinberg has also collaborated with Apogee to redevelop MasterTools, emulating the exact UV-22 architecture from the hardware. Currently only for TDM users, it should be available in the VST format soon.

In addition to Steinberg plug-ins, companies such as Prosoniq have developed such new classics as Orange Vocoder, Roomluator, and the 3D Ambisone for VST. SPL has released the SPL De-Esser, and there is even a TL Audio EQ-1 plug-in, with four bands of classic TL valve equalization. Waldorf has designed Dpole for VST, a

filter plug-in that brings classic synth sounds to your computer. GRM of the Institut National de l'Audio-visuel (Paris) created GRM Tools, a sound manipulation collection including PitchAccum, Shuffling, Comb Filters, and BandPass. Pluggo, from Cycling '74, is a collection of 74 VST plug-ins (look for a review in a future issue), which also allows MAX and MSP users to develop their own creations.

With such a diverse array of plug-ins available, VST users now have many options beyond the tradi-



tional delays and choruses for all-inclusive desktop music production. With the addition of the new VSI format to VST, the possibilities become even more exciting. Don't sell your hardware samplers and drum machines yet, but you may need to make some closet space for them in the near future.

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KORG TRITON

BY HOWARD MASSEY

It seems like just yesterday that the so-called experts were predicting the imminent demise of the synthesizer. Today, of course, with the rise of techno, acid, electronica, trance, drum'n'bass, and all the other varieties of turn-of-the-century (as in 21st century) music, the synth once again reigns supreme. Not surprisingly, Korg — manufacturer of the immensely popular M1 and Trinity — is still setting the pace. Their new Triton workstation is a state-of-the-art powerhouse, with enough cool features (and great sounds) to keep even the most fanatical gearhead satisfied for years to come.

Old Joke Alert: Where does an 800-pound canary sit? Anywhere it wants. Therefore, what does an instrument that comes with 640 factory programs (768 if you add the optional MOSS board) sound like? Well, pretty much like anything. Especially noteworthy are the vintage keyboard patches, which are killer; helped to great degree by the extraordinary on-

board effects (more about these shortly). The Triton essentially provides you with every great Hammond sound you've ever heard. In addition, it offers a bunch of Clavinet, Pianet, Rhodes, Wurlitzer, Farfisa, and Vox Continental-type organs that will place you squarely back in the Austin Powers era.

There are also many excellent guitar patches — both acoustic and electric — and glassy, esoteric pads that will have you reaching for the incense and herbal tea. Pianos, brass, and woodwinds are less impressive, though the optional Pianos/Classic Keyboards and Studio Essentials PCM expansion boards provide superior samples to those in the instrument's onboard ROM. The MOSS board adds several other digital synthesis processes, including modeled sounds (analog synth, brass, and string) taken mainly from the Korg Z1. With a few notable exceptions, these didn't knock my socks off. However, in conjunction with its futuristic look, the Triton is more forward-thinking than retro, and where it absolutely excels is in the sounds of today — ultra-phat technobasses and every whacked-out drum and percussion sound imaginable. Combined with the onboard sequencer and arpeggiators, these provide precisely the raw materials needed to create exciting, original loops.

Yes, we said arpeggiators, as in plural: two, to be precise, both polyphonic. When stacking up to eight programs in "combis," or when assigning up to 16 different programs to the tracks of the onboard sequencer, both can be simultaneously active, though you can't use both with the same sound. (There are, by the way, 512 factory combis.) In addition to the four basic modes of operation (up, down, up and down, and random), there are a whopping 232 user slots for the storage of more complex arpeggiation patterns. These are factory-loaded with everything from guitar strums to complete drumbeats, and an edit page allows you to alter these at will or create your own patterns from scratch. The arpeggiator can also be triggered from a single key or latched (so it plays continuously while you play over it), and dedicated knobs allow you to adjust the tempo, gate time, and velocity. If you're using the Triton with other MIDI devices, the arpeggiator tempo (as well as sequencer tempo, effects delay times,

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and even oscillator LFO speeds) can be synchronized to incoming MIDI clocks.

Beyond the arpeggiators and onboard sequencer (which, unusually for a hardware sequencer, allows individual tracks to be looped), a very hip feature called Realtime Pattern Play/Recording (RPPR for short) allows you to create complete songs on the fly by triggering complete patterns from individual keys — your performance can even be recorded into the sequencer. There are 150 cool factory patterns provided, and another 100 slots into which you can store your own. You'll have a blast with this feature; it's good, clean fun for the entire family.

The Triton is also one of the first instruments we've seen that is GM2 as well as GM-compatible. A separate bank contains nine sets of GM sounds (the basic sound set as well as eight variation sets) and a slew of GM drum kits, and a Song Playback mode allows you to play type 0 or type 1 Standard MIDI files (SMFs) directly from the onboard floppy disk drive; you can even play along on the keyboard in real time during sequence playback (even arpeggiations, which can be sync'd to the tempo of the SMF). Looking for some between-set background music? Use Jukebox mode, and Triton will sing merrily in the background, happily playing back a bunch of SMFs in whatever order you choose.

Other than the MOSS sounds, the Triton is essentially a sample-playback instrument, and, yes, it does allow you to create your own custom samples. Just connect your signal to one or both of the 1/4-inch analog inputs on the rear panel (sorry, there's no digital I/O), set the mic/line switch and input level control correctly, and you're ready to rock. Out of the box, Triton comes with 16 MB of RAM (expandable to 64 MB with standard 72-pin SIMMs), which is enough for about 3 minutes of mono sampling time (or a minute and

IN THE Groove

MANUFACTURER: Korg USA, 316 S. Service Road, Melville, NY 11747. Tel: 516-333-9100. Web: www.korg.com.

APPLICATION: Keyboard workstation.

SUMMARY: Full-featured yet easy to use. Offering literally hundreds of excellent sounds, the Triton is primarily oriented towards the dance/techno market, though it's got enough raw power and great "meat-and-potatoes" presets to find a place in anyone's rig, regardless of musical genre.

STRENGTHS: Excellent organ, vintage keyboard, guitar, bass and drum/percussion sounds; large touchscreen display; user sampling; six hardware outputs (L/R and four individual outs) and stereo mic/line inputs; maximum 62-voice polyphony; extensive editing capabilities; seven real-time knobs for fast tweaking; 16-track sequencer with independent track looping; optional SCSI interface and ROM expansion boards; much more.

WEAKNESSES: No resampling; no multitrack audio recording; no digital I/O; samples and sequences are stored in volatile RAM; minor (but noticeable) delays when writing data to memory; no undo function.

PRICE: 61-key Triton, \$2850; 76-key Triton Pro, \$3350; 88-key Triton ProX, \$4000. Expansion options: (MOSS) DSP synthesis board, \$600; PCM expansion board, \$200 each; SCSI interface board, \$200.

EQ FREE LIT. #: 102

a half in stereo) at the fixed 48 kHz sampling rate. The Triton's A/D converters are 16-bit, and, since no data compression is used, the sound quality is excellent.

Unlike some other instruments (which shall go unnamed), the entire procedure is rendered quite painless here. Your new sample is automatically assigned a number and a key range (which, of course, can be altered as desired) and can instantly be played back. There's even a handy "Convert To Program" command, which instantly saves your multisample as a program. Triton's RAM is volatile, though, so you'll need to back up your data before powering down; the onboard floppy drive won't be much use here, so, if you're planning on using the instrument for sampling purposes, you should figure on springing for the extra 200 bucks and adding the SCSI interface, which allows you to connect any standard hard drive. This same interface will also enable you to download samples from CD-ROMs. Akai file

formats, as well as WAV and AIFF, are all acceptable. Most remarkably for a keyboard workstation, the Triton provides a fairly full-featured wave editor — complete with graphic display of the waveform — that allows precise looping, truncating, copying, and pasting of data, as well as normalization and the creation of fade-ins and fade-outs.

The synthesizers of days gone by had dedicated knobs and switches for every function, so you could instantly alter any aspect of a sound while playing the keyboard. While the Triton cannot make that claim, it does provide a number of real-time devices for tweaking sounds, and all of them can be programmed to simultaneously output MIDI continuous controller data. These include the ubiquitous Korg X-Y joystick controller (horizontally center-sprung for

pitchbend), two switches, a small ribbon controller (which can be latched), two footpedal and two footswitch inputs, and the data entry slider. In addition, there are four knobs and an associated A/B switch. In "A" mode, the knobs control the four most popular parameters: filter cutoff frequency, filter resonance, filter and amplifier envelope intensity, and filter and amplifier release time. In "B" mode, the knobs can control almost any aspect of the sound you like, including effects parameters or send levels. Taken together, this collection of real-time controls allows you to add a great deal of expressivity as you play.

Onboard effects are the Achilles' heel of most keyboard workstations, but not the Triton. Not only are there lots of them, they actually sound good! Every program, combi, or sequence track can access five different insertion effects (many of which are dual effects), plus another two master effects, plus a 3-band master equalizer. There are

102 different insertion effects available, running the gamut from the tried-and-true (reverbs, multi-tap delays, chorusing, flanging, phasing, distortion, dual-speed Leslie) to the completely out there (multiband limiters, random filters, talking modulators, bit-reduction decimators, piano body/damper simulator, ring modulator, and a vocoder). Most of these (89 to be exact) can also be used as master effects. The main difference between insert effects and master effects is that, in combi or sequencer mode, individual insert effects are assigned to different timbres or tracks, while master effects can be applied to all timbres and tracks. This means that you can, for example, set up a sequence where the piano track is chorused, the guitar track is phased, the bass track is harmonized, and the drums receive a short delay, while all four tracks are compressed and feed a hall reverb.

As a bonus, the Triton allows incoming audio signal to be routed through any one insertion or master effect (if both jacks are used, the incoming left and right signals can each be routed to a different effect). This can be done in real time, so you can, for example, play along with a CD track that Triton is equalizing, compressing, or flanging, or it can be done during sampling so that the incoming signal is sampled complete with processing. There is, however, no provision for resampling; that is, a sample stored in Triton's memory cannot be routed through the effects and then re-sampled into a new memory location.


Like its immediate predecessor, the Trinity, the Triton is outfitted with a large, central, backlit touchscreen — something that I find to be a real aid in programming and editing. Unlike Trinity, however, the response of this second-generation touchscreen is almost instantaneous, thanks in large part to Triton's more powerful CPU. There is, however, a noticeable delay of a second or so (during which audio is muted) while data is being written to internal memory. This won't affect you at all in live performance (unless you're brave enough to actually be writing a new sound while onstage), but it does tend to get a bit old when you're in a long all-night programming session.

In program play mode, the main screen shows a complete listing of all assignable controllers as well as the selected master and insertion effects. There are also eight virtual sliders that allow you to instantly alter major sound parameters such as octave, oscillator balance, overall level, attack time, decay time, and effect wet/dry balance. Another virtual slider controls a unique parameter called "pitch stretch"; this essentially alters the overtone series, often making for interesting timbral changes. If you alter these sliders (using either the front-panel rotary encoder, keypad, or data increment/decrement buttons) and then write the resultant program to a new memory location, all your changes are saved and the sliders are reset to their center positions. In the various edit modes, the touchscreen allows you to instantly select from the parameters presented.

In case you haven't gotten the idea yet, the Triton is deep, deep, deep. It can take you weeks alone to just go through all the factory sounds, much less to start tweaking them. Nevertheless, for all of its complexity, a straightforward operating system (and a set of comprehensive, if somewhat obtuse owner's manuals) makes for a relatively gentle learning curve, especially if you've had some experience programming digital synths. If I had to make one complaint, it would be the lack of an undo feature; given the staggering number of editable parameters, this would be particularly helpful. (Though there is a compare function, it only compares to the state of an edit when it was last stored, so it doesn't let you retrace your steps one at a time.)

Nevertheless, most of all, the Triton is an instrument designed to get your creative juices flowing, and it certainly had that effect on me. Great sounds, great effects, great feature set. As long as new instruments like the Triton keep coming, the future of synthesizers would appear to be assured.

Howard Massey heads up On The Right Wavelength, a MIDI consulting company, as well as Workaday World Productions, a full-featured production studio. His latest book — Conversations With Record Producers — is due to be published in early 2000.

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CIRCLE 88 ON FREE INFO CARD

GEMINI CD-240 DUAL-CD PLAYER

BY CRAIG
ANDERTON

As more DJs add CDs to their bag of (vinyl) tricks, dual-CD players become increasingly important. Intended for pro DJ applications, Gemini's latest offering consists of a pair of 2U rack units — one with two CD transports, the other a remote with all controls for the CD players except audio/power connections.

INS AND OUTS

The transport rack has front-panel open/close buttons (duplicated on the remote) and the power switch. The rear panel sports RCA phono lineouts (+4 nominal level), digital S/PDIF out (on a BNC connector), IEC-compatible line cord socket, and voltage select switch (115/230V). The remote connects to the transport rack with an included 2-foot multipin cable that uses the same connector as pre-USB Macintosh serial ports.

The BNC connector for S/PDIF is a non-standard choice for DJs and studio personnel who use digital outs (although it does have the advantage of preventing someone

from plugging an RCA audio lead into the digital out). Either use an adapter or wire up a BNC-to-RCA cord using low-capacitance cable.

GIMME CONTROL!

Each CD section contains identical control groups.

Transport. Includes buttons for Play/Pause, Stop, Skip

forward.

Pitch. A 60-mm slider controls pitch, with three range selection buttons ($\pm 4\%$, $\pm 8\%$, or $\pm 16\%$). A Pitch button turns the pitch change on or off, ramping up or down smoothly to the new value over a couple seconds for the most extreme settings, and shorter times for lesser pitch changes. Two additional pitch bend controls, + and -, slip the pitch independently of the slider setting. This can quickly tweak a CD's speed when beat-matching, much like dragging or pushing vinyl to re-sync two songs when their tempos start to drift.

Cue. There are several cueing functions. After getting close to the cue point by playing the CD or fast-forwarding/rewinding with the jog wheel, use the search dial to fine-tune the cue point. Once stored, you return to the cue point by hitting a Cue button. If you press Cue while stopped, playback occurs as long as you hold the button down, providing a preview function.

The Cue B/Exit button selects a second cue point during playback, which allows the CD to "block repeat" between the first cue point and Cue B. Unfortunately, though, the transition is not instantaneous, so you can't use this for seamless looping. It's more for situations

one track forward, Skip one track back, and Skip 10 tracks

where, after transitioning over to the alternate CD, you want the first to return to a particular point. Pressing this button again turns off the Cue B point. A Cue B/Return button reinstates the Cue B point.

A final cue button, Auto Cue/Continuous, selects between two functions. In Auto Cue, upon reaching the end of a track, the CD pauses and positions itself at the beginning of the next track (past any silent area prior to the track). In Continuous mode, the player jumps back to the beginning of the CD after playing the last track. As with the Cue B function, this is not a seamless loop.

Display. The backlit LCD shows the pitch bend status/amount, cue status, track number, total number of tracks, and elapsed/remaining time in minutes, seconds, and frames. (With 75 frames per second, timing resolves to 13 ms.) The Time button toggles among elapsed time for a cut, total remaining time on the CD, or remaining time for the current cut. A separate bar-graph-type indicator shows how much of a cut has played (or remains to be played). When a cut is within 30 seconds of the end, this indicator flashes slowly as a warning that you better have the next disc cued up. When the cut is down to less than 5 seconds, the display flashes rapidly.

ROBO START

One very DJ-friendly CD-240 feature is that cued sections hit full speed in less than 15 ms after a cold start, and the Robo Start feature takes advantage of this by letting you switch



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CIRCLE 36 ON FREE INFO CARD

IN THE Groove

MANUFACTURER: Gemini, 8 Germak Dr., Carteret, NJ 07008. Tel: 732-969-9000. Web: www.gemindj.com.

APPLICATION: Pro-oriented, dual-CD player for DJ applications.

SUMMARY: Solid and cost-effective, the CD-240 includes several DJ-friendly features.

STRENGTHS: Virtually instantaneous start-up time from cue points; anti-shock buffer (10 seconds for each CD); jog/shuttle wheel with 13 ms resolution; separate remote; "Robo Start" feature allows extending breaks and doing seamless transitions from one CD to the other; digital output for each CD is great for those with samplers.

WEAKNESSES: Only one "hot start" cue point per CD at any given moment; S/PDIF connector is BNC, not optical or RCA coax; manual could be better; block repeat mode not designed to provide seamless looping.

PRICE: \$899.95

EQ FREE LIT. #: 103

again. CD 1 starts playing instantly from the cue point. If you use two copies of the same CD, this makes it easy to extend a break indefinitely.

