PROJECT POST Quarterly

EQ
THE PROJECT RECORDING & SOUND MAGAZINE

SEPTEMBER • 1997

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- Audio-for-Videogames
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- Acoustical Baffles for reduced handling noise (utilizing Space Shuttle materials)
- Neodymium Magnetics for superior output gain
- Rubberized Finish for less handling noise and comfortable feel

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The MONITOR Magazine is a publication filled with the latest information musicians want to know. To recieve 4 issues for only $5 (price good in U.S. only), send check or money order to: Monitor Magazine, Peavey Electronics, 711 A Street, Meridian, MS 39301 • (601) 483-5365 • Fax (601) 486-1278 • http://www.peavey.com • ©1997

CIRCLE 66 ON FREE INFO CARD

M•1400AMP

We figured if the world really DID need VERY affordable, and loaded with lots

M•1400	4Ω bridge	8Ω bridge	2Ω load	4Ω load	8Ω load
at 1% THD	1400 W	960 W	700•700 W	480•480 W	280•280 W
at rated power*	1260 W	850 W	630•630 W	425•425 W	250•250 W
THD at rated power*	0.05%	0.025%	0.05%	0.025%	0.012%

■ **Selected M•1400 specs. Signal-to-Noise Ratio, ref 400 watts:** greater than 108dB ■ **SMPTE Intermodulation Distortion, 250 mW to rated power, 8-ohm load:** 0.025%; 4-ohm load: 0.05%; 2-ohm load: 0.15% ■ **Transient Intermodulation Distortion, 8-ohm load:** less than 0.025%; **4-ohm load:** less than 0.05%; **2-ohm load:** less than 0.096% ■ **Frequency Response, 1W, 8-ohm load:** +0, −1dB 20Hz to 40kHz; +0, −3dB 10Hz to 80kHz ■ **Power Response, 400 watts, 4-ohm load:** +0, −1dB 20Hz-20kHz ■ **Rise Time:** +4.4 microseconds ■ **Voltage Slew Rate:** greater than 50 volts per microsecond, greater than 100 volts per microsecond bridged mode ■ **Current Slew Rate:** greater than 32 amps per microsecond at 2 ohms ■ **Transient Recovery:** less than 1 microsecond for 20dB overdrive at 1kHz ■ **Gain:** 33dB **Input Sensitivity for full power:** 1.23V ■ **Weight:** 36 lbs.

■ **Detented gain controls** calibrated in both volts and dBu with constant sensitivity gain structure.

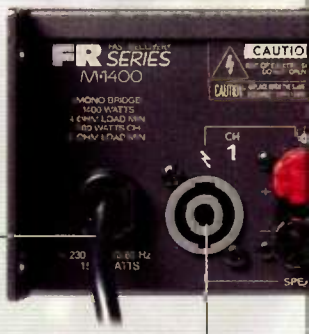
■ **Meters (with overload LEDs** display relative output level in dB.

■ **Signal Present** LEDs.

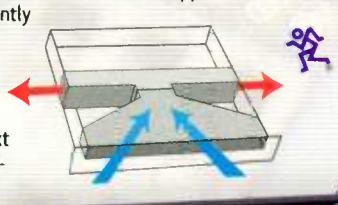
■ **A Mackie Designs exclusive: Short Circuit LEDs** that can save precious minutes of troubleshooting time. They light up only when the M•1400's protection circuits have been triggered by short circuits in cables, speaker crossovers, or driver voice coils

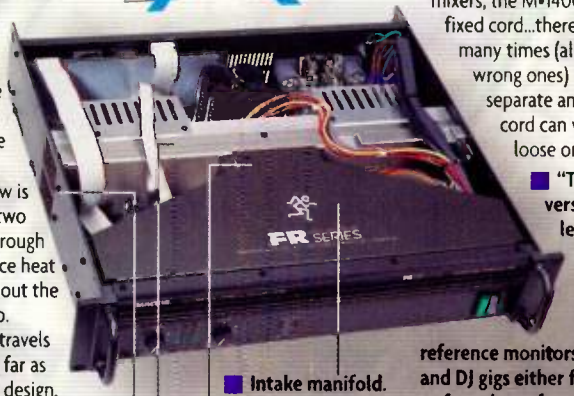
■ **Protection circuit (and Protect LEDs).** The M•1400's protection circuits are there when you need them, but not so hair-trigger that they insist on kicking in every time the amp momentarily clips (you know how bad that can sound). Instead the circuits only activate **1)** for three seconds at power-up; **2)** when a short or near short is encountered; or **3)** when the output section's temperature rises to an unsafe level.

■ **Temperature Status LEDs. Cold** is lit during normal amplifier operation. **Hot** lights up when the amp's normally more-than-ample cooling abilities are exceeded.



■ **T-Design Constant-Gradient Cooling.** Output device cooling technology has constantly advanced over the last decade. From primitive "blow-air-indiscriminately-through-the-whole-chassis-and-hope-it-cools-something" approaches to sophisticated cooling tunnels that put the air only on the heat exchangers. The only drawback to this latter approach is that the air temperature constantly increases as more and more heat is picked up along the length of the cooling tunnel. Our T-Design is the next logical step. A demand-sensitive fan collects room air through a manifold whose intake extends across the entire front of the M•1400. Air flow is directed down two SHORT paths through the output device heat exchangers and out the sides of the amp. Because the air travels less than half as far as in a long-tunnel design, the temperature gradient between the first and last output devices remains nearly constant.





■ **Intake manifold.**
■ **Demand-sensitive fan.**
■ **Dual constant temperature gradient exchanger tunnels.**
■ **Side air exhausts.**

■ **100, 110, and 220-volt models available.** All with UL, CSA, CLA, European, and several intergalactic safety approvals. Although we use plug-in IEC line cords on our mixers, the M•1400 uses a fixed cord...there are too many times (always the wrong ones) when a separate amp power cord can vibrate loose or pull out.

■ **"The amp's versatility lets us use it in our home studio with reference monitors or for PA and DJ gigs either full range or for subwoofers (the subwoofer filter is one of those Mackie innovations that make you guys leaders."**
P.S., St. Louis MO

■ **Neutrik® Speakon® and multiway binding posts** spaced for standard ripe or newer unripe banana plugs.