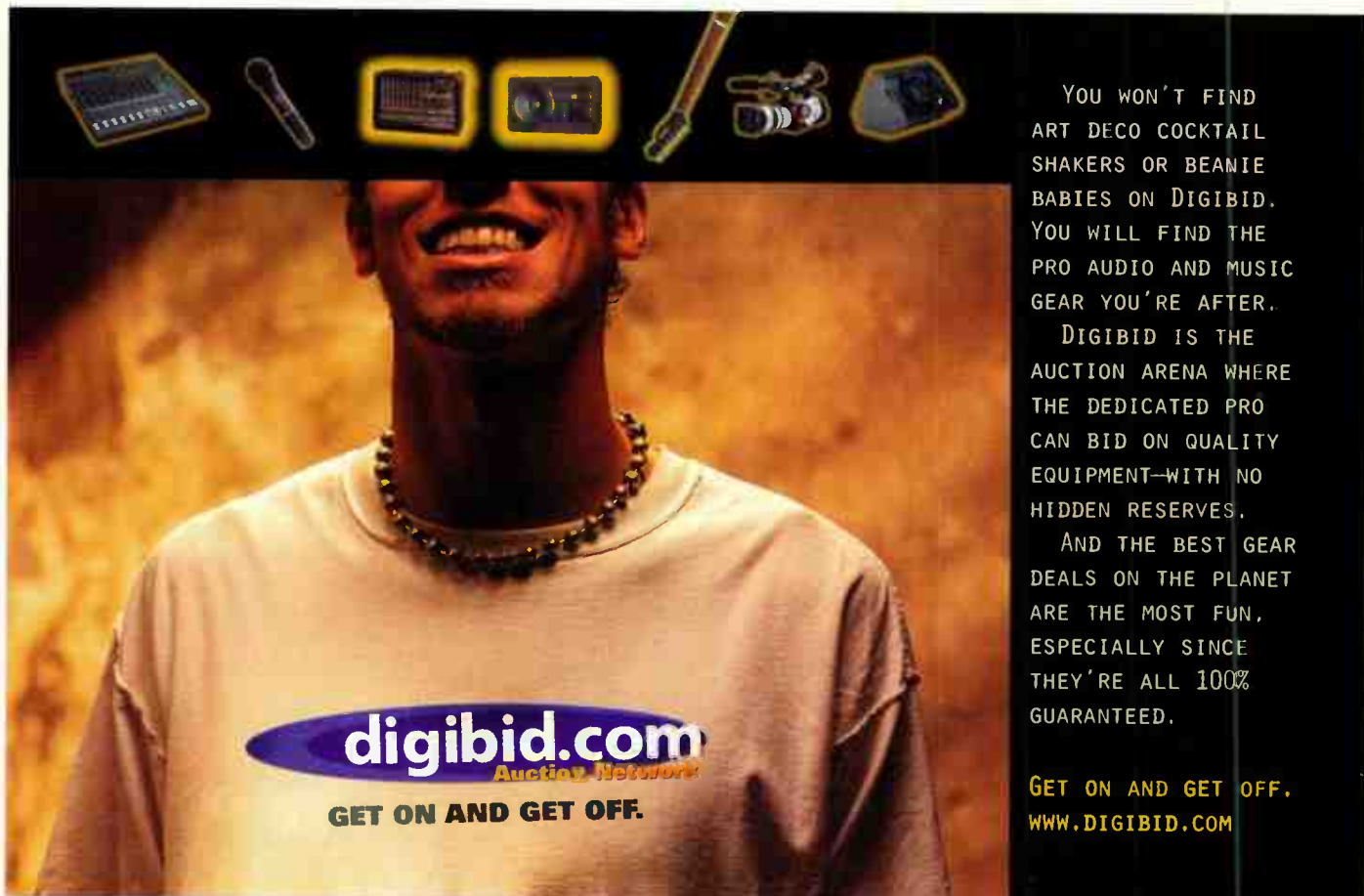
THE BOTTOM LINE

The CD-240 sounds good (credit the 1-bit, 8X oversampled DACs), has 10 seconds of anti-shock memory buffer for each CD, fires up instantly from cue points, has the cool Robo Start feature, and uses big, user-friendly buttons along with a highly readable display. I'd like to see more storable cue points and seamless looping, but, overall, this is a player that gives bang for the buck.

Craig Anderton has played on, produced, or mixed 17 major-label recordings, presented lectures on technology and the arts in 37 states and 10 countries, and written 15 books. He is also the online content editor for the MPN Network (www.MusicPlayersNetwork.com).

back and forth between cue points (or the beginnings of cuts) on the two CDs. Suppose CD 1 is playing; as it plays, you can set up a cue point on CD 2. With Robo Start active, when

you hit the Play button on either CD, it instantly switches over to the cue point on CD 2 and starts playing. You can then cue up CD 1, and when you want to transition back, hit Play



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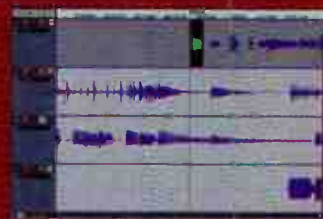
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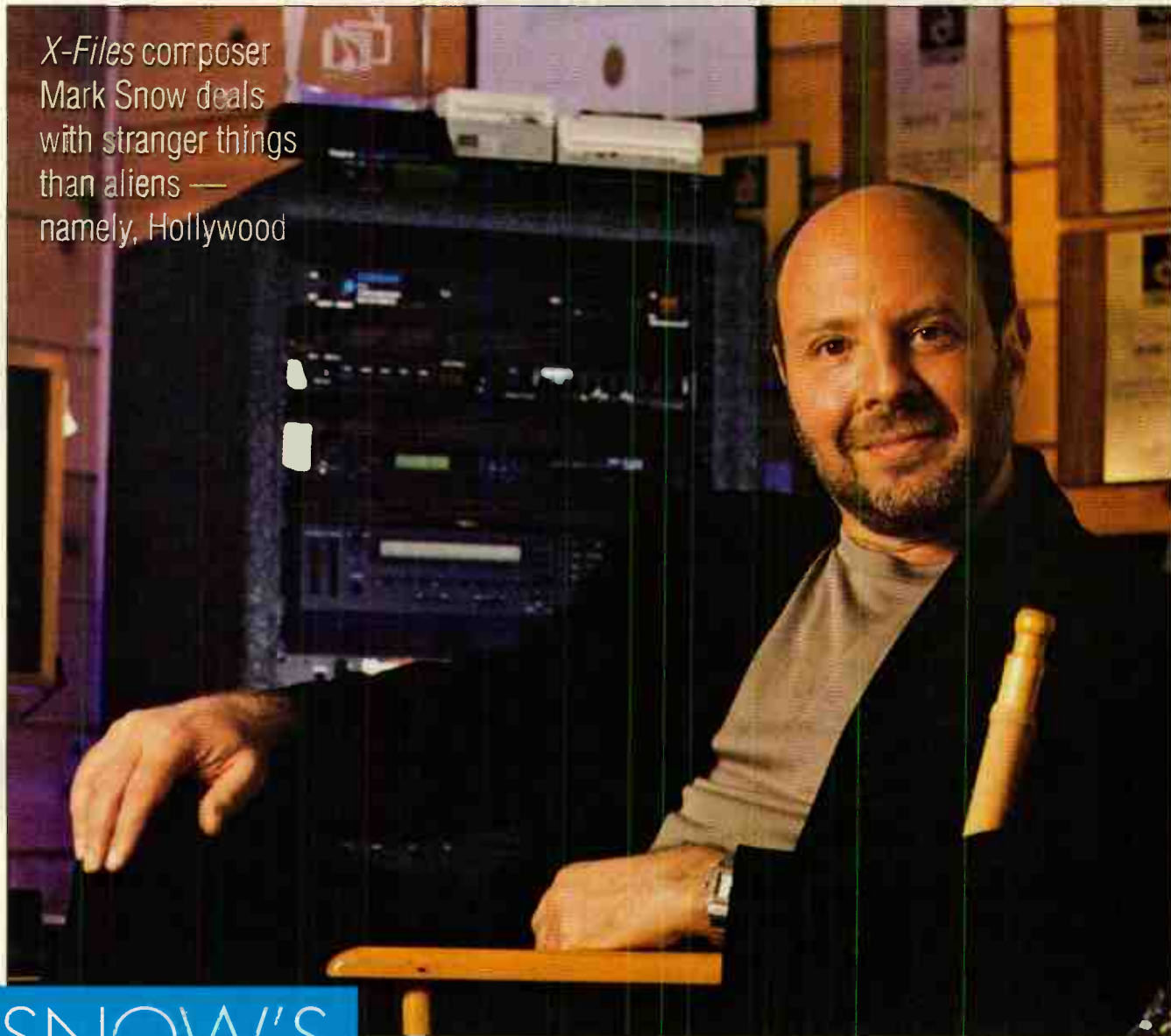
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EQ Multimedia

EQ MULTIMEDIA

X-Files composer Mark Snow deals with stranger things than aliens — namely, Hollywood



SNOW'S DAY

BY JONATHAN MILLER

Hollywood composer Mark Snow is perhaps best known for his work on *The X-Files*, forever pushing the con-

temporary scoring envelope on his trusty Synclavier. Yet Snow is a man of many musical talents — above and beyond the call of television.

HOLLYWOOD OR BUST

Born into a musical Brooklyn-based family in 1946, Snow began his own musical studies on piano at the tender age of 10. He later progressed to composition at New York's High

School of Music and Art; and, finally, a four-year spell as an oboe student and percussionist at the prestigious Juilliard School of Music in New York between 1964 and '68. Pre- and post-graduation, his career took several eclectic twists and turns — from classical performance to co-founding the New York Rock & Roll Ensemble with Michael Kamen, with whom Snow extensively recorded and toured, to pop

album producing — before finally relocating to Los Angeles in 1974. Here he began, "...a slow, very pleasant ascension in the business — nothing really remarkable, until *The X-Files* came along."

EQ: Can you reveal more about events leading up to this momentous cross-country transit and, given that — to outsiders at least — there appears to be a kind of "Mafia"-type stranglehold on all things "Hollywood," how you managed to gain a sympathetic audience within those hallowed Tinsel Town corporate corridors?

Mark Snow: I was an instrumentalist, but I was also extremely keen on composing, and I was especially infatuated with many of the modern 20th century composers — Prokofiev, Ravel, Stravinsky, Bartok; just to name a few. Even more, perhaps, "boutique modern" than them, and a little more recent, are people like Boulez, Stockhausen, John Cage, Xenakis, Ligetti — some of the real *avant garde* guys. I played a lot of that music, and I felt very close to it as a performer. Then I went to the movies one day and saw *Planet of the Apes*. Hearing that score by Jerry Goldsmith just impressed me so much, because there was that ethereal, atonal, musical language being used in a film score. Before that, I'd always thought most film and TV music was just pretty melodies and cheesy little B-bands — jazzy, middle-of-the-road-type stuff. Then it was like, "Well, that's fine; I love that score, and I think I can do it, but

I'm in New York and I have no real intro to anything out there."

It was actually my wife who said, "Come on, we're young, we can do it; if you're gonna do it, now's the time." So we did, and, to be perfectly honest,

she had family in the business. Her sister is an actress named Tyne Daley. So when we landed in California, Tyne's husband at the time — a guy named George Stanford Brown — was working on a series for Aaron Spelling called *The Rookies*. He took my demo tape, liked it, and gave me a chance. So, this first thing I did for him was a cop show; its theme was actually written by Elmer Bernstein of all people! Its scores were mostly based around 15- to 20-piece pop-jazz, soft rock ensembles — a little brass section, a few strings, and percussion. It was a very *tinny*, thin sound. I thought, "Well, let's try something different." So, I scored the thing with a big string orchestra, a harp, and a solo ocarina. These guys thought that was the greatest thing they'd ever heard, so that led to more of that stuff. In 1976 I did this TV movie called *The Boy In The Plastic Bubble*, starring John Travolta, and later there were others like *Something About Amelia*. Fast-forwarding somewhat, you moved to the Californian oceanside suburb of Santa Monica, to a residence replete with cozy backyard recording studio — christened Snowtunes, and generously described by *Keyboard* magazine as "...a piece of ivy-covered paradise." Did the picturesque outbuilding that became the backyard studio already exist before you moved there, and, if so, did this influence your choice of real estate in any way? This was our first house that we ever bought. Before then, we rented a house in the neighborhood, and I rented a studio space a few blocks away for a very low rent. So, here we had this outbuilding, which was actually a garage, and I thought, "Well, this could be a great place for us to have a studio."

Did this studio-to-be require any structural alteration or professional acoustic treatment to accommodate your recording gear before you began seriously working there? Well, not really. It was sort of halfway done — the floor was built up; wires were passed through under the floor. The walls were sort of knotty pine wood from a builder. I

got some wiring guys in, but it's pretty funky. It's not like the grand studios you hear about — like Hans Zimmer's place, with banks of technical stuff, looking like Frankenstein! Some people come here and go like, "Mmm. Well, okay." Then they hear the music, and I have it sounding pretty good, and everyone starts to smile.

But I've had situations — twice, I remember — where people came in, walked out, called the agent, and said, "Well, you know, we wanted him, but he just doesn't have enough gear, so we're not interested." At the time when all these composers' studios started, everyone had banks of keyboards — 10 or 15, with wires everywhere! And if you didn't have that, then you were sort of thought of as not being up to par. They didn't realize that one keyboard was all you needed, or what a cool machine the Synclavier is. Speaking of which, I understand that your accountant originally advised you to buy the Synclavier — surely a risky business with its attendant hefty price tag! What time frame are we talking here, and did this overdraft-inducing purchase coincide with setting up the Snowtunes studio?

Right. This was approximately between '84 and '86. It was apparent that this was the way of the future — a self-contained, electronic studio. So my accountant asked, "What does the most current thing cost?" I said, "Well, there's this thing called the Synclavier, but that's a *fortune*!" And he said, "Shut up; you're gonna get it — even if we have to borrow, beg, and steal; whatever we have to do." Well, at the time, the Synclavier *did* cost a fortune — about \$110,000 just for the bare bones of the thing! And that wasn't adding on the extra voices, the extra memory, extra outputs, and so forth and so on, which brought it up to at least \$200,000! Now they can be bought, fully blown, for around \$20-25,000 — if that. It's so fast, so elegant, with such a great sampled sound and storage architecture — it's just an amazing thing. I know many users, who are way more technically facile than I am, and they've not gone off it.

I've had situations — twice, I remember — where people came in, walked out, called the agent, and said, "Well, you know, we wanted him, but he just doesn't have enough gear, so we're not interested."

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ORCHESTRAL MANEUVERS

During the recording sessions for your score to *The X-Files: Fight The Future* movie, you were captured on camera as saying, "It's really a gas here, because there's going to be an 85-piece orchestra playing the film score, so this is the first time when

that theme has sort of grown and become musical." What are your memories of having the necessary budget to mix what you termed "the cliché *X-Files* electronic sounds" with a large orchestra for the big screen?

Oh, it was a cool event! The only personal disappointment was that I thought some of the more innovative, interesting, original type of music that I was doing on the show was for more of the stand-alone episodes, and not the big government, mythology, serious, cover-up shows — which the movie was. I don't mean to be negative whatsoever, but to have a little less leeway with those shows, they have to be a little bit more generic. So, I had the orchestra, and that was really great, but I don't think any of these people knew that I did this — and I did it before *The X-Files*. I think they were all completely jazzed out by it. It was great fun, especially doing at it Fox's recording studio.

I understand *Fight The Future* Director Rob Bowman was none too keen on orchestral strings, preferring the percussive and sound design aspect of modern scoring. Given that strings are obviously such an integral part of an orchestra's make-up, how did you set

about resolving a potential conflict of interest when scoring this movie? He knew that an orchestra is an orchestra. I remember going to the scoring stage of Bernard Hermann's last

scoring session for *Taxi Driver*. He had an orchestra that was just violins, violas, and cello; no woodwind or brass. So it was like a baritone orchestra — no high end, and it was a really cool sound. But I knew this project wasn't quite that; this needed more of the traditional orchestra setup. Now, I understood Rob's likes and dislikes, but I said, "You know, some of this stuff we're just gonna have to do." And he understood it, and, to this day, he always kids me about the very first note of the score, which is just violins holding a single tone! I think he thinks it was my way of sort of winking at him, and giving him a show.

BRING MYSELF INTO THE FUTURE...

You are on record as saying, "Since my background is music, rather than electronics and technology, I just know as much as I have to." Are we to take it, then, that you initially viewed your studio and Synclavier investment as a kind of necessary evil?

It was sort of a necessary evil, but it was a very exciting choice, because people started responding more. I learned so much from directors, who'd come here and hear the thing. They'd make their comments, and I thought, "Oh, my God! They're so far off." They'd say things like, "Look, I don't know anything about music, but why don't you just try taking the bass off, so we can hear the piano playing better?" And, being very collaborative, I'd say, "Oh, sure," all the while thinking to myself, "These guys are crazy; this is gonna sound like sh*t!" And it often sounded great. I learned more about this form of music from directors and producers than from any teacher or colleague, because they were looking at it as a complete emotional experience — a dramatic experience to help their film or TV show as best as it could.

Recently, because of the advent of the newer samplers — and I have a bunch of those — the mocking up of the orchestra thing is now pretty amazing. You can get pretty damn close. For example, on the Antonio Banderas movie I recently did, I had

the score all ready for him, mocked up on the electronics, so he could comment on it.

SOUTHERN COMFORT

As you say, you have been engaged in scoring *Crazy In Alabama* for Columbia Pictures, with Hollywood lead Antonio Banderas in the director's chair. Pitched as a poignant, yet stirring comedy-drama, that intertwines two unique stories against the backdrop of Los Angeles and the Deep South, how did you set about tackling this big screen assignment?

Well, Banderas heard a demo tape of mine. There was one piece on it that I did for a TV movie, starring Farrah Fawcett. It was a period piece — very Americana-sounding, very sympathetic and sweet; not big and soaring, but more soothing. He apparently thought that was perfect, and it just went on from there. It was pretty simple, in a way, because he'd spent a long time temp'ing the movie with music. He said, "I don't know how you feel about this; I don't mean to be disrespectful, but this is the direction; this is the kind of thing I really love." He was somewhat naive in that he would temp little five- and ten-second bits, and then go into another ten-second thing. I said, "This is fine, except the only thing wrong is that all these fragments are just a little schizophrenic. I think we have stay on one thing and play it through, instead of having these little moments." And he said, "Oh, yes; absolutely. I'm just giving you an idea of a direction."

I think that the most gratifying moment of the whole experience was right in the middle of the movie: there's a very moving, '60s civil rights montage scene where there's a whites-only swimming pool, with an African American protest taking place nearby. The Klan comes at night, and there's police and horses — a big melee. There's this moment when this little black boy, who doesn't want anything to do with it all, takes off his clothes and goes into the pool and just floats, and the position of his

My accountant asked, "What does the most current stuff cost?" I said, "Well, there's this thing called the Synclavier, but that's a fortune!" And he said, "Shut up; you're gonna get it — even if we have to borrow, beg, and steal

body, floating in the pool, is like Jesus on the cross. It's *very* poignant. They told me that Dylan had heard about the movie, and this particular scene, and he was willing to write a song for *free*. I thought, "OK, I'm not gonna stand in the way of that! That's fine." But it never happened.

So, the first piece of fresh, original music that Banderas heard from me was for that scene. It was just piano and strings — real feeling, with a beautiful melody. Banderas was here; the producers were here; the head of music from Sony was here. They wanted my first meeting with Banderas to be good, but everybody didn't know quite what to expect. So I put this piece up, and all the people there just loved it. But I could tell Banderas didn't want to just immediately jump all over it. He said, "Let's hear it again." And he heard it about three times, until it sank in. Then he stood up, almost in tears, and gave me a hug. So, from then on, it was great; a wonderful experience.

CRAZY FOR YOU

Earlier, you intimated that the Synclavier remains at the heart of your studio. It could be argued that this once groundbreaking instrument is now beginning to look a little long in the tooth when pitted against the latest, relatively low-cost, yet high-performance offerings from rival manufacturers like EMU and Akai. Are you planning to stick with your trusty Synclavier workhorse for the foreseeable future?

Well, its sequencer is maybe not as powerful as other things, but when you're doing the kind of music that I am — background scoring — then it's fine. Other sequencers are more geared up towards rhythm-based songs; the Synclavier can do the same thing, but not quite as up-to-date. But, for scoring, this does just as much as I need. I've got some new samplers and other MIDI boxes for new sounds.

Such as?

The Roland S760 sampler is my favorite, and a lot of other people's, too. They've stopped making them, unfortunately. I work with four, and could probably do with four more. I saw some advertised in a Japanese magazine; I had someone go out there and track them down. We found another one in Texas. It's really quite a coup to come up with one of those things!

There's a rumor that Roland is making a new one that combines four S760's in one box. I don't think these guys realize how valuable they are to so many people. People would go crazy if they either started making them again or brought out this "four-in-one" model!

And those MIDI "boxes"?

There's the Proteus 2000, for example. Half of it is really not much to speak of, but it's like buying an album or CD of a recording artist, right? If you like two songs on the album, then that's worth it. So with these MIDI boxes it's the same thing. If you think even 10

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percent of the thing is great, then you've gotta have it!

SAY HELLO, WAVE GOOD-BYE

New England Digital Corp. — the company behind the Synclavier that served as your spectacular introduction to electronica — is, of course, no more, closing its doors back in June 1992. Fortunately, in February 1996, DEMAS, Inc. took complete ownership of all hardware assets, including inventory, equipment, patents and documentation under the guidance of president Brian S. George, and continues to offer Synclavier support and software updates to this day. Have you investigated any of DEMAS's latest developments — like Synclavier PowerPC, for instance, a PCI-

based interface card and associated software, which, when installed in a PowerPC-based Macintosh computer, enables this popular platform to access voice cards, Poly RAM, and the other hardware modules within the Synclavier tower; effectively an integrated PowerPC-based Synclavier, in other words, with all the advantages that entails?

Yeah, I have that now. I've had a PowerPC in a G3 Mac for quite a while, and that's really great. The next thing, if it happens, is that two Synclavier guys are looking for investment, as

they are very close to developing a card that will substitute the whole Synclavier tower — about a 4-foot by 3-foot-wide box; that's a lot of hardware. If all that can be transferred onto a card that fits inside a Mac, then that would be brilliant! If that happens, then there will be a lot more Synclavier users.

I understand you've recently moved house. No doubt this entailed relocating your private recording studio. Given Snowtunes' compact and bijou nature, were you looking to increase your workspace, perhaps?

The situation is that we had another house in Vermont for 13 years. I was able to get a second Synclavier and set it up in Vermont. For two years I did work for Hollywood, without having to leave Vermont, which was wonderful.

Then *The X-Files* came along; we still had the Vermont place, but we were getting there way less, so we decided to sell it. We came back to the Santa Monica house, and thought, "Well, we've sort of out-grown this place; we've been here since 1981; let's get another house in the neighborhood." So, we've got this new, nice house, which is quite large and very traditional. We're building a studio in one of the rooms in the house, but it has its own private entrance, so my wife can still have some privacy with me working at home.

Sounds ideal. Has the move prompted you into splashing out on more new gear — replacing your compact Soundcraft Sapphire LC 44-channel mixer with a total

recall-endowed digital equivalent, perhaps?

I'm just moving in everything I already have — except for a new Mackie digital mixing board [Digital 8•Bus], which is proving incredibly popular right now. Before this thing, these guys made these tiny little boards, which were thought of as being amateur, somehow. And all of a sudden, this thing comes along — very small; made out of plastic; doesn't weigh much, and costs practically nothing. But what it can do is just brilliant! I can't imagine anyone *not* wanting one. This is enabling project studios to become absolutely state-of-the-art!"

LET IT BE

So, what can we expect from Mark Snow next?

I'm asking myself that, too! Actually, at the moment there's nothing new on the horizon. And, in thinking to myself, "Well, I've gotta get a new agent; I've gotta light fires; I've gotta make calls," it suddenly hit me: I'm just gonna take Paul McCartney's advice and let it be. I guess I've been hustling, doing, and being ambitious for so long that it's starting to become a bore. I don't need to do it. I'll let it be, and see what happens.

Jonathan Miller is a British freelance writer living in...well, England. He specializes in the "ancient art" of the high-tech music interview, and can be reached at jonathan.millermusicmedia@virgin.net.

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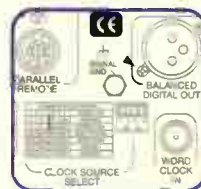


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World Radio History

Hot House Professional Model Four Hundred Amp

Hot House offers an amp that lets the character of your gear shine through

BY STEVE LA CERRA

In spite of the fact that they're just as important as any other part of the audio reproduction chain, it seems like power amplifiers get no respect. In most studios, they're tucked away in an amp closet or hidden underneath a console, never to be minded until something goes wrong. Yet having a quality power amplifier is crucial to the sonic accuracy of a control room. While many of the tools we choose for making recordings are selected because of their sonic coloration, power amplifiers and monitor speakers may be the only components we choose for accuracy.

Fortunately, Hot House Professional Audio takes monitoring very seriously, as evidenced in *EQ's* review of their PRM 165 loudspeaker and ASB 115 subwoofer in the October 1999 issue. Most recently, Hot House sent us

the Model Four Hundred and Model Two Thousand high-resolution control room amplifiers for review. Circuit topology for the two amplifiers is largely similar, with the exception being power output rating: 125 watts per channel into stereo 8-ohm loads for the Model Four Hundred and 390 watts per channel into stereo 8-ohm loads for the Model Two Thousand.

MODEL FOUR HUNDRED

We'd classify the size and weight of the Model Four Hundred about average for an amp with its qualifications, but its external finish and build quality is in a class shared by few. The front panel is almost 3/16 inches thick and finished with a glossy black enamel, giving it a unique look. A view under the hood of the Model Four Hundred reveals what is essentially a dual-mono design, with the two channels on separate circuit boards bolted directly to the heat sinks that form the left and right side-panels of the chassis.

A large toroidal power transformer occupying the center of the chassis is the only component shared by the two channels. The transformer employs split-dual secondaries for complete galvanic isolation between channels, significantly enhancing

the toroid's ability to respond to transients. Each channel is individually fused, and circuit layout is clean, with hand wiring of the input from the rear-panel Neutrik Combo connectors to the circuit boards.

On the rear panel are a pair of five-way binding posts for speaker output, an IEC power receptacle, and silk-screened legends for pin configuration and bridged operation. Bridging the Model Four Hundred is a bit more complex than just flipping a switch: a parallel input must be applied to both channels with the right channel phase-reversed. Then the left-hot and right-hot output posts are connected to the speaker and the two ground output posts are connected to each other. When bridged into an 8-ohm load, the Model Four Hundred can deliver 400 watts. According to Hot House Professional Audio, manual bridging avoids switches that would otherwise compromise the pristine audiophile signal path, and assures that the owner is deliberately going mono (no chance of accidentally screwing up).

IN THE STUDIO

We used the Model Four Hundred (with a Yamaha 02R and several TASCAM DTRS machines) over a period of



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several months for tracking, overdubbing, and mix sessions, powering several sets of loudspeakers including Hot House's PRM 165's and Westlake Lc8.0's. We quickly noticed that the Model Four Hundred is a very transparent amplifier, really allowing the character of your gear to come through. Transient response was excellent, most noticeably on synth sounds containing clicks and clangs, which really came alive with the Model Four Hundred.

This amplifier is a perfect match for the PRM 165's, allowing the speakers to play sufficiently loud, yet never putting them in danger of being overpowered. The Model Four Hundred/PRM 165 combination moved a decent amount of air on low-frequency synth sounds and kick drums, though, when we attempted to achieve near-realistic SPLs for kick drum, the system didn't quite have the muscle. It was interesting to note that, as we approached the power limitations of the Model Four Hundred, it didn't sound compressed like many amps do under similar circumstances; it just stopped getting louder. Although it may not have the horsepower to drive large control room "mains" monitors to thunderous SPLs, it certainly delivers the goods on a nearfield system.

EQ LAB REPORT

MANUFACTURER: Hot House Professional Audio, 275 Martin Avenue, Highland, NY 12528. Tel: 914-691-6077. Fax: 914-691-6822. E-mail: info@hothousepro.com. Web: www.hothousepro.com.

SUMMARY: High-quality, medium-powered amplifier designed for studio monitoring.

APPLICATIONS: Control room monitoring.

STRENGTHS: Exceptional clarity and stereo imaging; excellent transient response; beautiful design; amp may be bridged for future "expandability."

WEAKNESSES: May not have enough power to move your world.

PRICE: \$1699

EQ FREE LIT. #: 104

One of the more subtle characteristics of the Model Four Hundred was its "presentation." We've never really liked using that word to describe amplifiers, but the Model Four Hundred does exhibit a marked sense of realism. Stereo separation was extremely well-defined, no doubt due to the circuit topology. Also, the level of detail that the amp could resolve was definitely better than the average bear: low-level reverb tails and subtle echoes were clearly audible, as were high-frequency percussion sounds that might otherwise be buried in a mix.

The Model Four Hundred high-resolution control room amplifier from Hot House Professional Audio is a beautifully executed design that combines a healthy power output with detailed reproduction, excellent stereo separation, and very fast transient response. Keep in mind that, should you outgrow its power capabilities, you can always purchase another Model Four Hundred and run the two amps in bridged mode. Definitely a good match for the proliferation of nearfield monitors we've seen over the past few years, and a welcome addition to any control room. **EQ**

ON TO TWO THOUSAND

In addition to the Model Four Hundred, Hot House Professional Audio also sent EQ the Model Two Thousand High Resolution Control Room Amplifier (\$4999). This amp is Hot House's flagship and everything speaks "serious" about it (in fact I'm still swearing over the condition of my lower back after unpacking this 85-pound beast and moving it into the control room). The Model Two Thousand is built upon a massive chassis in a true dual-mono design which includes separate power cables and front-panel on/off switches per channel. In addition to the same rear-panel I/O connectors as the Model Four Hundred, the Model Two Thousand also has a switch for each channel to toggle between floating and common ground, facilitating installation. Peering under the hood reveals two toroidal transformers and a total of 20 MOSFET output devices per channel. If you can find a rack strong enough to support it, the 1/4-inch-thick front panel will occupy five rack spaces. Unlike the Model Four Hundred, the Model Two Thousand is actively cooled by a quiet fan which never became obtrusive during session work.

Having the Model Two Thousand in your monitor system is like driving a Ferrari on a Sunday cruise down the interstate — you really don't need all that power, yet when you want to put the pedal to the metal, the reserve is there. However, unlike many high-powered amplifiers, the Model Two Thousand

is about more than just brute force. It's also about finesse, clarity and detail — much like the Model Four Hundred. In addition to those attributes it reproduces low frequencies in a completely effortless manner, never giving the impression that it could run out of steam regardless of SPL or monitor size. We also felt that the Model Two Thousand *sounded* a bit more extended in the low-frequency range than the Model Four Hundred. This is in fact due to the Two Thousand's ability to deliver huge amounts of current to easily move any woofer — resulting in a perceptual difference in low end (both amps are actually high-passed at 3 Hz for protection from DC).

Since the Model Two Thousand delivers at least double the rated power before the onset of audible distortion, the need to bridge the amp for mono is unlikely. Hot House Professional Audio does offer a bridging switch as an option, however, they note that the only time they ever bridge a Model Two Thousand is to run the 3840-watt, triple-12-inch mid bass section of their High Output Series SD312 mega main monitor system. In bridged mode, a Model Two Thousand has a peak output of 200 amps into an 8-ohm load. No question: this is one of the best amplifiers we've ever used. Hmmm...maybe I really don't need that new car...

—Steve La Cerra



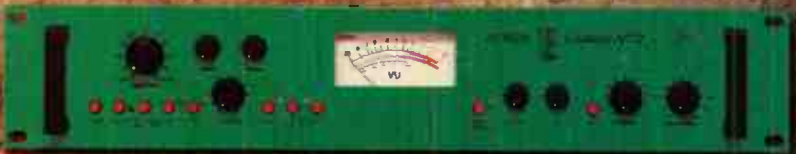
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Millennia Media NSEQ-2 Parametric Equalizer

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built to last

BY MIKE SOKOL

Here's another industrial-duty design by John La Grou and the folks at Millennia Media. I've had some experience with their HV-3 preamp, and was very pleased with the unit. Therefore, I was curious to check out their dual-topology parametric equalizer. [For a refresher on equalizer types and techniques, check out my article "The Art of EQ" in the November '98 issue of *EQ* Magazine (or find it in the articles section of my Web site at www.soundav.com).]