■ **How can we** offer so much amplifier at such a reasonable price? It isn't because we chintzed on anything. It's because of our manufacturing and parts purchasing efficiencies. Mackie Designs' 160,000 square foot complex in Woodinville, Washington includes state of the art, automated surface mount, axial and radial insertion equipment as well as expensive machines that go "ping." We've also made the investment in our own metal fabrication, coating and screening departments.

*20Hz to 20kHZ

another power amp, it had better be reliable, of extras. Introducing the M•1400.

No gimmicks. The M•1400 does NOT run on snake oil. It doesn't pull power out of the ozone or switch on and off at a zillion gigahertz. At its heart is proven "lead sled" construction with hefty toroid, big storage capacitors, robust power transistors, and an serious cooling system.

FR SERIES **FR™ refers to Fast Recovery.** Running a power amp right on the edge of — and into — clipping is just a fact of life. It isn't so much WHETHER an amplifier will "misbehave" when driven into clipping...it's how the amp SOUNDS when forced to "misbehave." If an amplifier latches ("sticks" in prolonged clipping mode, instead of quickly recovering) it's painfully audible. The M•1400 uses Baker Clamps (a circuit we shamelessly borrowed from digital technology) on positive and negative voltage amplifier stages. The "clamps" prevent saturation, which in turn prevents high frequency latching during periods of overdrive. An additional transistor senses Baker Clamp activity and activates the amp's output limiter. Also, since negative feedback is a primary cause of latching, the M•1400 uses VERY sparing amounts.

The M•1400 is the only amplifier in its price range to include built-in variable low-cut filters, a 2-position crossover filter, and variable constant directivity horn compensation. It also has the sorts of "extras" you normally find only on far more expensive amplifiers. Stuff like a full complement of status indicators plus output level LED ladders, both male and female XLR inputs, and Neutrik® Speakon® outputs.

The M•1400 is built to run all day long at the edge of clipping into fiendishly low impedances. And it's designed to sound verygood while doing it.

If this sounds like a bunch of pretty strong claims from a company that used to specialize in mixers, please understand that the M•1400's design team is composed of seasoned power amp veterans. Between them, they've developed some of the most notable amplifier designs of the last two decades. Working at Mackie gave this gang of misfits a chance to combine new ideas and proven electronic design concepts with our high-efficiency manufacturing capabilities.

We know that your livelihood depends on the reliability of the audio equipment you install. And that you naturally have a "wait- and-see" attitude towards any new amp design. All we can hope for is that you'll pick up an M•1400 and put it to the test. We think you'll agree that it's an exceptional value for its price.

Air intake all the way across the front for our T-Design constant gradient heat exchanger (see below left) pulls in room air instead of hot air from inside the rack.

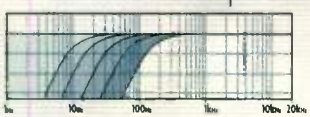
Rocker power switch and large, visible **Power indicator.**

More cooling: Filtered rear intake guides slower, secondary airflow across main amplifier electronics.

Amp mode switch.

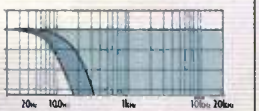
Input-O-Rama. Along with balanced TRS and female XLR inputs, the M•1400 also has MALE XLRs for inputs or pass-thru (rarely if ever found on a power amplifier in this modest price range).

70-volt capability. While not exactly a Stripped-Down Contractor's Amp (one LED on the front, terminal strips on the back), the M•1400's high power output lets it directly drive constant voltage systems without the use of a step-up transformer.

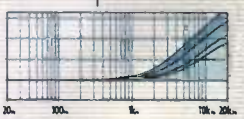


Variable Low Pass Filter. If you subscribe to this magazine, we don't have to lecture you about the benefits of low pass filters. The only trouble with them has been that you either had to buy an extra plug-in module or settle for a few pre-set frequency positions. The M•1400 has separate left and right VARIABLE high pass filters. Each has linear-phase, 2nd-Order Bessel circuitry and is sweepable from 5Hz (off) to 170Hz. Panel markings include a "typical" (35Hz) setting, as well as one at 100Hz that does wonders for stage monitors.

Application switch has full range w/limiter, full range w/o limiter, and subwoofer (low pass w/o limiter) settings.



18dB/octave subwoofer filter. The M•1400 can drive a subwoofer without the addition of an external electronic crossover or plug-in cards. Linear-phase, uniform-time-delay low-pass filter is switchable between 125 and 63Hz.



Constant Directivity Horn Compensation EQ. Instead of resorting to hard-to-find, harder-to-adjust crossover modules, you can now tweak CD horns' compression driver response right at the amp. The 6dB/oct. boost is sweepable from 2kHz to 5.6kHz. We extended it this high to provide "AIR" EQ for non-CD HF drivers.

Below: a few of the 400+ folks and one incontinent Chihuahua (not shown) who work at Mackie Designs in Woodinville, WA. 20 miles northeast of Seattle.

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SEPTEMBER 1997

FEATURES

EQ LIVE

TECHNIQUES/WORKSHOPS

COLUMNS/DEPARTMENTS

ON THE COVER:
Butch Vig in his project studio. Photo by Charlie Hoselton/Shot in the Dark

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I will play music

Nothing but music

Way back then it was cool
to play the blues
When hip-hop was be-bop
you know, straight ahead.
When a young musician
had visions of Oscar an' McCoy
settin' it out so smoothly-
kind of like Jordan taking flight,
but in the key of B flat.
Dreaming of being a student
in the Miles Davis
"turn my back to you"
original school of funk
Having knowledge of the old
keeps you prepared for the new.
Get ready for the DA-38

TASCAM
CHANGES EVERYTHING

DA-38 The Digital Multitrack built with the musician in mind

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If You Can Make It There...

...You can make it anywhere

This is my once-a-year reminder to get your butt to New York for this fall's AES (Sept. 26–29, Jacob Javits Convention Center). If you don't know it already, AES is where everything you work with in your studio can trace its roots. It's where everybody who really matters in recording and sound is hanging out. That means that those guys walking the convention center halls actually invented the science that went into the circuits that went into the chips that went into the boxes that went into the cardboard that you eventually bought at that pro audio dealer where you spend all your hard-earned bucks.

Before you see it at Guitar Center, Sam Ash, in the Sweetwater Sound catalog, or even at NAMM, you'll see that wonderbox you're after on display somewhere in the AES exhibition hall. It's the only place on the planet where a new $90 reverb can share the same floorspace with a $900,000 automated mixing console.