At first heft, I would have to qualify this thing as "heavy-metal" (25

lbs.). So, of course, I ignored the warning label about hazardous voltages and opened it up for a visual inspection. Every aspect of its construction — the 3/8-inch faceplate, machined aluminum knobs, rugged lighted switches, and massive power-supply — speaks of its no-compromise design heritage. Ceramic sockets with gold contacts are used for a pair of Sovtec 7025 tubes (I think the Russians still make the best tubes), while two mysteriously unbranded 12AU7's are used in the output sections. It's a transformerless signal path, so I suspect the massive 10-microfarad, 200-volt capacitors are part of a cathode-follower output stage. Top-quality brand components are used throughout the design; examples being Neglex OFC cabling, Vishay pots, ITT and Grayhill gold contact switches, Roederstein resistors, and Electrocube capacitors. It's almost enough to make the audio-

phile part of my brain become dominant. (I guess after that happens all that's left for me to do is become a mastering engineer.)

However, this sort of building does come at a price. It's heavy...*really* heavy (as much as a medium-sized power amplifier). So much so that you'll want a second person to help load it in the rack. In addition, there's also a good bit of heat generated, so don't put it in a tight rack without adequate ventilation. Class-A designs are power hogs by definition since they can actually dissipate more heat when idle than when producing full signal output. Furthermore, designing in four tubes and a 7-pound toroid transformer big enough to drive loudspeakers adds to the heat and weight. However, it's a small price to pay considering the sonic benefits.

Operationally, the NSEQ-2 is a classic parametric equalizer with a few modern conveniences added.





LAB REPORT

MANUFACTURER: Millennia Media, 4200 Day Spring Court, Placerville, CA 95667. Tel: 530-647-0750. E-mail: infor@mil-media.com. Web: www.mil-media.com.

APPLICATION: Parametric equalizer for track processing and final mastering.

SUMMARY: Stereo, 4-band parametric EQ with sweepable frequency and Q on the midrange controls, and selectable frequency and filter shape on the low and high ranges. Dual-topology circuitry (Class-A discrete J-FET or Class-A vacuum tube) for selectable J-FET or Tube signal paths.

STRENGTHS: Built like it will last until Y3K; very responsive controls with up to 20 dB boost or cut; select FET or Tube flavor in a single box (it's two taste-treats in one); this is one gorgeous-sounding equalizer.

WEAKNESSES: No output muting relays means there's a few audible thumps on startup, and the tubes take several minutes to stabilize and get down to business.

PRICE: \$2995, w/gloss black cosmetics; \$3195, w/platinum cosmetics; detented/loggable controls, \$500 option.

EQ FREE LIT. #: 105

The center of the front panel has lighted switches that allow you to select either J-FET or Tube paths, a 10 or 20 dB gain range, and in/out for each channel. The low- and high-frequency bands offer selectable frequency points of 20, 34, 56, 100, 180, and 270 Hz and 4.8, 5.6, 8.0, 10, 16, and 21 kHz, respectively. A selector switch sets them to a shelving curve or peaking curve (called "haystack" by the English, I think... those "Brits" are so cute). The two midrange sections are fully sweepable, able to vary their center frequencies from 20 Hz to 2.2 kHz and 240 Hz to 25 kHz via a rotary control and 10X switch. A variable Q control on the low- and high-mid bands has a range of 0.4 to 4, with fixed Q of 1.0 for the low and high ranges.

On the back panel are XLR inputs and outputs, plus a terminal strip with a strap that allows you to float the audio ground from the chassis (which I often need to do in the wire jungle of my studio).

So, what's in an equalizer to get excited about? I put it in the output path of my console and cued up some 2-track masters. Well, with the NSEQ-2 switched into J-FET mode and all the controls at unity, it just sounded like a wire (which is exactly as it should sound). Grasp a control and start adding in a little boost at 34 Hz, and the kick drum starts to come alive! Set the high range for 10 kHz on wide Q, and you can get the sweetest, silky top-end you've ever heard. The interesting thing is that you can really isolate each problem area and correct it

without compromising the rest of the sonic picture. There's simply no image smear, no hint of running out of headroom, no strain whatsoever. Switching in the Tube path gives you a subtly different sound, something I'll call a little rounder and a bit more resonant. This is the same sort of sonic magic I've heard in classic tube gear built decades ago, but in a modern package that doesn't require the constant care and feeding of a 40-year-old piece of gear. If I were a mastering engineer, I would want this equalizer in my rack.

Now, \$2995 may seem like a lot of money for an equalizer, but this could be a life-long investment. You can use it patched into a channel strip during mix-down in Tube mode and really tune in that snare. Or polish a vocal track to perfection while adding just a hint of warmth provided by all those electrons slinging at the cathodes. Then patch it into the final output path in J-FET mode for final mastering and make those surgical strikes on audio blemishes without touching anything else. It really is like having two equalizers in one package.

Mike Sokol is a live/recording engineer with over 30 years experience on both sides of the microphone. Check out his Web site at www.soundav.com for previous columns or e-mail him at jmsokol@intrepid.net with your questions or comments. We're here to believe you!

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Pendulum Audio OCL-2 Compressor

Pendulum offers a new way to keep your paths clean

BY EDDIE CILETTI

Quite literally "out of the blue" comes a new line of products from a company that once made "only" an acoustic guitar preamp. The OCL-2 is an optical compressor/limiter with a minimal, Class-A signal path consisting of two tubes per channel. (List Price: \$2795.) It is so minimal that there are no input or output transformers, even though XLR connectors get you the old "in-out."

The beauty of working with the OCL-2 and with its designer, Greg Gualtieri, is that both are remarkably open and flexible. Translation: There are a number of options, including balanced I/O and passive sidechain EQ filters. Mastering engineers and tweak heads take note: many of the control pots can be "customized" to reflect user preferences such as Attack and Release ranges.

After an extensive interview, I learned that Mr. Gualtieri's design philosophy is derived from his need to capture acoustic guitar in the most transparent way possible. He is, however, not so much of a purist as to scoff at compression. Classic vintage signal processors are not always clean enough — nor are they in such great condition after time and abuse to justify current market prices. Greg originally created both the OCL-2 as well as the 6386 Variable-Mu compressor/limiter for his own personal studio.

WEIRD (BUT COOL) SCIENCE

The Pendulum OCL-2 is not a clone of the Teletronics LA-2A. As a former physicist for Bell Labs, Mr. Gualtieri knows how a photo resistor works — at the molecular level — having devised a proprietary method of taming the unruly optical beasts to a previously unattainable level of consistency. As such, the OCL-2 inspires confidence as a stereo unit that no other optical unit can match — and then some...

It is hard to make traditional optical limiters sound bad. Without Attack and Release controls, users are "limited" to the natural characteristics of the optical parts, which just happen to be perfect for voice, guitars, and bass — gentle enough to massage a stereo mix, but not damage it. Other modern optical boxes like the JOEMEEK have added Attack and Release controls that go beyond normal to create interesting, near-backwards "effects." The controls on the OCL-2 are more effective (without the "effect"), in part because of the proprietary tweak that only Pendulum has.

A LA MODE

Science aside, the OCL-2 has a three-position Mode switch — labeled Fast, Presets, and Manual. The first two preset "modes" disable the Attack and Release controls. Fast is as fast does. In this mode, the OCL-2 gets about the most sonic agility possible from an optical device.

Four of the six Presets were originally modeled from the popular Fairchild limiter. The last two presets are "Program Dependent," which is to say that their response is more akin to a human "riding the gain," and so less obviously processed. Manual mode

turns on the Attack (1 mS to 40 mS) and Release (.1 S to 2 S) controls.

HOW FAST DO YOU WANT IT?

A VU Meter can indicate apparent "loudness" better than a bargraph-style peak meter (unless the latter can simultaneously indicate peak and average levels). "Instruments" such as voice and bass have a nearly identical peak-to-average ratio, a perfect match for accurate display via VU meter. (The exceptions would be "Popping" consonants and "snap happy" electric bass strings!) Conversely, transient-intense instruments such as drums and tambourine might deflect a VU meter only as high as "-5 dB," but the peaks can be 10-dB to 15-dB higher. Analog tape machine users learn this lesson very quickly!

ON THE ROAD

The OCL-2 was evaluated at the same time as the Pendulum 6386 Variable-Mu limiter even though the two reviews appear in separate issues. (See the 6386 review in the December '99 issue.) The units were daisy-chained along with a Great River transformerless mic preamp and the TASCAM DA-45HR 24-bit DAT recorder. I was completely comfortable using them together with no fear of signal degradation and so thankful for the Bypass switches, which are not common on vintage products (and even some modern units). Having both units in the signal path made the comparison of identical settings quite easy. With slow attack and fast release, the two models behaved as twins, but in Fast mode, the 6386 is more responsive.

GETTING WITH THE PROGRAM

Stereo program was the first signal passed through the OCL-2 because



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EQ LAB REPORT

MANUFACTURER: Pendulum Audio, Inc.; P.O. Box 339, Gillette, NJ 07933. Tel: 908-665-9333. E-mail: info@pendulumaudio.com. Web: www.pendulumaudio.com.

APPLICATION: Audio dynamics processing.

SUMMARY: Stereo (or dual-mono) optical compressor/limiter with three response modes: Fast, Preset (four "normal" plus two "program dependent"), and Manual (front-panel Attack/Release).

STRENGTHS: Minimal Class-A signal path maintains sonic purity; in addition to a Bypass switch, the output is normally bypassed until the unit warms up and voltages are stabilized.

WEAKNESS: The Gain Reduction Meter needs (and may get) expanded range to more accurately reflect the quick response of Fast mode.

THE I/O CONNECTION: Unbalanced XLRs in and out plus 1/4-inch TRS sidechain access. (Several balanced options are available.)

PRICE: \$2795

EQ FREE LIT. #: 106

that is my acid test. Pass the test, and you know the unit can handle individual tracks with ease. The LA-2A and the LA-3A were most notable for their transparent approach to dynamics processing. The OCL-2 goes two steps further by being more sonically transparent (no input or output transformers on a "stock" unit) and far more versatile in terms of Attack and Release parameters. This will be of particular interest to those who wish to capture vocals, or any acoustic instrument, with the least amount of added color while still having equally transparent control over dynamics variations.

With the luxury of having the two models at the same time, I set the OCL-2 for a Slow Attack and Fast Release (my personal default) followed by the 6386 in FAST mode (as a peak limiter). My heavy-handed "visual" setting for the 6386 had lots of meter movement in Gain Reduction mode. To fully appreciate the Fast mode, however, more conservative settings — less than 1 dB of meter movement (2 dB for the OCL-2) — yielded such a profound sonic improvement that the 6386 review served as my "VU meter refresher course." The combination of both units on a stereo mix was killer. (And this is as close to "born again" as I will ever be!)

Note: Mention of the meter's response time appears on page four of the manual. It also deserves "honorable mention" on the first page, where front- and rear-panel layouts plus a quick summary of each control (a simple yet brilliant move) serve as a convenient and quick reminder.

FLAT, COOL HEAD

Unlike the LA-2A (and especially the ADL clones), the OCL-2 has a very flat detector circuit, which means the unit equally processes *all* frequencies. One approach is not better than the other, although I personally prefer a "weighted" detector circuit — one that "hears" in a similar nonlinear way to the human ear. (Through experimentation with sidechain equalization, I have found that a broad 6-dB boost — centered at 2.5 kHz — works well for many applications.) Pendulum sells a TRS sidechain insert plugs with a passive RC network customizable to a user's needs. Very Cool!

NO RIVALS

Though not as quiet as the 6386, the OCL-2 has gobs of headroom. (Maximum out is +35 dBu into a hi-Z load, +24 dBm into a 600-ohm load.) Maximum gain reduction is 27 dB. The OCL-2 is always open and airy, never harsh or muddy. This was made even more apparent on the very last test — narration — clearly showing that the OCL-2 has its feet planted in two worlds, satisfying the passions of the sonic purist along with the needs of audio control freaks.

For the audiophile/minimalist, the plain and simple signal path, using high-quality components (gold switches, polypropylene caps) is most reassuring. For the knob needy, no optical signal processor can match its control range. The Pendulum OCL-2 is not "re-hashed retro," but enhanced vintage technology.

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Comp/Lim Compendium Part 2

A look at gain
“make-up” amplifiers



BY EDDIE CILETTI AND DAVID HILL

In January, an overview of compressor/limiter topology was presented in this column. FETs, VCAs, Vari-

able-Mu (vacuum tubes), and Optical gain-control devices all have an optimum operating range, each with idiosyncrasies and artifacts that are magic to some and a curse to others. But the magic does not come from these devices alone. At a time when most stuff is assembled by machine in a matter of minutes, it seems that magic is more likely to come from products that are hand-assembled using technology that most capitalists have long forgotten. Magic is not easily mass-produced.

Compression is addictive. When time is of the essence, it solves performance inconsistencies. If a track seems lifeless, it adds excitement. If a little sounds good, then more is better, right? Down the slippery slope we go until the gain reduction meter is at “-20 VU” or the every segment of the bargraph display is fully lit. It should be no surprise to find an amplifier at the end of the chain, ready to “make-up” (recover) the signal lost to processing. Here’s where the magic continues...

KISS AND MAKE-UP

Every audio product has an output amplifier designed for a very specific task: to drive long cable lengths without struggle and — in olden times — drive devices with

low, 600-ohm input impedance. That hunk of interconnecting cable is a multifaceted device — filter, resonator, antenna — all of which can contribute to instability if the amplifier design is flawed or if its execution is compromised by bad grounding or poor circuit layout.

When all is well, a product’s sonic fingerprint is determined by four characteristics: the intended purpose (gain, EQ, dynamics processing), the degree of neutrality (from input to output when used with adequate headroom), and idiosyncrasies in both the region of the noise floor and at the opposite extreme, as headroom begins to run out.

DO YOU LIKE BUTTER?

Ever have a yellow flower held under your chin? Kids see the flower’s color reflected in your skin and say, “You like butter!” How this applies to audio is not as obtuse as you might think. Most of the time, we use signal processors to add color.

Consider what happens when using a slow attack time on a compressor. Some higher level transients will be passed along to the gain make-up amplifier, which is likely to distort if signal levels approach the headroom limitation. On an old

TABLE 1B: COMPARING SLEW RATE AND DRIVE CAPABILITY OF VARIOUS IC OPAMPS

IC Opamps	Slew Rate	Output Drive Capability	Vintage	Notes
MC1558 (dual)	0.5V/μS	2 kohms	Early to Mid '70s	—
RC4136 (quad)	1.7V/μS	2 kohms	Early to Mid '70s	used in LA4A
LM301 (single)	10V/μS	2 kohms	Early to Mid '70s	Slew rate depends on how used
LM318	50V/μS	2 kohms	Early to Mid '70s	Used in Ampex ATR-100
MC1303	—	—	Early to Mid '70s	Intended as low-noise consumer phono preamps,
μA739	—	—	Early to Mid '70s	both have poor load driving ability and low max output. Type μA739 used by TAPCO.
TL071 (single)	13V/μS	2 kohms	Mid '70s	—
TL072 (dual)	13V/μS	2 kohms	Mid '70s	—
LF353 (dual)	13V/μS	2 kohms	Mid '70s	—
NE5534 (single)	13V/μS	600 ohms	after 1975	—
NE5532 (dual)	9V/μS	600 ohms	after 1975	—
AD711 series	16V/μS	2-kohm load	1990s	FET input, very low distortion
OP275 (dual)	22V/μS	600 ohms	1990s	high performance
OP2604	25V/μS	600 ohms	1990s	runs on 24-volt supplies
OPA627	55V/μS	600 ohms	1990s	very low distortion

TABLE-1A: COMPARING SLEW RATE FOR VARIOUS DISCRETE LINE AMPLIFIERS

Modules	Slew Rate Low range	Slew Rate High Range	Vintage
Neve 283	w/mic xfrmr 5V/μS	w/line xfrmr 6.25V/μS	1969
API 325	2V/μS	—	1971?
Jensen 990	16V/μS 75-ohm load	18 V/μS 150-ohm load	1980

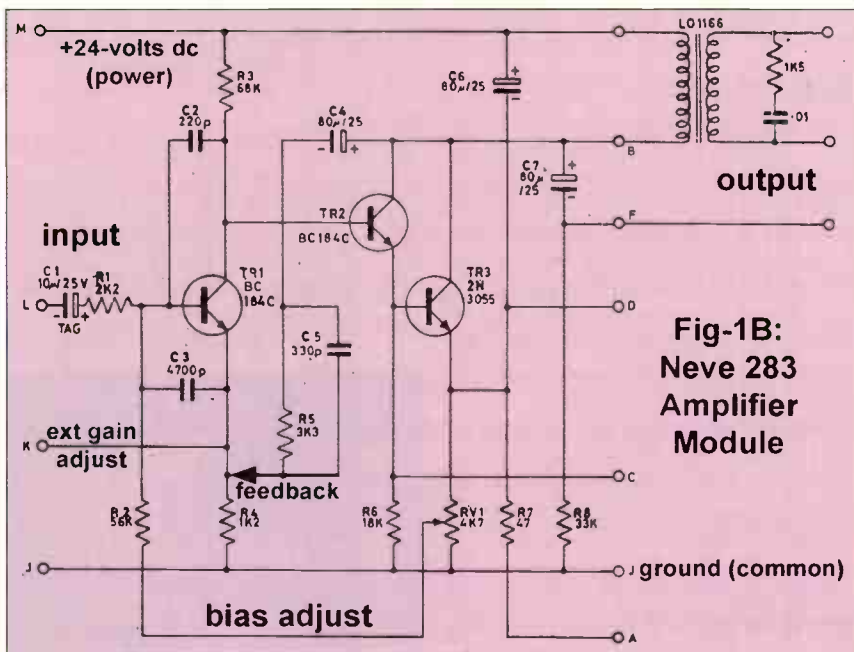
Neve 2254 compressor, this can be a desirable "happy accident" because the waveform becomes gradually and asymmetrically distorted. On most opamps, gear clipping is symmetrical and annoying. The dbx 166 has a "peak stop" feature because the output amp has no "sonic airbag."