This year is the AES's 50th anniversary. That means the society is as old as popular recording. It began at the dawn of the LP (1948), first brought us multitrack recording, then signal processing, electronic music, desktop audio editing, and now audio on the Internet. You wouldn't be spending your late nights in your project studio, sitting there alone in your underwear, if it wasn't for the AES.

Elsewhere in this issue you'll find our Golden Anniversary AES Tribute, which traces the society's infinite contributions to our passion for buttons and soundwaves. But is that a good enough reason to visit New York in September?

Frankly, we personally think the pizza is New York's major attraction (visit Johns). But there isn't any decent food anywhere near the Javits Center anyway, so consider the following other incentives to come to this year's (103rd) AES Convention in New York:

- George Massenburg is the keynoter. If you read our April cover story and were influenced by his vision, this is a chance to hear the man in the flesh.

- There are 350 exhibitors, which means more cool gear in one place than at any dealership on the planet.

- There are 140 technical papers that will be presented. They're a great way to be humbled about how little you truly know about what goes in (and out?) your ears.

- Don't miss the workshops. This year's highlights include: "MDM Care and Feeding," "Guerrilla Acoustics," "Internet Audio Server Setup and Operation," "Layup: Concept to Completion," and "3-D Audio for Multimedia." Good, solid, practical stuff.

- NARAS is holding its 9th Annual Recording Forum, featuring the likes of Chuck Ainlay (recorded for Mark Knopfler, George Strait), Tom Lord-Alge (Wallflowers, Dave Mathews Band), Syliva Massy (Tool, Red Hot Chili Peppers), Bob Rock (Metallica), and Bruce Swedien (Michael Jackson).

- And if that's not enough, come by the *EQ* magazine booth and get a free copy of next month's issue (before you'll find it anywhere else).

So, go ahead and drive the receptionists crazy at AES and register now (212-661-8528; tell 'em that *EQ* told you to call).

— Martin Porter, Executive Editor

What a standing ovation looks like on paper.

If you're a musician, you know what kind of performance it takes to bring the critics to their feet.

And Sony's MDM-X4 delivers just that kind of performance. But don't take our word for it, take theirs...

"SONY IS THE ORIGINAL DEVELOPER OF THE MINIDISC FORMAT, AND THAT MAY HAVE HELPED THEM REALLY NAIL IT WITH THE MDM-X4."

LOREN ALLDRIN. PRO AUDIO REVIEW.

As if inventing the MiniDisc format weren't enough, Sony took that technology one step further, with the introduction of the MD Data format rewritable optical disc—the heart and soul of all four-track MiniDisc recorders. It made it possible to record digitally on four tracks instead of two, which in turn led to the creation of the MDM-X4 MiniDisc Recorder. So don't be fooled by imitations. If anyone understands the capabilities of the MiniDisc format, it's Sony.

"SONY HAS DONE A WONDERFUL JOB WITH THE MDM-X4'S EDITING CAPABILITIES. YOU CAN NOT ONLY COPY AND PASTE SECTIONS OF SONGS AND ENTIRE SONGS, BUT, UNLIKE THE YAMAHA AND TASCAM UNITS, YOU CAN EVEN COPY PARTS OF TRACKS TO OTHER TRACKS AT DIFFERENT TIMES AND AMONG SONGS."

MAY 1997. KEYBOARD MAGAZINE.

Sony's exclusive Track Edit function allows you to edit freely over all four tracks, so you can combine the best parts of a multi-track recording to create the perfect take. And with MixWrite you can continually mix four tracks down to one or two, freeing up the third and fourth for additional recording. But best of all, you can use Track Edit to make a digital backup of each track, allowing you to complete as many mix downs as you want, without losing any of your original elements. Listen to the experts, without Sony's exclusive individual track editing you'll be settling for a lot less than the MD format has to offer.

"THE SOUND (OF THE MDM-X4) IS ALMOST AS GOOD AS DAT, AND LIGHT YEARS AHEAD OF CASSETTES."

CRAIG ANDERTON. EQ MAGAZINE.

Sony's MDM-X4 uses version 3.5 of ATRAC, the latest generation MiniDisc technology. It improves the resolution of mid-range sounds and expands the dynamic range even further, so the music you record will stay true to your original performance. And what's more, version 3.5 delivers sound that's as close to DAT as you can get in an MD multi-track. It simply blows away the old cassette based four-track machines, not to mention some of the toughest critics in the business.

When it comes to MiniDisc recorders, there's no comparison. Call 1-800-635-SONY, ext. X4, or visit your nearest Sony dealer for a hands-on demo and see why the people who know most about music choose Sony.

MiniDisc MD DATA

SONY

TOAD YOU SO

We were pleased to see in print the very kind words of Glenn Phillips concerning the sound of a few microphones our company worked on for Glenn ("Toad The Wet Sprocket: Poolside Punch-Ins," July '97). However, the name of our company was misspelled. The correct name is The Mic Works. Located near Pittsburgh, Pennsylvania, we offer restoration, repair, and modification (if requested) of a wide range of microphones. Inquiries can be made at 412-937-1349.

Tracy Korby
The Mic Works

WE FEEL YOUR PAIN

I enjoyed the article on Rush's MIDI setup (July, '97). Redundancy seems to be the key to using MIDI live and keeping your sanity. I've been using a Mac SE with MOTU Performer in a Duo for about five years, and I think my life insurance is more expensive because of it.

At a performance in front of about 500 junior high students on career day I had the pleasure of trying to locate why, when I hit Play, nothing happened, even though everything worked fine at soundcheck. After about ten minutes of sweating profusely in front of the angst-ridden teenagers and former teachers (my alma mater no less), it all came down to one of those @#$%^&!* wall warts. My interface used an $8 external transformer and it decided that it couldn't take it any more and ceased to work. The whole school had been excused to experience this special music/computer/former student/career day event and I was left with no choice but to stand amongst my $20,000 worth of high-tech blinking light boxes of musical wizardry and do a piano/vocal arrangement of "The Rose."