TYPE CAST

This article is intended as an overview. It is oversimplified for reasons of space (1500 words is not a doctoral thesis on audio subtleties) and my own mental limitations. That said, there are three basic amplifier types: single-ended (tube or transistor), push-pull (vacuum tube), and bipolar (transistor). Single-ended types will have a higher amount of even-order (musically complementary) harmonic distortion, assuming the signal is not overloaded to the point of hard clipping. "Single-ended" implies that there is a single output device (more devices could be added in parallel), which, by default, is bi-

ased Class-A, meaning that current flows for the full audio cycle.

Solid-state (transistorized) circuits come in two basic flavors — discrete and monolithic (the integrated circuit, or IC) — with many variations on a theme. Like tube gear, the single-ended Class-A output stage is popular for its musically complimentary overload characteristic. It can be found in the Neve 2254 compressor/limiter and the 1066 and 1073 mic preamp/EQ modules, as well as the 1272 line amplifier module. (See fig. 1A and fig. 1B.) The most desirable, the Universal Audio



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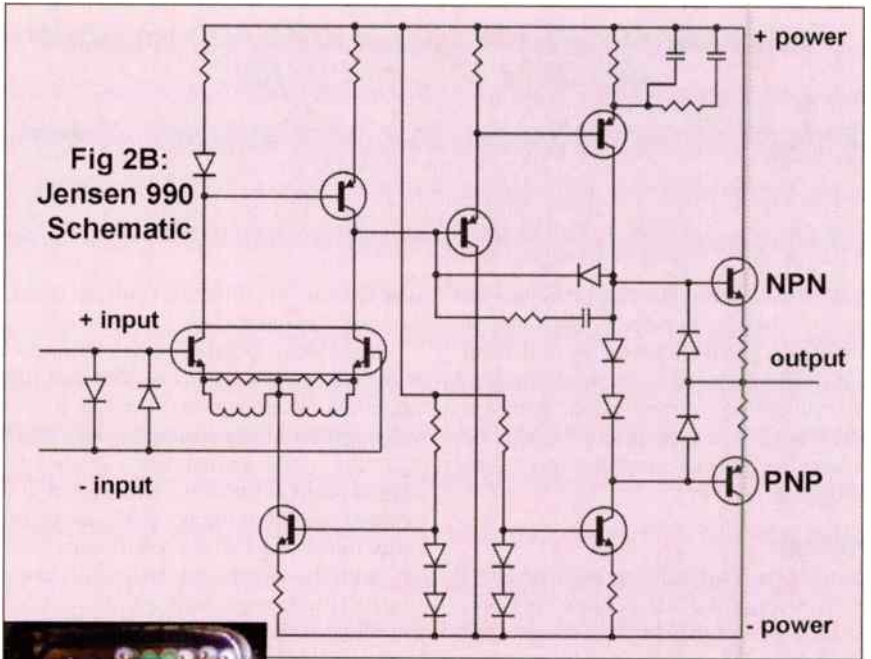


Fig 2B: Jensen 990 Schematic

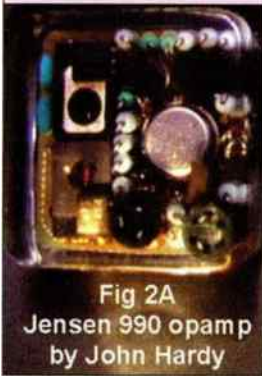


Fig 2A Jensen 990 opamp by John Hardy

more odd harmonics — third and fifth — because the push-pull or balanced circuit will cancel most of the even-order harmonic distortion.

NATURAL FLAVORS

An operational amplifier (opamp) is a "device" that starts out with more gain than needed. The gain is easily configured assuming that stability (no oscillations) and bandwidth (the frequency response) remain acceptable within its usable range. There are many opamp designs, both discrete and integrated circuits (ICs). Fig. 2A and fig. 2B show the Jensen 990 discrete opamp (this version is manufactured by John Hardy) and its schematic.

Discrete and IC opamps are likely to have a pair of output transistors. The most common output circuits are said to be complimentary. (NPN and PNP transistors are identical in characteristics, but are polarity-specific.) ICs typically run Class-AB (relatively clean and efficient). This is a combination of Class-A (hot and inefficient, but tasty) and Class-B (super effi-

cient, but only good for running motors). Each of these will impart their own color into the audio path, especially when overdriven. (Some ICs can be biased to run Class-A, but most can't stand the heat.)

Opamps biased for Class-A operation will produce second and third harmonic distortion when gently overdriven. Class-B amplifiers are biased so that each device handles only half the wave. (Most of the time, the NPN would be "on" for the positive excursion, while a PNP would be "on" for the negative excursion. The reverse is also true in some cases.) An output stage, biased Class-AB, will have some overlap at the zero-volt "crossover" point between positive and negative excursions.

DISTORTION

Many IC opamps are designed for low power consumption — meaning they are biased closer to Class-B than to Class-A. Large amounts of negative feedback will remove some of the distortion, but stability is a challenge — especially as gain and signal level increases and/or load impedance increases. continued on page 140



Fig-3: API 325 Line Amplifier card

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The Vegas Connection



PHOTO BY STEVE JENNINGS

A review of Sonic Foundry's Vegas Pro as an Internet authoring system

BY JON LUINI AND ALLEN WHITMAN

The largest corporate merger in history (as of this writing), between a media content company and an Internet service provider proves Internet audio is here to stay. Though the FezGuys despise huge corporate mergers (less and less people decide what information and services are made available), there's a potential upside to the marriage between America Online and Time Warner. It may smooth the way to faster, earlier adoption of broadband technologies, thereby increasing the usability and immersiveness of the Internet experience. But don't throw away your modem just yet! Widespread broadband access is still three to five years away. Musicians and listeners getting music up on, or down off, the Internet still requires an ear toward the limitations of low bandwidth. That

brings us to the subject of this month's column: Sonic Foundry's Vegas Pro, the self-described "multitrack media editing system."

Though Vegas Pro does a whole lot of stuff, including rudimentary multitrack recording (with 24-bit/96 kHz sampling), simple video editing, and MIDI Time Code sync [see the full review in the last issue], we're going to focus on the tools for exporting files to Internet content delivery technologies. In addition to other standard formats (such as WAV), Vegas Pro exports to Real Audio, MP3, and Microsoft Windows Media (MSWM).

The FezGuys wriggle through the crawlspace into the secret FezLab, dragging the shrinkwrapped, faux-steel-and-rivet cardboard box of software behind us. These big display boxes containing a small manual and a couple of CDs are enlarging your local landfill. Ah, packaging...remember to recycle! Maybe what you really pay for is the groovy design on the outside of the box.

We power up a Windows machine (PII, 400 MHz, a SoundBlaster PCI 512 card) and crack the box, inserting the CD into a drive. Naturally, we throw the manual to the side in order to simulate a typical user experience. Besides, we're the FezGuys, and we slept with the box under our pillows last night. That should give us a handle on it!

All of Sonic Foundry's products (and there are many) are written specifically for the Windows environment. Spokespersons for the company emphatically state that there will be no Mac releases. Ever.

INSTALLATION

Our first try is a failure. Oddly, the installer froze. Second try worked fine. We're off to a flying start! A dialog box pops up and asks if we'd like to load 490 MB of demonstration songs. We pass. Installation is pretty basic, the app adopts the common Windows software model of "show tips at startup." The FezGuys like this organic method of discovering more about a product, but it's helpful that it can easily be turned off. Also typical with Windows-based software, installation did not offer a choice of where to place the app, it was casu-

ally tossed into "Programs." We moved it manually into our preferred "Multimedia" sub-menu.

LAUNCH

Of course, since we've hidden the manual and forgotten where we've hidden it, the first thing we're doing is wandering around within a new and unfamiliar environment, trying doors and peeking down hallways. In the Help area, we're reminded to "check for updates" from the Sonic Foundry site. The FezGuys know the first rule of working with audio in a digital environment is to close every other application. But, also typically, we ignore the rules and, since there apparently is an update available on the site, we are busily downloading while attempting to familiarize ourselves with the software.

Registration is a good idea but, in this case, confusing — forcing you to quit and restart after installation in order for you to complete the process. And it feels restrictive: Sonic Foundry wants to know a little too much about you and they appear a little too paranoid about piracy. We can't imagine why, only three (or was it four?) other friends installed this program first (just kidding!).

Actually, the process uses your e-mail address, along with the creation of a unique computer ID, ostensibly to prevent transferring the app between machines. Online registration sends us to a Web site, the Web site takes our info (including serial number), the site e-mails us a key contained within an enclosed file, we transfer the key from a machine that gets the e-mail to the machine running Vegas, finally manually entering the key into the software. But wait! Another separate and distinct key is required for the MP3 encoder plug-in...

The FezGuys find the installation and registration process to be an entirely tedious and non-intuitive experience. Vegas Pro happily confirmed its activation code, but the MP3 portion provided no indication of whether or not its code took. We'll have to fire it up to see if it's accepted. Why does the MP3 encoder need a separate registration process? This business is time-consuming and, in our opinion, overly complex.

GENERAL USE

The FezGuys are pleased as punch with the user interface for docking and undocking pop-up windows. By default, Vegas Pro stores an "explorer" window that makes it easy to find, drag, and drop media files into projects. After pulling up, say, an EQ window, we can drag it and dock it in the same space as the explorer. Tabs on the bottom of the dock area list both the explorer and the EQ. Very efficient and simple. Other pop-up windows can similarly be dragged and docked, and you can split up the dock area, displaying more than one item side-by-side.

We had fun playing with the pitch shift feature. It's weird how musicians never tire of hearing their music too fast, too slow, or just plain altered. And OK, OK...though we'd intended to blast into Vegas Pro without the manual, we were stymied almost immediately. *Drat!* We aren't as hot as we think. We unearth the manual. What is it about men and manuals?

We begin by taking a simple (1 minute, 38 seconds) stereo MP3 music track and dragging it into Vegas Pro. It's a very easy process to turn an MP3 file into a track of editable audio. After years of being unable to edit MP3 files, this is nice. Next we record, edit, and mix two distinct vocal tracks on top of the music. EQ and compression are monitored in real time. We use the "normalize" feature constantly. When we're satisfied with our plaintive little lament, we add a very basic 332-x216-pixel video (primarily still photos) track and then save to MP3, Real G2, and MSWM. The results can be experienced at www.fezguys.com/columns/040.shtml.

MP3

When saving, the Vegas Pro MP3 encoder offers the option of saving a portion of the piece or "rendering the entire project." This makes it easy to select a small portion of your project for testing different bitrate and codec options. We choose our encoding parameters (128k stereo, 44.1 kHz) and also fill out ID3 data for the resulting mixed and compressed file. In addition to having our choice of bitrates (from 24k to 320k), there is a convenient "Convert to Mono" checkbox. Now we are ready to encode. We press save and — what a surprise! — this MP3 encoder is not registered! We take another ten minutes and go through the entire process again.

After getting the registration sorted out, we encode happily. Encoding time is monitored by a little line at the bottom of the explorer window. At 128k, the Vegas Pro MP3 encoder works a little faster than real time, finishing the file in 83 seconds. The results of this audio-only file are acceptable. The encoder is reasonably fast and the process is relatively simple. Our only suggestion is to provide a more obvious notice of saving status — a pop-up window documenting elapsed time would be helpful.

REAL PLAYER G2

The Vegas Pro version of the RealPlayer encoder includes options to override standard parameters, just like Real's stand-alone encoder. This is good. Users can modify the encoder and change settings as they would with RealProducer. This version of the Real encoder is pretty quick, finishing in 49 seconds. The end result sounds and looks as you'd expect from a video/stereo audio file streaming over *continued on page 140*

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CIRCLE 90 ON FREE INFO CARD

BONZAI BEAT

continued from page 54

ing in different ways.

What is the biggest mistake of your life? Rothrock: Not licensing Beck's *Mellow Gold* to Geffen. It was on our label, Bong Load Records, and we'll never see it again. Rob, would you disagree with that?

Schnapf: I wouldn't disagree with that being a big mistake.

Have you ever really pissed anyone off? Rothrock: No! [Laughs.]

Schnapf: [Shrugs shoulders, rubs head thoughtfully.]

Any advice for getting a good start in the music business?

Schnapf: You gotta jump in and do it — because you have to do bad stuff before you do good stuff. You write bad songs before you write good songs — it's part of learning.


Rothrock: Bad productions before good productions. You have to develop a taste and a style, and it takes repetition.

Schnapf: So just start doin' it.

Rothrock: A footnote to that is "anywhere." People say they can't work because they aren't in a big studio, but it can be at home on a 4-track cassette. If you have a thousand bucks — in this day and age — you can make great recordings. Get some headphones and a VS-840, one microphone. For instance, "Loser" was done with a Boss 8-channel mixer, Radio Shack PZM handheld \$50 mic...

Schnapf: ...Fostex 1/4-inch 8-track, an EPS sampler, and a Roland drum machine. And the inexpensive recording environment did not effect sales.

Rothrock: Sometimes you gotta step it up when you mix. We didn't mix it on the Boss 8-channel, we really blew it out there and went with a 16-channel Mackie for the mix.

Schnapf: Whatever you got — you can do good stuff. 

1-watt of power at maximum output would consume more than 2 watts (in the form of heat) when no signal is applied.

SPEED AND STABILITY

Speed is the last factor considered in this overview. "Slew rate" describes the time an amplifier takes to go from 0 volts to whatever the maximum signal level is, in volts per microsecond (V/ μ S). It becomes more critical as signal level increases. Tables 1A and 1B are provided strictly for the purpose of comparison. (Dates were ballparked. Errors are possible.) Included in the first list is the API 325 line amplifier module, which features the 2520 discrete opamp along with its output transformer. This combo is the heart and soul of all API modules.

In addition to traditional opamps, there are also a number of application-specific parts designed as mic preamps, balanced line drivers, and receivers. They deliver good results, but have limitations (usable gain, stability, noise). Discrete circuits can be tailored for a specific purpose, yielding better and more-controlled performance.

Speed isn't everything, and any well-designed circuit can be compromised by poor implementation. When used in a hostile environment, an unstable device will generate noises, harmonic distortion, and oscillation in *and* out of the audio range, affecting all of the devices downstream, from power amplifiers to digital converters. A slower, more stable amplifier will sound better than its faster "more reactionary" counterpart.

That's all I have room for this month. There are so many other roads to travel. If you want to learn more about your equipment, be sure to get the service manual and make sure the schematic is included. A sine-wave oscillator and an oscilloscope will display waveforms (really obnoxious distortion will be visible). A square-wave oscillator will assist you in determining whether a device is properly loaded (older, transformer-balanced gear likes to see a 600-ohm load). The 'scope will also display oscillations — especially if the unit becomes unstable when overdriven.

Eddie Ciletti's life story and audio archive are available online at www.tangible-technology.com. This article was written with the assistance of David Hill, the original designer of the Summit product line before starting his own company, Crane Song, maker of 24-bit converters, analog signal processors, and mic preamps. Additional help from Dan Kennedy of Great River Electronics was greatly appreciated. (Check out his mic preamps, too!)

FEZGUYS

continued from page 139

a 56k modem. Not great, but legible.

Interestingly, when doing "Save As -> Real G2 -> Custom," closing the dialog box causes the entire app to shut down. This happened repeatedly, so we assume it's Sonic Foundry's special "emergency exit" feature.

MICROSOFT WINDOWS MEDIA (MSWM)

In "Custom," the MSWM encoder allowed us to select "multiple bitrate video," but, alas, it does not support multiple bitrate audio. This is not the fault of Vegas Pro, it's a limitation of the Windows Media format. Encoding the file took longer than real time, weighing in at 134 seconds. MSWM audio sounds pretty good over 56k, about the same as MP3. Like the Real track, the MSWM version also includes a visually legible video track.

COMMENTS

Vegas Pro feels like a demo version of Adobe's Premiere video editing software folded in with Macromedia's SoundEdit16 audio app. The FezGuys couldn't help but notice a slightly "dumbed-down" feel, although the app does contain some nice newer technologies. One example of this next-generation class of audio software is included in the process of exporting to supported streaming media formats. "Command markers" can be used to allow hyperlinks to be associated with certain portions of your file. Being able to import and edit newer audio formats (such as MP3) is wonderful. It's a feature that should be adopted by all multitrack audio software.

Sonic Foundry's Vegas Pro is for those who don't care to deal with formats or sample rates of their raw media. Vegas Pro handles various types of input and output formats and can also handle mix-and-matching sample and bit rates. While it's not the home run of Internet authoring, it's a good step forward and will serve a basic group of users well. If you aren't already loaded down with apps, take a trip over to www.sonicfoundry.com and download the trial version (full version retails for \$699).

The FezGuys: making things rounder and redder. Check out what they are up to by visiting their Web site at www.fezguys.com

MAINTENANCE

continued from page 136

ance decreases, creating its own signature distortion problems.

The "better" amplifier is one that has low distortion before the negative feedback is applied. In terms of output stages, this will be the Class-A circuit. A Class-A amplifier will sound very good, but the disadvantage is that it runs hot. As an example, a Class-A amplifier that produces

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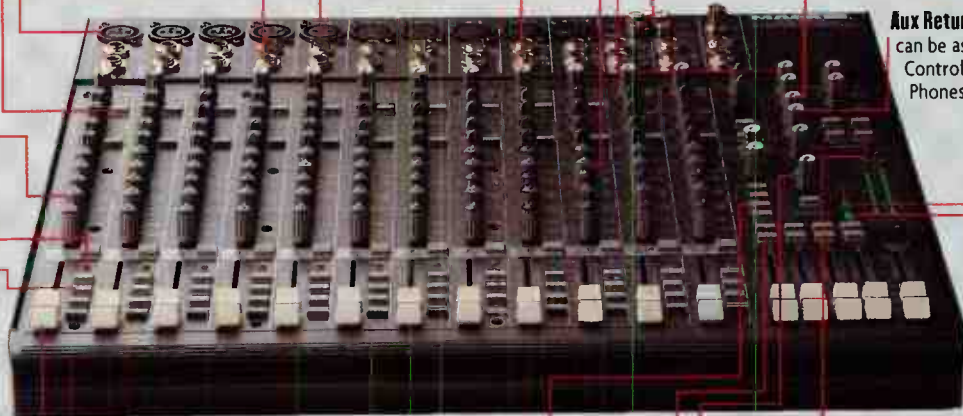
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Control Room/Phones Section with separate headphone and control room level controls. Source Matrix selects any combination of Main Mix, Subs 1 & 2, Subs 3 & 4 or Tape for exceptional studio monitoring flexibility. Also lets you create a third live stage monitor mix or separate feed.

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JASON MILES

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dropout, you're done. I don't want that. At worst case, if the drive crashes, I bounce the tracks back over to another drive and keep working — which is essentially what happened.

"You also have to be careful about the way you backup your files — file management is so important. Make sure not to do any weird things in the file names because the computer will read them in a certain way. You have to spend time to lay everything out right, clean up your audio, and get rid of stuff that you're not using. Like if there's an extra complete guitar solo, you might want to keep it. But if it's not 'the take,' if it's a fragment of a solo, you don't need it, and you *know* you're not going to need it, so get it off the hard drive. There's a function in Paris called 'Select All Unused Tracks.' They'll light up in red. *Boop!* Goodbye. I have that stuff saved to a backup tape in case I need to get the file back, but anything I'm not using comes off the hard drive. Oh yeah, and don't even think about unplugging a device until every freaking thing in the studio is shut down. Forget about hot swapping. *Nothing!* It's very delicate equipment!"

Celebrating the Music Of Weather Report was mixed in the EMU/Ensoniq Paris system by Doug Oberkircher and Miles. Jason refers to Oberkircher (who is based at Bear Tracks in Suffern, NY) as "a world-class engineer, as well as a Paris owner/user." Along with the Control 16 — a hardware mix controller for Paris that provides 16 channel faders, one master fader, and transport control — Doug and Jason used a combination of the Paris internal effects and outboard gear, including a Lexicon 480L and Neve EQ modules. These outboard units were interfaced to Paris using the EDS-A8oT-24 and EDS-A8iT-24 modules. Using the 480L as an example, Jason would connect two outputs from the 480L to two inputs on the EDS-A8iT-24 card, and two outputs from the EDS-A8oT-24 to the audio inputs of the 480L. In the software, he'd designate aux send 1 and aux send 2 as "external," and assign them to outs 1 and 2 on the card, creating a software-to-hardware link between the aux sends on the Paris virtual console and the output connectors on the EDS-A8oT-24 — which in turn fed the 480L. Returning the outputs of the 480L back to Paris employed the same concept in reverse. Two more outputs from the EDS-A8oT-24 card served as the stereo master mix bus

output. These outputs were patched to the input of either a TC Electronic Finalizer or a Lucid Technology AD9624 for conversion to a 24-bit stream. Mixes were recorded onto the TASCAM DA-45HR DAT recorder with a 24-bit word length. Mastering for the CD was handled by Greg Calbi at Sterling Sound (NY).

SCARY WEATHER

Jason reveals that he sometimes gets "a bit scared at the end of a record because I'll listen back to it and think, 'Wow we did that? That's outrageous! How did that happen?'" Somewhere along the line the ideas happened and it came together. It blows me away. I can't believe that I was a part of it, but I was right there with it. I feel like there's so few people who can actually do what I do that it keeps me going. What it comes down to is that you have to keep your work at a really high level and you can't let it slack. As long as my name is going on it, it's got to be brought to another place."

Celebrating The Music Of Weather Report will be released by Telarc on February 20, 2000. Jason Miles may be reached via his Web site at www.mediuvision.com/jmiles.

MICROPHILE

continued from page 42

C28B and C28C employed a screw-on cap. A third variation — the C28C — used a Nuvister 7586 instead of the 6072 tube.

USER TIPS: The vacuum tube inside the C28 mic body may be replaced in the following manner: first unscrew the threaded ring at the bottom end of the microphone. This allows the body cover tube to be removed by sliding it towards the bottom while gently holding the capsule end of the mic. The now-exposed "chassis" of the microphone is hinged near the tube socket to facilitate removal of the tube, but it is hinged *in one direction only*. Gently open the hinge, which will expose the tube so that it may be removed. After replacing the tube, close the hinge and slide the cover tube back onto the body (make sure that the pin on the upper end of the body mates with the slot on the cover tube). Lastly, screw the retaining ring back onto the bottom end of the mic.

Technical data furnished through the courtesy of Kevin Madden at AKG Acoustics US and Karl Peschel at AKG Acoustics Austria.

EQ

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CIRCLE 6 ON FREE INFO CARD

World Radio History

AL KOOPER

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horror show she explained to you is only for long-term usage, which is not prescribed here. My advice is to follow hers. She's on the right path."

Another call to a physician friend of mine: "You'll experience very minor problems with the short-term use she's prescribed. I prescribe it for poison-ivy cases once in awhile. Don't worry — you'll be fine."

Another call to a friend who had been on the drug for various short periods of time: "Oh *that* drug? I've taken that. Nearly fired everyone in the office the last time I took it. You'll have some emotional fun with that medication, but you'll be fine."

Assured, I decided to go for it. The other drug — the blood-thinner — was so volatile that I had to get my blood checked every other day at the hospital lest I might hemorrhage. Fun stuff here.

On the morning of Xmas Eve, I began taking both medications. Did I mention that those steroids also pumped up one's blood sugar to alarming heights, and that double the amount of insulin I was normally prescribed was indicated here to combat the steroids? So now I've got chemical warfare going on, with my body as the battleground. Great.

As I sit here typing this, I have five days to go on the medications. I've been through a minor emotional roller-coaster ride, but I'm beginning to approach the other side of the tunnel, even if I can't quite see all of the light at the end of it.

If you are ever diagnosed with Diabetes 2 (Adult Onset Diabetes), please take it seriously. It's just as potentially insidious as Diabetes 1. My overview of the situation is thus:

I'm basically thankful. If something has to be wrong with me, I'll accept it in the eye. Better than my hands or ears. Better than chemotherapy or a *hundred* other things that could've gone wrong. Actually, it's more of a *nuisance* than anything else. I can still do everything I could do before this happened except drive at night. *And where do I ever go anyway?* So I thank God that this is all there is for now, and I continue my musical life with this very small stone in my passageway. I'll have my usual sense of humor back here next month. So, please, take care of yourselves — but keep on digitizin' and analogin'!

EQ

LEXICON 960L

continued from page 38

nectors, so studios with digital consoles will have no trouble maintaining word sync when connecting the 960L to a digital mixing console via digital aux send/effect return loops. Also included in the 960L are MIDI in, out, and thru jacks, a 3.5-inch floppy disk drive for storage of programs and system configurations, and a CD-ROM drive for installation of software upgrades and updates.

Hundreds of factory programs are shipped with the 960L, including popular Lexicon programs such as Halls, Chambers, Rooms, Plates, Stage+Hall, Stage+Chamber, Ambience, Wild Spaces, and Post. An additional 500 user-programmable slots are available for storage of custom programs. Lexicon's plan is to continuously update and enhance the features of the 960L; new programs and system software upgrades will be provided to 960L owners as they become available.

TAKE CONTROL

Similar in concept to the 300L and 480L, access to 960L system configuration, programs, and parameters is provided by the LARC2 remote controller. Like the original Lexicon LARC, LARC2 is designed to sit on the recording console or production desk while the 960L is remotely located in a rack. Lexicon actually hired an award-winning industrial design firm to help develop the new controller into a powerful but easily used interface in an 8-inch wide x 10.5-inch long x 5.5-inch deep package.

At the top of the angled LARC2 control panel is a set of eight LED meters: one for each input channel with a three-segment display showing green for signal present, yellow for 6 dB below clipping, and red for overload. A large, backlit color LCD provides information such as program category (room, hall, plate, and wild spaces are examples), bank number, register number, and current settings for as many as 32 parameters.

The display also includes a joystick grid with position indicators for left, right, front, and back; a complementary joystick built into the controller allows source panning and placement within this field. In addition to the joystick, there are eight touch-sensitive, motorized faders, eight soft-function keys, and 29 dedicated function keys. Lexicon's idea in providing so many controls is to allow a user to access functions and enter parameters quickly, using whatever manner

they feel is most efficient. "Hot" keys are provided for instant access to machine setup/select, program and bank, edit mode, register, store, system control or edit, fader label/value, soft key, mute/bypass, and tap tempo control. As with the original LARC, parameter adjustments may be made through the LARC2 by moving the corresponding fader, or by using the increment/decrement keys provided. The 960L rack chassis may be located as far as several hundred feet from the LARC2, allowing the rack unit to be installed in amp rooms or machine rooms.

The Lexicon 960L multichannel digital effects system was developed by Lexicon after extensive research from leading engineers, artists, and producers in the audio industry, and will be debuted by Lexicon at the 108th Convention of the Audio Engineering Society this spring in Paris, France. Units should be available for purchase in the Spring of 2000, starting at a suggested retail

For more information contact Lexicon at (Tel.) 781-280-0300, (Fax) 781-280-0490, (e-mail) info@lexicon.com, or visit their Web site at www.lexicon.com. Circle EQ free lit. #125.

SURROUND SOUND

continued from page 63

real answer yet, other than to note that I've been setting up a formal scientific test to determine what types of CD-R media works in the majority of consumer CD and DVD players. All I need is a sponsor to underwrite the cost of the study, and we're in business. Once that information was published, you could do small runs of surround mixes that would play back on home theater systems. In the meantime, don't do anything like burn a thousand surround CD-Rs and sell them, because that would create a real problem.

ON THE ROAD AGAIN

By the time you read this, I will have gone to the NAMM in L.A. and hit six other cities on the West Coast with another tour of my Surround Sound Seminars. So, as usual, there will be tales to tell and gear to haul. But it really is great to meet all the students and professionals that want to be on the bleeding edge along with me. So welcome to my surround nightmare, and pull up a chair in the center of the room. We'll be having some surround fun in the next few months. Following my West Coast haul, I'll update you all on the latest and greatest gear and techniques for live and recorded sound.

EQ

Your computer

Your mixer

Your card

Introducing WaveCenter/PCI

OK, you see what's happening: digital mixers are looking pretty cool. After all, they've got incredible sonics, built-in effects, and the automation capabilities you could only dream about before. But if you hook that puppy up to the NoiseRacket analog soundcard that came with your computer, you're right back in ****ville. (Rhymes with "Snapville.")

Here's a better idea: keep it digital with our new **WaveCenter/PCI** card. It has all the connections you need to integrate your digital mixer into your computer-based studio. Transfer up to 10 channels of digital audio simultaneously using ADAT lightpipe and S/PDIF, with 24-bit resolution on all channels. Use one of the built-in MIDI ports for mixer automation, and the other to connect your synthesizers.

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Time To *Add A Room*

How to avoid — or
at least lessen —
growing pains

BY MARTIN POLON



A vexing question for all studio owners/operators, whether they be of the project variety all the way up to the so-called mothership category, is when to add another room. This is an especially tough decision to make usually, since it means a quantum jump in size and function beyond that of the single-room facility. The driving force behind the second room is usually, but not always, economics. A studio that is booked fully 90 percent of the time is a studio that is ready to expand.

The only question is whether that 90 percent booking is a permanent feature of a studio's activities or is the result of a current hot status that may not last indefinitely. Knowing your clientele is one clue. If you are permanently booked doing postproduction, surround work, creating radio ads, etc. — or want to be — then it is indeed time for a second room. Or if your coterie of youth bands yearns for digital or really, really old-time analog, then, again, the answer is to go for it. Just make sure that you carefully and logically analyze the pattern of your studio trade and don't jump into expansion for the sake of expanding or just because your neighbor competitor studio is doing it.

Consider the following patterns of expansion:

An analog second room is frequently a safe option, filled with tube equipment, vintage microphones, and vintage mon-

itors as well as more current speakers. Just remember that this category could become overdone and that eventually the pendulum could swing back with groups again favoring digital rooms with digital toys. An all-digital second room is another safe option for expansion, as long as the first room is not also so digital as to constitute unwanted competition within your own plant.

A post-oriented second room can be a great facility expander if your business currently or expectedly includes post activity from independent producers or local commercial or public TV stations. In this category, as with all expansion options, the best reference you can use to research the viability of your plans in terms of the size and shape of the competition in your community is the Yellow Pages.

A 5.1 or 6.1 surround room is the hot button in today's recording universe. Just look through the pages of *Surround Professional* and other leading-edge professional audio publications. But make no mistake that this option can be the most expensive of any room expansion plans!

A second control room built-in to an existing high-quality acoustic space with an existing control room is also an option. As odd as it sounds, it has been done. There is an obvious cost control with this category, but it will only work if your space is large enough and portable acoustic pieces are used that can be moved about to shape the room. It can make sense if a tube room is added to a digital control room or vice versa. It also works quite well if the second control space is a post facility that never or only occasionally has to record live from the acoustic space!

In addition, the following categories of studio life will forever change with your expansion — and not always for the best (or, at least, the easiest). But these changes will be acceptable if they indicate you are making money with your expanded facilities.

1. Scheduling — With two or more rooms, you may have to hire a studio scheduler or manager to juggle the use of your rooms and/or computerize your schedules.

2. Maintenance — What was a part-time evolution with one room could well become a full-time one with two or more spaces, or at the least require significantly more time and money.

3. Staffing — Two studios mean two staff engineers on duty with both rooms working. Consider that cost as part of the increased operating expense that multiple facilities bring.

4. Power Facilities — This category is frequently ignored, but marginal AC facilities that will support one studio space will not support two or more.

5. Acoustic Isolation of Facilities — Considerable construction may be required to ensure that what is being recorded in Studio A will not leak into the recording space of Studio B and vice versa. In a one-studio facility, such leakage into public or office spaces is often tolerated. In a multi-studio facility, acoustic leakage cannot be toler-

ated in any way, shape, or form!