Before I dove into the lounge-act thing, I asked the school's band director to round up every transformer in the school while I gave a very unprepared talk on the use of computers in music. He came back with a handful and I began the dreaded search for the one with compatible volt/amp rating. I found one that was close. I plugged it in and hit Play. Everything was working fine...for about 30 seconds, then the wonderful world of MIDI took me on a ride that still keeps me awake at night. My sequences controlled lights, outboard vocal effects, guitar patch changes, and, of course, a rack of sound modules. It sounded and looked like the whole rig had been filled with the spirit of some Southern Baptist Revival and every piece of equipment was running up and down the center isle of the church screaming in tongues. It's painful to describe in detail the demise of my gear and ego, but let's just say I wasn't invited back to give the commencement address.

Hopefully, with the help of *EQ*'s informative articles on music and technology, I won't be having anymore such experiences.

Alan Daubenspeck
Belle, WV

FORMAT FOLLOWING FUNCTION?

Working with incompatible formats has unfortunately become a fact of audio life. Congratulations to DVD, however, for being the first format to be incompatible with itself — by design! I am referring to the compressed audio found on DVD-Video and whatever sorry stepchild emerges as the audio "standard."

No one asked me, but here's what I'd like in a future audio format:

1. Compatibility, compatibility, compatibility. Let's do away with the 44.1 kHz vs. 48 kHz, 16-bit vs. 20-bit vs. 24-bit, 2-channel vs. 4-channel vs. 5.1 (ad infinitum) wars. How about one format that could go from the car to the video post house? A decoder would play it back correctly whether you had two speakers or 20.

2. A leap in audio quality comparable to the vinyl-to-CD revolution. DVD will not pass this test with the consumer.

3. Flexibility. Don't force us "little guys" to adapt immediately to 6-channel or die. (Where will you put all those new monitors?)

4. Longevity. No more DAT/CD-R shelf life worries.

5. SMPTE support. Or something better.

That's all I ask. It seems so reasonable, so "self-evident." There's even a technology that might help us get there, called Sony Direct Stream Digital, or something like that. Personally, I'm not buying into any more ill-conceived, incompatible formats. My clients want them all, but won't pay for any of them.

Dan Popp
Colors Audio
Akron, OH 44302

PUSHING HIS PLATFORM

Just read another "Windows" letter about interaction with drivers and waves and exe's and whatever else Hell has in store.

I'd love to be able to ask advice on how to resolve conflicts and problems with my computer/MIDI rig...but I don't have any. You see, I use a Macintosh.

Haven't had *one* single solitary crash or conflict in seven years and counting. The longest software installation I had was 30 minutes for Logic Audio, when I first got it, and that was the only application that took me more than 15 minutes to learn/master in and out.

PCs? Just like the emperor's new clothes. Us Mac guys are more comfortable in our old Levi's and button-down shirts. We like stuff that works.

P.S. Craig, we're waiting for you to return like the prodigal son you are. Not all us guitarists laughed at you either!

Ward Pike
via Internet

[*Craig Anderton responds: I never stopped using the Mac, so there's nothing to return to (and I'm playing more guitar than ever)! It's just that I started using the PC, too, and was blown away by how much you can do with it these days. As far as I'm concerned, they're both deeply flawed platforms in their own ways...but when they're humming, they sure are fun.*

In any event, EQ *will be extending its coverage to more Mac programs. I just got a new Power Computing machine, and will be reviewing version 1.6 of Bias's PEAK soon. I also just finished reviewing the Steinberg ReBirth version on both Mac and PC.*

The day will come when everyone realizes that if you really want it all, you're going to need more than one platform!

Thanks for the input, and for the humor (always beats whining!).]

WRITE TO US

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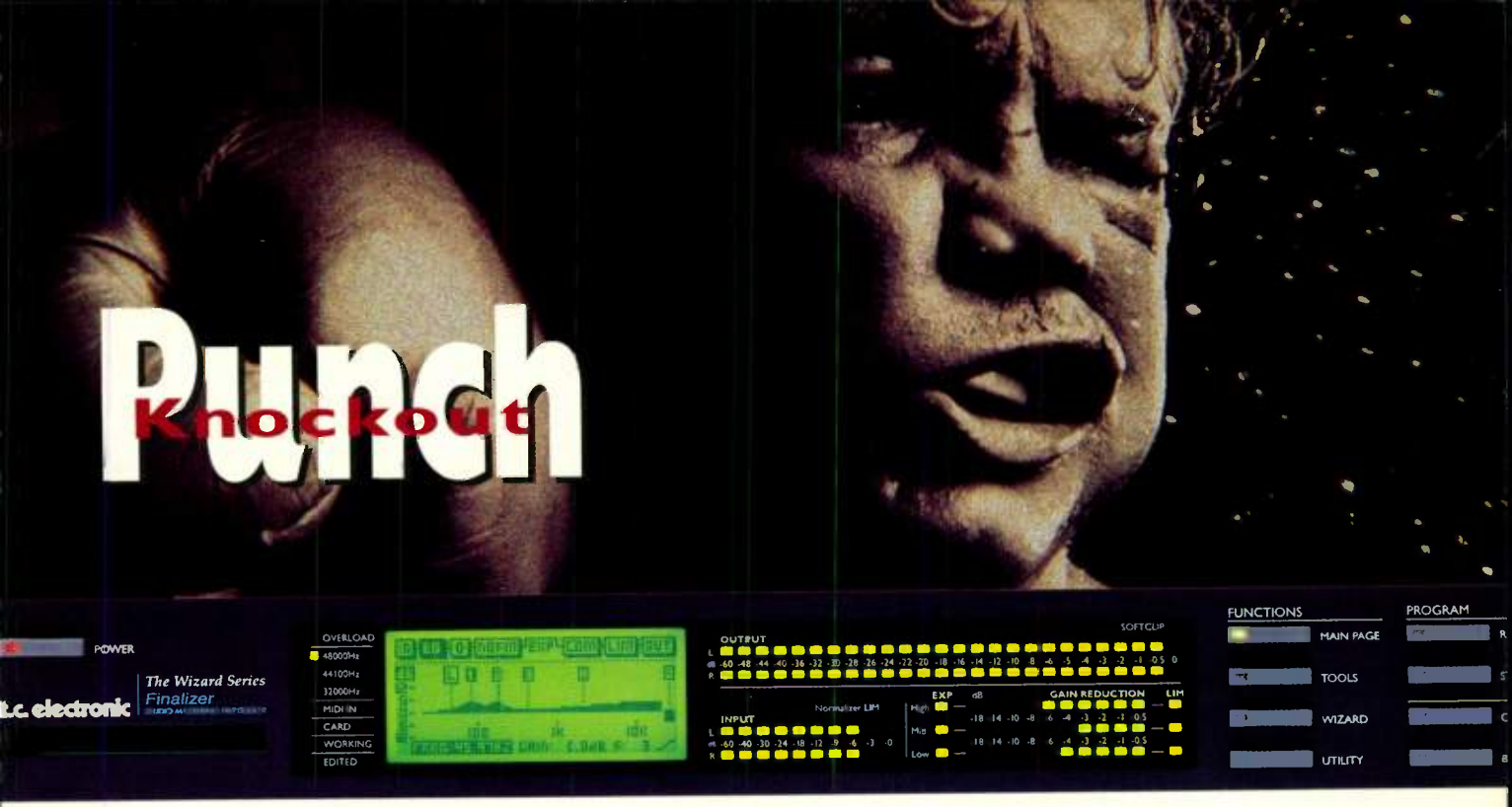