Remember that the most important partners you can have in any such expansion project are not your technical people (who are obviously important), but your acoustic designer (hire the best) and your tax advisor. **EQ**

Is that 90 percent booking a permanent feature of a studio's activities or is it the result of a current hot status that may not last indefinitely.

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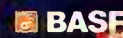
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DIGITAL MIXERS



Digital 8 Bus Mixing Console

Everything you've been waiting for and more!!! The digital 8 bus from Mackie features great sound quality, full recording and mixdown capabilities, motorized faders and an array of digital features geared to take you flying into the next century. See for yourself what the entire industry is raving about.

FEATURES-

- 48 channels of automated compression, gating, EQ and delay
- Built-in 3-way meter display keeps you on top of your mix.
- Built-in meter bridge.
- J17trax II automation for complete control, hook up an S-VGA monitor and you'll feel like you spent a lot more money.
- All functions can be automated, not just levels and mutes. Store EQ, reverb, compression, gating and even AUX send information.
- Fast SCENE automation allows you to change parameter snapshots on every beat.
- Reads Standard MIDI tempo maps, displaying clock info on the built-in position counter.
- Truly the cutting edge of mixing technology.



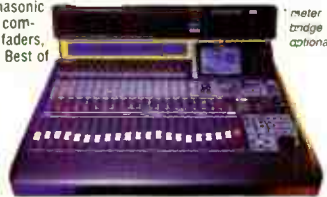
Panasonic

WR-DA7 Digital Mixing Console

Stop dreaming about your digital future, it's here! The Panasonic WR-DA7 digital mixer features 32-bit internal processing combined with 24-bit A/D and D/A converters as well as moving faders, instant recall, surround sound capabilities, and much more. Best of all, it's from Panasonic.

FEATURES-

- 32 inputs/6 AUX send/returns • 24-bit converters • Large backlit LCD screen displays EQ, bus and aux assignments, and dynamic/delay settings • 4-band parametric EQ • Choice of Gate/Compressor/Limiter or Expander on each channel • 5.1 channel surround sound in three modes on the bus outputs • Output MMC • Optional MIDI joystick



TASCAM

TMD1000 Digital Mixing Console

You want to see what all the digital mixing buzz is about? The TMD1000 from Tascam will have you smiling & automatin' in no time. It features fully automated I/O, levels, muting, panning and more in an attractive digital board with an analog "feel". Your digital future never looked, or sounded, so clear.

FEATURES-

- 4 XLR mic inputs, 8 1/4" balanced TRS inputs.
- 20-bit A/D D/A conversion, 64x oversampling on input, 128x on output. • Store all settings, fully MIDI compatible.
- **Optional IF-TD1000** adds another 8 channels of TDIF and a 2-channel sample rate converter.
- **Optional FX-1000** FX board adds another 4 dynamic processors and another pair of stereo effects.



MASTERING

dbx QUANTUM Digital Mastering Processor



24-bit/96kHz mastering processor with a 48-bit digital signal path and the dbx TYPE IV Conversion System that retains the warmth and body of your signal while adding punch and depth. The intuitive user interface puts several high-end mastering tools at your fingertips including Tape Saturation Emulation (TSE), compression, EQ and more.

FEATURES-

- 96 kHz, 24 bit A/D, and Digital I/O on AES/EBU or S/PDIF • 48 bit internal signal path for increased headroom and low level resolution • Type IV A/D Conversion system with TSE • 4 band stereo compressor-gate-limiter • 5 band EQ Hi and Lo shelves, 3 band fully parametric • Normalizer • Stereo adjust controls stereo image • Sync I/O using dbx's own proprietary clock chips for extremely low jitter sync • Dither outputs to 16, 20, or 24 bits • Sample rate conversion • Software updatable via Internet and MIDI • 4 band crossover with variable slopes

t.c. electronic

Finalizer Express



The Finalizer Express is a fast and efficient way to turn your mix into a Professional Master. Based upon TC's Multi-Award winning Finalizer Mastering Technology, it delivers the finishing touches of clarity, warmth and punch to your mixes, putting the world of professional mastering within your reach.

FEATURES-

- 24-bit resolution A/D/A converters • 16 & 20 bit dithering • Multiband Comp & Limiter Algorithms • Boost and cut over three bands with the Spectral Balance Controls
- Soft Clipping and Look Ahead Delay • Finalize Matrix for 25 variations in style and rate • Optimize overall level

- with the Automatic Make-Up Gain • Extra compression in each band using Emphasis keys • Record fades from the built-in Digital Fader or the optional TC Master Fader via MIDI • Connections include AES/EBU, S/PDIF, Optical Toslink & MIDI I/O's • High Res LED Metering of I/O & multi-band gain reduction

DIGITAL RECORDING

1224 Recording System



The 1224 is an expandable, cross-platform recording system using the latest 24-bit A to D and D to A converters. The system includes a 1224 single-rack space interface with 8 balanced 1/4" I/O's a pair of balanced XLR main outputs as well as AES/EBU and word clock I/O, the same PCI-324 audio card used in the 2408 hard disk recording system, ASIO drivers for Mac and PC, a multi-channel Wave driver (Windows 95/98), Sound Manager (Mac OS), and MOTU's AudioDesk workstation software for Mac OS. Connect any combination of up to three 1224 or 2408 interfaces with one PCI-324 card for a wide range of I/O configurations, customized to suit your specific needs.



FEATURES-

- 24-bit analog audio interface • Mac OS and Windows 95/98 compatible • State-of-the-art 24-bit A/D/A
- Simultaneously record and play back 8 channels of balanced (TRS), +4 dB audio • 24-bit balanced +4 XLR main outputs • Stereo AES/EBU digital I/O
- Word clock in/out • Includes software drivers for compatibility with all of today's popular audio software plus AudioDesk, MOTU's sample-accurate audio workstation software for Mac OS
- Host computer determines the number of tracks that the software can record and play simultaneously, as well as the amount of real-time effects processing it can support
- Front panel displays six-segment metering for all inputs and outputs
- Dynamic range of 116 dB (A-weighted)
- Headphone jack with volume knob
- Up to 2 optional 1224 single rack-space expander units, based on a core 2438 or 1224 system
- **AudioDesk Audio Workstation Software** for Mac OS features 24-bit recording, multi-channel waveform editing, automated virtual mixing, graphic editing of ramp automation, real-time effects plug-ins with 32-bit floating point processing, crossfades, support for third-party audio plug-ins (in the MOTU Audio System and Adobe Premiere formats), background processing of file-based operations, sample-accurate editing and placement of audio, and more
- Available with MOTU's award-winning Digital Performer audio sequencer software package

Lexicon CORE 2 Recording System

High quality, true 24-bit computer based audio system at an affordable price (List \$599.00). Easy to use interface offers 4 analog inputs and 8 outs as well as coaxial S/PDIF and 8 channels of ADAT optical digital I/O. Dedicated hardware takes on the burden of CPU intensive tasks putting less strain on the computer's processor.

FEATURES-

- Ultra wide-range 24-bit A/D and D/A converters
- Four channels of analog in, eight channels of analog out.
- Eight channels of ADAT™ digital I/O and a stereo S/PDIF pair.
- Selectable dbx Type IV™ soft-knee limiting on every input channel to simulate tape compression and provide 40dB of improved headroom.
- Ships with Lexicon Drivers and Control Panel for Win 95/98
- Includes Syntrillium's Cool Edit Pro SE, providing as many as 64 mixing tracks
- An optional MP-100 daughterboard will be available soon and will include all of the effects found in the Lexicon MPX 100 Dual Channel Effects Processor: Chorus, Flange, Pitch, Detune, Delay, Echo, Rotary, Tremolo and Lexicon Reverb and Ambience



EFFECTS PROCESSING

t.c. electronic

M3000 Professional Reverb



Incorporating TC Electronic's new VSS-3 technology, the M3000 is a great sounding, versatile reverb that is easy to use. Combining ultimate control of early reflections with a transparent reverb tail, the art of reverberation is brought to a new level. Whether it's a phone booth, cave or concert hall, the M3000 delivers high-quality ambience.

FEATURES-

- VSS-3, VSS-3 Gate, C.O.R.E. & REV-3 reverbs as well as Delay, Pitch, EQ, Chorus, Flanger, Tremolo, Phaser, Expand/Gate, Compressor and De-Esser
- 300 high-grade factory presets including Halls, Rooms, Plates, Ambience, Gated Reverbs, and more
- Up to 300 user presets in internal RAM and 300 more using an optional PCMCIA card.
- Dual engine configuration featuring 24-bit A/D/D/A's.
- Connections include AES/EBU, Coaxial S/PDIF, Optical Tos-Link/ADAT & analog XLR I/O's, MIDI IN/OUT/THRU, Clock Sync and External Control

Lexicon MPX1 Multi-Effects Processor



The MPX-1 is truly an outstanding multi-effects device. Using Lexicon's Lexchip, it offers outstanding reverb or ambience as well as a separate processor for effects for awesome power in the studio or on the road.

FEATURES-

- Intuitive user interface for easy editing, built-in help.
- Balanced Analog I/O (1/4" & XLR)
- 5x effect algorithms
- Digital Inputs & Outputs (S/POIF @ 44.1KHz)
- 18 Bit A/D, 20 Bit D/A Conversion, 32-bit processing
- >90dB of Dynamic Range
- Intelligent Sorting by Name, Number, Application, etc.
- Parameter Morphing
- Dynamic MIDI® patching & MIDI automation

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ANALOG TO DIGITAL CONVERTERS



Rosetta 96k 24-bit Analog to Digital Converter

The high-end quality analog to digital solution for the project studio. With support for both professional and consumer digital formats you can now record your audio at a higher resolution and with greater detail than standard converters found on MDM's, DAT's and DAW's. Ideal for mastering or tracking.

FEATURES-

- 24-bit, 44.1-48, 88.2-96 kHz Sample Rate ($\pm 10\%$)
- 116dB dynamic range (unweighted)
- Improved UV22HR for 16 and 20-bit A/D conversion

FRONT PANEL:

- Power switch • Sample Rate (44.1, 48, 88.2, 96kHz) selector • 16-bit (UV22), 20-bit (UV22) and



- 24-bit resolution selector • S/PDIF-ADAT optical selector • Soft Limit on or off • 12-segment metering w/ over indicator & Meter Clear switch • Level trim

REAR PANEL:

- XLR balanced inputs • 2 x AES/EBU for 88.2/96kHz 2 channel path, Coaxial S/PDIF, switchable S/PDIF or ADAT optical outputs • Wordclock out

lucid AD 9624 24-bit Analog to Digital Converter

Transparent analog to digital conversion designed to bring your music to the next level. XLR balanced inputs feed true 24-bit converters for revealing all the detail of the analog source. 16-bit masters can take advantage of the AD9624's noise shaping function which enhances clarity of low level signals.

FEATURES-

- 24-bit precision A/D conversion • Support for 32, 44.1, 48, 88.2 & 96kHz sample rates • Wordclock sync input • Selectable 16-bit noise shaping



- Simultaneous AES/EBU, coaxial and optical S/PDIF outputs • 20-segment LED meters w/ peak hold & clip indicators • ALSO AVAILABLE: DA9624 24-bit D/A converter

DIGITAL MULTI-TRACK RECORDERS

TASCAM

DA-88 Modular Digital Multitrack

The standard digital multitrack for post-production and winner of the Emmy award for technical excellence, the DA-88 delivers the best of Tascam's Hi-8 digital format. Its Shuttle/Jog wheel and track delay function allow for precise cueing and synchronization and the modular design allows for easy servicing and performance enhancements with third-party options.

FEATURES-

- 1-48 minutes record time on a single 120 min tape
- Expandable up to 128 Tracks using 16 machines
- User-definable track delay & crossfade
- Shuttle & Jog capability
- Auto punch with rehearsal



- SMPTE, MIDI and Sony 9-Pin sync capability
- Options include RC-828/898 Remote Controllers, IF-AEB/IF-88SD digital interfaces, MU-Series meter bridge, MMC-88 MIDI machine control interface, SY-88 Sync Carc

DA-38 Digital Multitrack for Musicians

Designed especially for musicians, the DA-38 is an 8 track digital recorder that puts performance at an affordable price. It features an extremely fast transport, Hi-8 compatibility, rugged construction, ergonomic design and sync compatibility with DA-88s.



ALESIS ADAT M20 20-bit Digital Audio Recorder

The M20 represents Alesis commitment to meeting the high-standards of world-class audio engineers, producers, studio owners and high-end video and film post production studios. A new professional digital multi-track, the M20 records 20-bit for outstanding sound quality. Combined with a host of production features like SMPTE/EBU, the M20 is a powerful tool.

FEATURES-

- SVHS Recording format - up to 67 minutes recording.
- 18-XLR connections (9 in and 9 out) as well as a 56-pin ELCD connection.
- Digital I/O
- Includes LRC remote and a digital cable.



- 24-bit, 64x oversampling recording, 20-bit, 128X oversampling playback

ADAT XT20 Digital Audio Recorder

The New ADAT-XT20 provides a new standard in audio quality for affordable professional recorders while remaining completely compatible with over 100,000 ADATs in use worldwide. The XT20 uses the latest ultra-high fidelity 20-bit oversampling digital converters for sonic excellence, it could change the world.

FEATURES-

- 10-point autolocate system
- Dynamic Braking software lets the transport quickly wind to locate points while gently treating the tape.

ADAT OPTIONS-

- BRC for all Adat (except M20) w/ 460 locate pts, smpte/absolute time & bar and beat timing references, digital editing and transport control for up to 16 ADATs
- A13 20-bit 8 channel analog - optical I/O interface



- Remote control
- Servo-balance 56-pin ELCD connector
- Built-in electronic patchbay
- Copy/paste digital edits between machines.
- CADi remote control/autolocator for M20 w/ jog/shuttle & r-45 ethernet connector for long distance cable runs
- Adat/Edit integrated PCI digital audio card and software for recording and editing on Mac & Windows computers

CD RECORDERS



CDR-850 CD Recorder

The new HHB CDR850 is one of the most comprehensive CD-R, CD-RW recorders available today. It delivers the outstanding sound quality that HHB is known at a lower price than previous models. Equipped with a complete range of analog and digital I/O and easy to use one touch recording modes make the CDR850 suitable for any audio environment no matter how sophisticated or demanding.



- CD-R, CD-RW compatible
- All functions accessible from front panel menu
- 4 one touch recording modes: 2 manual, 2 automatic
- Sample rate converter accepts any digital signal from 32kHz to 48kHz including varispeed

- Copies all CD, DAT, MD, DVD and DCC track starts
- Complete user control over SCMS
- Balanced XLR analog I/O, Unbalanced (RCA) phono analog I/O, AES/EBU digital input, coaxial & optical S/PDIF digital I/O

marantz CDR 640 CD Recorder

Marantz' flagship CD recorder benefits from 10 years of CD-R experience. Designed without compromise aided with the help of professional end-users ensuring maximum flexibility and stability in the most rigorous studio environments.

Features-

- Balanced XLR Analog in/out • Analog RCA/Phono in/out • AES/EBU & S/PDIF in/out • Records on CDR and CDRW audio and data disks • High resolution 20 bit Sigma/Delta AD conversion • Full SCMS Copy bit manipulation • 0.5 dB accurate level metering • Variable Audio Delay (0-4sec): Offset your audio to compensate for late track ID's • Preset function stores personal settings



- Optional RC640 Wired remote control

MICROBOARDS

CopyWriter A2D CD Duplication System

The first CD to CD standalone duplicator with built-in Analog to Digital Conversion capability. Easy to use and powerful, the A2D has a 2.1GB internal hard drive and a SCSI port for direct connection to a Mac or PC. A perfect solution for audio, data and video applications.

Features-

- Interface includes Microphone in, Audio line in, Audio line out and external SCSI port
- Supported Formats: CD BA, CD ROM mode 1 & 2, XA, CD Bridge, Photo CD, CD Extra, Multi Session, Mixed Mode, Karaoke, (optional)
- Duplication Speed: 8X Read 4X Write

- Windows 95, NT, 3.1, Mac OS and Unix compatible
- Headphone output with level control



STUDIO DAT-RECORDERS

TASCAM

DA-45HR Master DAT Recorder

The new DA-45HR master DAT recorder provides true 24-bit resolution plus standard 16-bit recording capability for backward compatibility-making this the most versatile and great sounding DAT recorder available. With support for both major digital I/O protocols plus the ability to integrate the machine into virtually any analog environment, the DA-45HR is the ideal production tool for the audio professional.