Want your mixes to deliver the punch and clarity of the industry heavyweights?

Now they can... thanks to the Wizard Finalizer, TC's new concept in dynamics signal processing. Inserted between the stereo output of your mixer or workstation and your master recording media, the Finalizer dramatically increases the level without sacrificing fidelity or stereo imaging.

Now even your demos will sound like a CD, because you can simultaneously:

Convert:	20 bit precision A/D & D/A converters
Shape:	Five band 24 bit Parametric Equalizer
Enhance:	Choose between: De-essing, Stereo Adjust or the Digital Radiance Generator™
Normalize:	Real Time Gain Maximizer
Expand:	Variable Slope Multiband Expander
Squeeze:	Multiband Compressor
Trim:	Variable Ceiling Limiter prevents overloads
Fade:	Manual or Auto Fade Tool
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The Finalizer creates that extra energy boost that you can otherwise only get from a professional mastering house. With it's powerful multiband processing it will make your mixes sound punchier, louder, crisper, warmer, spectrally balanced, more **"in your face"**... it's your choice!

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"TC Electronic has come up with a winner by packing tremendous flexibility into this unit. The Finalizer contains all the latest thinking in dynamics control and it is easy to use."

Bernie Grundman, Bernie Grundman Mastering
Five Time TEC Award Winner

"The Finalizer is capable of producing first-rate professional results. There's a lot of 'bang for the buck' in this single rackspace mastering tool."

Bob Ludwig, Gateway Mastering Studios
Seven Time TEC Award Winner

Editor's Pick 1996

editor's pick
musician magazine

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Wizard | Finalizer

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CIRCLE 79 ON FREE INFO CARD

DIFFERENT DRUM?

Q *Could you confirm that the sounds in my [Roland] TR-707 [drum machine] are the same as those in the 808 and 909? I know they are differently designed, tunable, etc., but the sampled sounds are the same, right? EQ is a cool and informative magazine.*

Csaba
via Internet

A Although the TR-707, TR-808, and TR-909 are all enjoying a similar massive resurgence in popularity, they are quite different in how they create sounds. The TR-707 is one of the earliest examples of a PCM-based, sample-playback drum machine, creating all of its sounds digitally. The TR-808, however, produces only analog sounds, creating them in the same way as early analog synthesizers. An example of a popular TR-808 sound is the huge, ever-present kick sound heard on countless rap and hip-hop tunes. The TR-909, though, is an analog-digital hybrid, most often identified with the drum sounds on Madonna's dance hit "Vogue." Each of these drum machines produces its own distinct sounds via a different method of sound generation, and does not share its sounds with the other two.

Eric Leach
Roland Product Support
Roland Corp. U.S.

WHAT'S A MAN WITHOUT HIS REMOTE?

Q *I bought a Fostex RD-8 digital 8-track after reading the EQ review. But I can't find anyone that has Opcode's software 1.2 or 1.3 as described for remote Mac control. Help!*

James Cotton
San Francisco, CA

A MIDI Machine Control (MMC) [remote] is handled by Opcode through the AV Controls. In versions prior to Studio Vision Pro 3.5 and Vision 3.5, the AV Controls were a separate application available only with the Studio Vision Pro and Vision products. In version 3.5 of Studio Vision Pro and Vision, the AV Controls are built into the application and are not separate. The separate AV controls are no longer shipped as part of an Opcode product. Most modern software does support MMC though, so ask your favorite software manufacturer for more information.

Paul de Benedictis
Opcode

I SYNC, THEREFORE I AM

Q *Will a Fostex RD-8 [digital 8-track] chase an analog TASCAM 38 [analog 1/2-inch 8 track] with one of the analog tracks striped at 29.97 fps? I have been trying to sync the 38 with an Akai DR-8 (using the DR-8 first as the master to generate SMPTE, stripe the 38, then switch the DR-8 to chase the 38). My efforts have failed due to the DR-8's inability to chase timecode without word clock. I am told that the RD-8 and the DR-8 will lock flawlessly right out of the box because of the RD-8's ability to generate word clock. Love the mag. Keep up the great work!*

Jobu 94
via Internet

A Your information is right. Fostex has designed the RD-8 to accomplish the task you describe. The RD-8 will, in fact, chase and lock to *any* frame rate, so you should have no problem. [For additional information check out the review of the Fostex RD-8 reprinted in the *EQ Buyer's Guide* or trip over to the *EQ* Web site at www.eqmag.com.]

Derek Badala
Digital Applications Engineer
Fostex Corporation of America

THE LONG & THE SHORT OF IT

Q *How come there are fewer errors recording CD-Rs at speeds of 2x than 1x or 4x? Also, how do you check for e32 errors?*

Unknown
via Internet

A The short answers: [1] Because I said so; [2] You can't.

The long answers: 1. It turns out that the optimum speed is 2x because of the length of time that the laser is turned on when cutting the pits varies with the speed. At 1x the surrounding area gets too hot and the edges of the pits melt and make the pits too big. At 4x the edges don't get quite hot enough because the area is cooled by the surrounding material. In this case the pits are a little too small. At 2x everything seems to work out the best.

Last year the VS-880
set the music world ablaze.

This year, we've added fuel to the fire.

One year after
the hugely successful
introduction of the VS-880,
things are heating up again.
Introducing the VS-880 V-Xpanded, a radical
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many takes on each track and then combine the best for the ultimate version.
And a Random Access Recorder with 999 levels of undo. Instantly copy the
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you'll ever need to record and mix your music.