FEATURES-

- Word Clock
- 24-bit A/D and 20-bit D/A with dither
- XLR balanced and RCA unbalanced analog I/O
- AES/EBU and S/PDIF digital I/O

- Word Sync In/Thru
- Alphabetic data entry for naming programs
- Independent input level adjustment capability
- Output trim for XLR balanced analog output
- Optional RC-D45 Remote Controller

Fostex

D-15 Pro Studio DAT Recorder

The new Fostex D-15 features built in 8MB of RAM for instant start and scrubbing as well as a host of new features aimed at audio post production and recording studio environments. Optional expansion boards can be added to include SMPTE and RS-422 compatibility, allowing the D-15 to grow as you do.



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
- Newly designed, 4-motor transport is faster and more efficient (120 minute tape shuttles in about 60 sec.)
- Parallel interface • Front panel trim pots in addition to the level inputs

D-15TC & D-15TCR

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)



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MICROPHONES



C4000B ELECTRET CONDENSER

This new mic from AKG is a multi polar pattern condenser microphone using a unique electret dual large diaphragm transducer. It is based on the AKG SolidTube design, except that the tube has been replaced by a transistorized impedance converter/preamp. The transformerless output stage offers the C4000B exceptional low frequency response.

FEATURES-

- Electret Dual Large Diaphragm Transducer (1st of its kind)
- Cardioid, hypercardioid & omnidirectional polar patterns • High Sensitivity
- Extremely low self-noise
- Bass cut filter & Pad switches
- Requires 12, 24 or 48 V phantom power
- Includes H-100 shockmount and wind/pop screen
- Frequency response 20Hz to 20kHz



audio-technica AT4060

Combining premium 40 series engineering and vintage tube technology, the AT4060 delivers a versatile and competent studio microphone. Low-noise and high SPL capabilities make the AT4060 a premier vocal mic as well as strings, guitars and other demanding applications.

FEATURES-

- 20 - 20,000 Hz freq response
- Dual gold-vaporized large diaphragm elements
- Includes the AT8560 power supply, AT8447 shock mount, rack mount adapters and case.



SHURE KSM-32

The new KSM32 side-address microphone features an extended frequency response for open, natural sound reproduction. Suitable for critical studio recording and live sound production, Shure steps up to the plate with another classic.

FEATURES-

- Class A, transformerless preamplifier circuitry for improved linearity across the full frequency range.
- Exceptionally low self-noise and increased dynamic range necessary for highly critical studio recording.
- 15 dB attenuation switch for handling high SPLs.
- Switchable low-frequency filter to reduce vibration noise or to counteract proximity effect.
- Great for vocals, acoustic instruments, ensembles and overhead miking of drums and percussion.
- SL model also features an elastic shock mount which greatly reduces external vibrations.



BPM CR10

Hand-crafted in East Berlin, the BPM CR10 Studio Condenser Mic features a full frequency response for competition against the best of the best.

FEATURES-

- 1" Gold diaphragm
- Suitable for most guitar and vocal recording applications.
- Includes Custom Aluminum Road Case, XLR-cable, wind screen and elastic suspension.



SAMPLING

AKAI

\$5000 & \$6000 Studio Samplers

Akai is proud to announce its next generation of samplers, with the introduction of the S6000 and the S5000. Building upon Akai's legendary strengths, both machines feature up-to 128-voice polyphony and up-to 256 MB of RAM. They use the DOS disk format and WAV files as the native sample format allowing standard PC .WAV files to be loaded directly for instant playback - even samples downloaded from the Internet into your PC may be used. And of course, both the S6000 and S5000 will read sounds from the S3000 library.

FEATURES-

- OS runs on easily upgradeable flash ROM.
- 2x MIDI In/Out/Thru ports for 32 MIDI channels
- Stereo digital I/O and up to 16 analog outputs.
- 2x SCSI ports standard
- Wordclock connection
- Optional ADAT interface provides 16 digital outputs
- .WAV files as native sample format



\$6000 ONLY FEATURES-

- Removable front panel display
- User Keys
- Audio inputs on both the front and rear panel allow you to wire the S6000 directly into a patchbay from the back and override this connection simply by plugging into the front.

E-MU

E-mu Systems, Inc.

E4XT ULTRA Professional Sampler

The Emulator legacy continues with the new ULTRA series from E-mu. Based on the EIV samplers the new 32-bit RISC processing of the E4XT guarantees faster MIDI response, SCSI, DSP and sampling.

FEATURES-

- 128 voice polyphony
- 64mb RAM (exp. to 128)
- 3.2GB Hard Drive • Dual MIDI (32 channels)
- 24-bit effects processor • 8 cal. outs (exp to 16)
- Word Clock & AES/EBU I/O
- EOS 4.0 software
- 9 CD RDMS over 2GB snds;



MIC PREAMPS



Classic 80 Pentode Tube Mic Pre

Fronted by a low noise EF86 pentode tube and 2 additional triode tubes per channel gives this pre amp detail, openness and presence. Input and output level controls allows precise control of harmonic contribution of the tubes.

FEATURES-

- 2 Channel Mic Pre • Balanced Mic Ins w/48V Phantom Power • Dedicated 1/4" instrument input
- High & Low pass filters w/ 3 cut off frequencies (HPF - 50Hz, 100Hz or 150Hz) (LPF - 5kHz, 10kHz or 15kHz)
- Phase reverse on channel 2
- Drive & Peak LED's • Large rotary output faders
- Illuminated VU meters • 250V HT voltage rail



dbx 586 Vacuum Tube Mic Pre

The DBX 586 Vacuum Tube Dual Mic Preamp uses hand selected and matched premium 12AU7 vacuum tubes ensuring ideal characteristics for a warm, distortion free signal path. Custom designed analog VU meters monitor tube level insert path or output levels well Line/Instrument and mic inputs make the 586 versatile enough to use with virtually any input source.

FEATURES-

- Mic or line/instrument inputs on each channel.
- 4-10 operation.
- Drive control for a wide variety of great tube effects
- 3-Band EQ with sweepable frequency
- Optional TYPE IV Conversion System outputs
- Separate 1/4" insert send/return on each channel



JOE MEEK VC1 Studio Channel

The Joe Meek Studio Channel offers three pieces of studio gear in one. It features a transformer coupled mic pre, compression and a professional enhancer together in a sleek 2U rackmount design!

FEATURES-

- 48V phantom power. Fully balanced operation
- Mic/Line input switch
- High pass filter for use with large diaphragm mics
- Extra XLR input on front makes for easy patching
- Compression In/Out & VU/Compression meter
- Enhancer In/Out switch & enhance indicator
- Internal power supply 115/230V AC



MONITORS



M6000/S Studio Monitors

The KRK M6000/S are designed for close-field monitoring. A smooth frequency response in a compact size make these units portable and efficient.

FEATURES-

- High power handling
- 62Hz - 20kHz, ±3dB
- Compact and portable
- Low distortion
- Smooth frequency response
- Custom Gray finish.



Hafler TRM-6

Bi-Amplified Studio Monitors

Offering honest, consistent sound from top to bottom, the TRM-6 bi-amplified studio monitors are the ideal reference monitors for any recording environment whether tracking, mixing or mastering. Supported by Hafler's legendary amplifier technology providing a more accurate sound field in width, height and also depth.

FEATURES-

- 123 dB Peak
- Bi-amplified (50 W Lt, 33 W Rt) w/Crossover
- 45Hz - 21kHz Response
- Magnetically Shielded
- Electrically and Acoustically Matched



HR824

These new close-field monitors from Mackie have made a big stir. They sound great, they're affordable, they're internally bi-amped. "What's the catch?" Let us know if you find one.

FEATURES-

- 150W Bass amp, 100W Treble amp
- Full space, half space and quarter space placement compensation
- Frequency Response 39Hz to 22kHz, ±1.5dB



TANNOY Reveal

The latest playback monitor from Tannoy, the Reveal has an extremely detailed, dynamic sound with a wide, flat frequency response.

FEATURES-

- 1" soft dome high frequency unit
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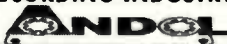
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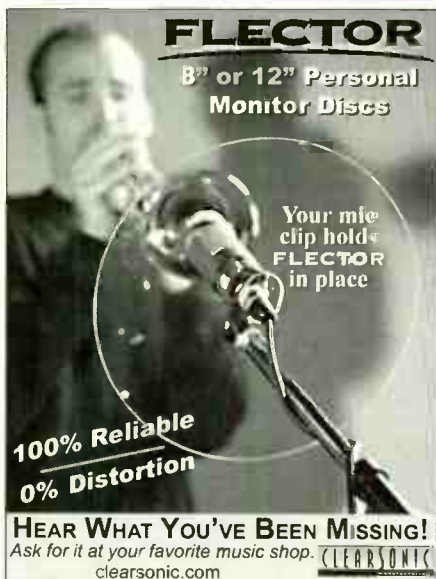
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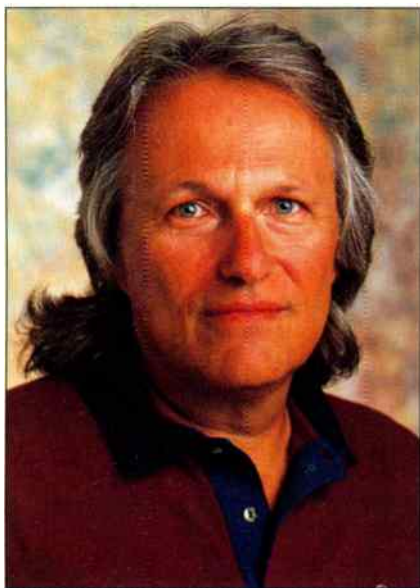
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CIRCLE 89 ON FREE INFO CARD

Stupid Engineering Tricks



How to avoid potential problems when working in your project studio

BY ROGER NICHOLS

I am getting a lot of calls for help from friends who have built their own project studios so they can do more work at home. When they work at the big studios, they have a crew of guys to help watch out for potential problems. When they start working at home alone, they miss a lot of details that someone else was usually taking care of. Most of the mistakes they make are little ones that snowball as the project progresses. One little thing going wrong at the beginning turns into a big problem by the time you are ready to mix. Here is a broad view of potential problems that you can avoid.

RECORDING

During the recording of the initial basic tracks, important things to remember

are: instrument placement in the room, microphone choice and placement, isolation, recording levels, EQ, dynamics, and effects on the instrument sound. Each one of these points should be considered "the most important thing to remember."

In the control room, remember: recording machine levels calibrated, monitors of equal loudness and evenly spaced in front of the listener, console checked for good signal path, oscillator turned off, a good set of headphones for checking details and setting cue mixes, plenty of preformatted tape (if required by the recording machine), detailed track sheets, and a notepad to keep a log of what happens during the recording session in chronological order.

MIXING

Don't forget to: calibrate tape machines, hard-disk recorders, consoles, and mix destination machines, check the monitor balance, check that all outboard gear is passing a good signal, multiple machines are sync'ing up like they are supposed to, use the proper cables for digital connections, and make sure there is only one word clock master.

NOW FOR SOME DETAILS

Instruments: The first thing that affects the sound of the instrument is the instrument itself. No matter how hard you try, you will never be able to make a bad-sounding instrument sound good. If you are renting instruments, have the rental company bring more than one so you can choose. The rental companies want your business, so they will give you a choice. If an instrument is in need of repair, have it serviced before the session. New guitar and bass strings always

help. Tune the piano and the other acoustic keyboards. I have been in professional studios where they tell me that the piano is tuned once a month whether it is needed or not. I have the piano tuned every day that it is being recorded. If it hasn't been tuned in a while, have it tuned once the day before the session, and then again before the session. It will stay in tune longer on the recording day.

Instrument Position:

The second variable is the position of the instrument in the room. The room affects all instruments more than you would expect. I realize that there may be a place in the room that was set aside for the drums and another area for guitars, and there is not much choice, but small changes in position may be all that is necessary. You may only have to move the drums one or two feet to make them sound 100 percent better. The bass amp may only need to be moved a little bit one way or the other to completely get rid of the boominess. Baffles don't really help for low-frequency isolation. Bass leakage into the piano won't be improved with foam baffles, but by repositioning the bass cabinet a few feet, you could end up with the leakage into the piano being significantly reduced.

Control Room:

The sound of the control room can be improved in the same way. When you are first setting up your project studio, you can set up a pair of monitors, play some music through them, and move them around until you find the best-sounding place in the room. Put your console in front of the monitors, and you are ready to go. Sonic reflections can ad-

continued on page 149

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you try, you
will never
be able to
make a bad-
sounding
instrument
sound good.*

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What The Professionals Are Saying About The Neumann M 147 Tube:

"So far, I'm thrilled to pieces with the Neumann M 147 Tube. I don't think there's any instrument that I wouldn't try them on. Whatever instrument I used them for, I was very impressed with the sound. I wish I had about five or six of them!"

- **Al Schmitt**,
as quoted in *EQ*,
March 1999

"I would recommend the M 147 highly for rock, rap, pop, jazz or blues vocals; drum room and/or kick drum miking; all tube and solid-state instrument amplifiers; nylon string guitar; and low-volume or indistinct sound sources that need some extra presence, and for any type of digital recording. In short, I like the M 147 a lot -- so much so that I bought one."

- **Myles Boisen**,
Electronic Musician,
August 1999

"The particular kind of presence it adds is really unique and desirable, and it's really not available from any other mic or easily obtainable with an equalizer. Typically, condenser mics that have a forward character are really just brittle and edgy, and the M 147 is completely different from that."

- **Monte McGuire**,
Recording,
July 1999

"I asked the singer on my session which mic she preferred and, when presented with a finite budget, her pick (and mine) was the M 147. Classic Neumann sound, tube electronics, the U 47 legacy, and a price that won't savage your bank account. Gotta love it!"

- **Rick Chinn**,
Audio Media,
February 1999

"The M 147 proves again that however close the imitators get, there is no substitute for the genuine article. This is the real McCoy and although it cannot be called cheap, its simple approach means that it is far more accessible than a valve Neumann would normally be expected to be. Another classic in the making."

- **Dave Foister**,
Studio Sound,
February 1999

"It's my opinion that the tone of the Neumann would not require much EQing during mixdown; a decided advantage. Its high end would sit nicely in a mix, and its round but controlled low end would not have to be cut to provide room for other instruments."

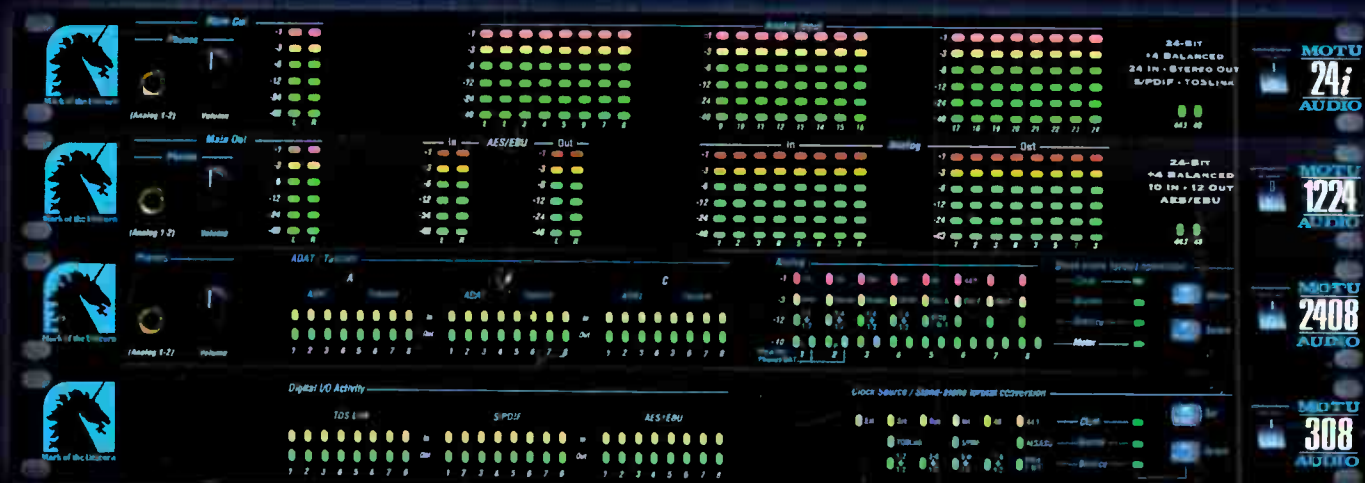
- **Mitch Gallagher**,
Keyboard Magazine,
June 1999

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