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full ***dynamic snapshot automation***. We've even added a COSM-based Mic
Simulator so you can plug in an inexpensive mic such as the Roland DR-20 and
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free video and hard disk recording guide and check out the incredible VS-880
V-Xpanded Digital Studio Workstation. And get ready for another heatwave.

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Used in conjunction with our pro-quality, affordable DR-10 and DR-20 dynamic microphones, our new COSM-based Microphone Simulator effect faithfully emulates the sonic characteristics of some of the greatest microphones in history.

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(Doc. #10202) http://www.rolandus.com

CIRCLE 68 ON FREE INFO CARD

EQ PRODUCT VIEWS

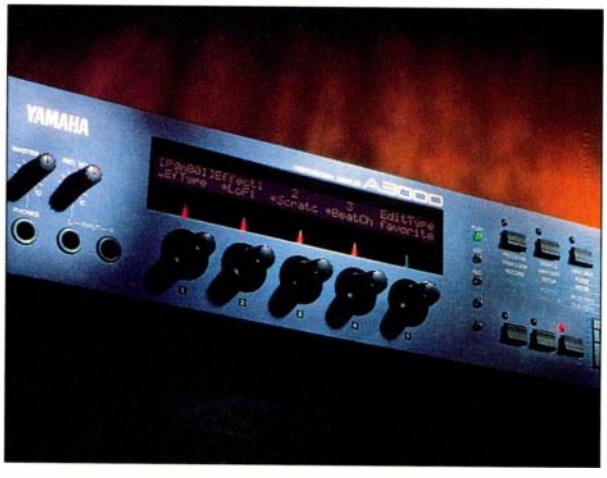
ROKIT TO THE STARS

The new RoKit personal shielded monitor from KRK Systems, Inc., is a passive, two-way, monitor featuring a 6-1/2-inch polyvinyl proprietary long-stroke woofer and a 1-inch silk dome tweeter. Providing 75 watts of power and a frequency response of 69 Hz–24 kHz (±3 dB), the RoKit offers a crossover point of 1.5 kHz and sensitivity of 91 dB (1 watt @ 1 meter). The RoKit measures 12.5 inches (H) x 10.5 inches (W) x 8 inches (D) and offers a maximum SPL of 104 dB at a nominal impedance of 8 ohms. RoKits feature a retail price of $329 per pair. For more details, contact KRK Systems, Inc., Group One Ltd., 80 Sea Lane, Farmingdale, NY 11735. Tel: 516-249-1399. Web: www.krksys.com. Circle EQ free lit. #101.

IT'S ALL ABOUT TOYS

Audio Toys, Inc.'s (ATI) 16MX2 is a single-rack-space mixer, combined with eight individual mic preamps, each with a main and auxiliary output that can simultaneously direct feed the line-level inputs of a digital multitrack recorder, as well as an additional audio device. [*Note: See* EQ*'s May '97 issue for a full review of the ATI 8MX2.*] Internal jumpers allow the user to reconfigure the channel signal path in a number of ways — the standard configuration provides each channel with a main output and an aux output with level control. Channels can also be assigned to a stereo mix bus with level and pan. The 16MX2 features ATI's high-voltage mic preamps and 9-pin master/slave ports that allow for multiple unit connection of the cue and bus mixes. For more information, contact Audio Toys, Inc., 9017-C Mendenhall Court, Columbia, MD 21045. Tel: 410-381-7879. Circle EQ free lit. #102.

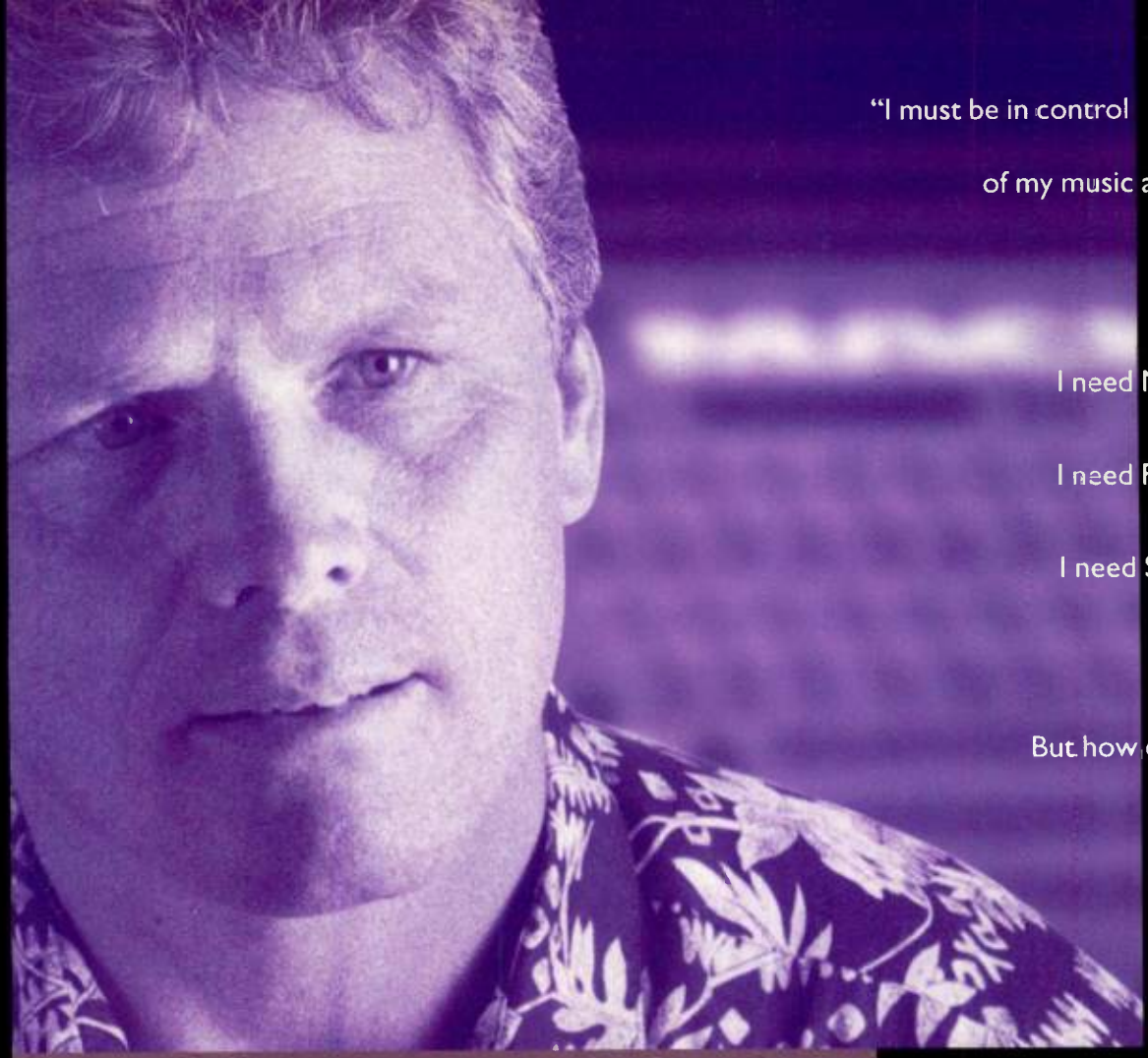
SAMPLER WITH BYTE



Yamaha's A3000 digital sampler features full 64-note polyphony, three effects blocks for each program, 4-band total EQ, a 40x2 LCD, recording effect, four analog outputs, and expandability of 128 MB of sampling RAM. The output expansion option adds an additional six analog and two digital outputs. The unit offers five rotary encoder knobs and a user-friendly voice editing architecture. The A3000's sampling rate is variable from 48 kHz to 11 kHz. The 2U rackmounted unit offers a standard SCSI interface that allows for the addition of an optional internal hard drive. The A3000 features on-board sequencer playback of SMFs (Standard MIDI Files) and will record in real time. For more information, contact Yamaha Corporation of America, Audio, Guitar, and Synthesizer Division, Digital Musical Instruments Department, P.O. Box 6600, Buena Park, CA 90622-6600. Tel: 714-522-9011. Web: www.yamaha.com. Circle EQ free lit. #103.

PROCESSOR POWER

Featuring unique effects like "Lo-Fi," "Karaoke," and "Auto-Filter," Zoom's 1201 studio reverb/multi-effects processor offers quality digital processing at an affordable price — $189 (MSRP). The 1201 offers a total of 363 preset effect patterns — 11 effects x 3 banks x 11 variations — which are instantly available at the user's fingertips. The unit's specifications include 44.1 kHz sampling and 18-bit A/D and D/A converters and full stereo implementation. For more information, contact Samson Technologies Corp., P.O. Box 9031, Syosset , NY 11791-9031. Tel: 516-364-2244. Web: www.samsontech.com. Circle EQ free lit. #104.



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I need More Inputs.

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Otari Singapore Pte., Ltd.
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Fax: (65) 284-4727

EQ PRODUCT VIEWS

CRAZY 8S

Otari's latest Pro DAT machine, the DTR-8S, has +4 dBu (–10 dBV switchable) active balanced analog I/O with XLR-type connectors as well as both AES/EBU and S/PDIF digital I/O. [*See complete review*, EQ, *July '97*.] In search mode, the DTR-8S uses TOC information from tape to locate up to 300 times normal play speed. Sampling rates — 48 kHz, 44.1 kHz, and 32 kHz — are switchable from the front panel. The DTR-8S also boasts the ability to monitor an input signal without the need for a DAT tape in the unit. The DTR-8S carries a suggested retail price of $1395. For more information, contact Otari Corporation, 378 Vintage Park Drive, Foster City, CA 94404. Tel: 800-877-0577. Web: www.otari.com. Circle EQ free lit. #105.

DAT'S SUPER

Sony's rackmountable PCM-R300 DAT recorder employs Super Bit Mapping (SBM) technology (which converts the audio signal from a 20-bit resolution A/D into 16-bit signals, which can then be recorded to DAT tape), as well as a defeatable SCMS circuitry. The unit is also equipped with auto head cleaning for improved sound quality. The PCM-R300's audio interface includes digital I/O (S/PDIF, RCA pin) and analog I/O (unbalanced/RCA pin). The PCM-R300 has a suggested retail price of $995. For more details, contact Sony Electronics, 1 Sony Drive, Park Ridge, NJ 07656. Tel: 1-800-635-SONY. Circle EQ free lit. #106.

TAKE A MEMO

Only 3/8-inch thick, 4 inches long, and 2-1/4 inches wide, the Musician's Pocket Memo from E.W Bridge LLC is a pocket-sized digital recorder and player for musicians. It features a mono sound synthesis chipset, a small high-sensitivity microphone, and a high-output small speaker. The Pocket Memo utilizes non-volatile flash memory for storage. The SPE25A-2J-EW (2 MB flash memory) costs $119.95, while the SPE50A-2J-EW (4 MB) costs $239.95. For more information, contact E.W. Bridge LLC, 1645 West Selby Lane, Redwood City, CA 94061. Tel: 888-248-3628. Web: www.ewbridge.com. Circle EQ free lit. #107.

DIGITAL MISSIONARY

The new AD-8000 from Apogee Electronics offers an 8-channel digital audio solution including true 24-bit conversion, optional D/A and interface cards, and Apogee's proprietary Soft Limit and UV22 processes. The AD-8000's eight channels of true 24-bit A/D conversion offers a dynamic range better than 114 dB and THD+Noise in excess of –108 dB. Soft Limit (which acts like analog tape compression, allowing maximum level to tape without "overs") and the UV22 process (which translates the AD-8000's 24-bit high-resolution output into 16 or 20 bits for CDs and other media) may be switched in on a channel-by-channel basis. The unit features built-in AES/EBU outputs and up to four interface cards — including Alesis ADAT, TASCAM TDIF, and Digidesign Pro Tools — can be installed in the AD-8000's AMBUS (Apogee Multimedia Bus) rear-panel, while multichannel format conversions may be carried out between available interfaces. AES/EBU and S/PDIF inputs are provided onboard for processing external digital sources, and an S/PDIF output follows the channel pairs selected on the built-in headphone monitor D/A converter. For further information, contact Apogee Electronics Corporation, 3145 Douglas Loop South, Santa Monica, CA 90405. Tel: 310-915-1000. Web: www.apogeedigital.com. Circle EQ free lit. #108.

AUDIX

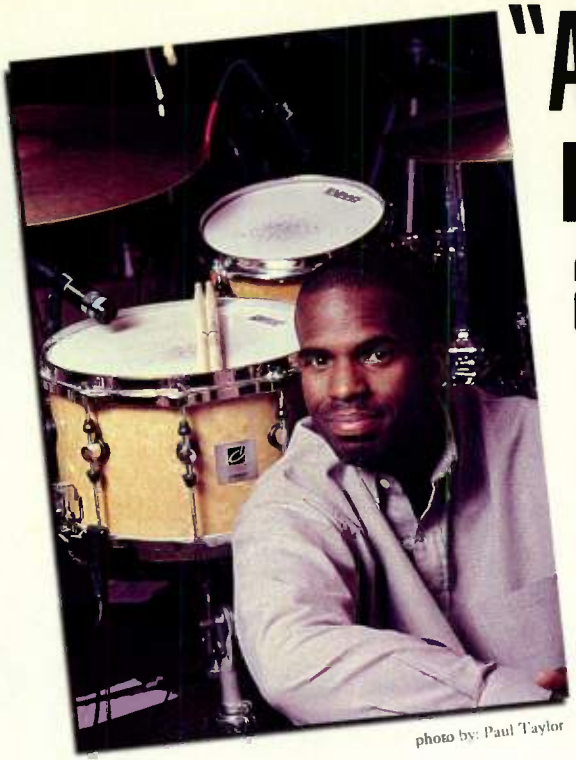
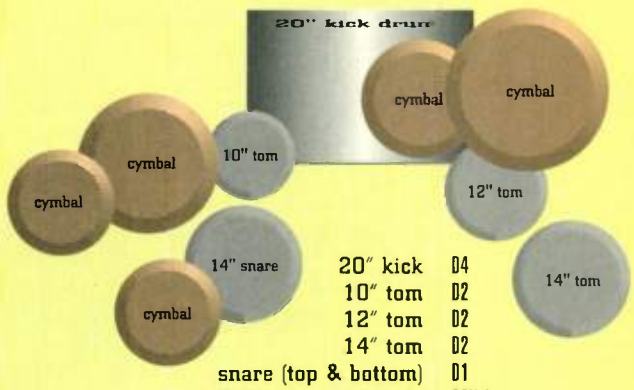


photo by: Paul Taylor

"Audix microphones allow me to express myself perfectly"

—Will Kennedy, The Yellowjackets

DRUM KIT AND MICROPHONE DIAGRAM



20" kick	D4
10" tom	D2
12" tom	D2
14" tom	D2
snare (top & bottom)	D1
left & right overheads	SCX-1

When it comes to defining the groove, drummer Will Kennedy is in a class by himself. As an eleven year veteran of the Grammy® award winning quartet, the **Yellowjackets**, Will has set a new standard for incorporating African, Brazilian, World Beat, Funk and Swing elements into the rhythmic foundation of one of today's hottest Contemporary Jazz ensembles. His unique style can also be heard on a variety of recordings by artists such as **Lee Ritenour, Herbie Hancock, Michael Franks, Bobby McFerrin, Tom Scott, Andy Narrell, Diane Schuur** and **Lyle Mays.**

At the heart of Will's success is his flawless technique combined with an irrepressible energy that pushes other players along to explore uncharted musical territory. His drums provide the means to express the emotion appropriate to each composition. Will Kennedy has chosen to use Audix microphones exclusively on stage and in the recording studio since they provide the perfect complement to his musical imagination.

AUDIX

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MADE IN USA

CIRCLE 100 ON FREE INFO CARD

EQ PRODUCT VIEWS

WELL-ROUNDED BOX

Boasting both phantom power and battery supplies as standard, BSS Audio's AR-133 active DI box/line balancer has been designed for both studio and sound reinforcement applications. If the phantom power from the console should fail or accidentally be switched off, the AR-133 automatically switches over to the internal 9 V battery, providing uninterrupted use. Housed in an aluminum-extruded case with polyurethane endcaps, the AR-133 offers both 1/4-inch and XLR inputs. For further information, contact BSS Audio, Harman Pro North America, 1449 Donelson Pike, P.O. Box 17251, Nashville, TN 37217. Tel: 615-399-2199. Web: www.bssaudio.co.uk/bss/. Circle EQ free lit. #109.

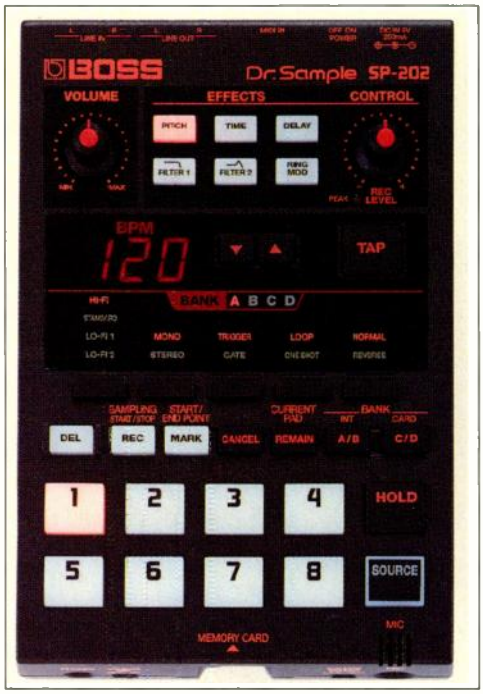
PLAYING WITH THE BANDS

Offering a selectable low-frequency 6-dB-per-octave shelving filter starting at 50 Hz, Summit Audio's EQP-200B dual-program EQ builds on the design of the EQP-200A. The low-frequency boost/cut section is enhanced with the addition of 180 Hz to the existing frequencies of 20, 30, 60, and 100 Hz. The low-frequency section offers separate boost and attenuation controls, capable of a 16-dB boost and 20 dB of attenuation. Summit has enhanced the high-frequency section with the addition of 1.5 kHz to the existing frequencies of 3, 4, 5, 8, 10, 12, and 16 kHz. The high-frequency boost section also provides a continuously variable bandwidth control and attenuation shelving filters at frequencies of 5, 10, and 20 kHz. The unit offers silent "in," "in/LF shelf," and "bypass" switching operation for each channel of the passive equalizer. For more information, contact Summit Audio Inc., P.O. Box 223306, Carmel, CA 93922. Tel: 408-464-2448. Circle EQ free lit. #110.

WHAT'S YOUR POINT?

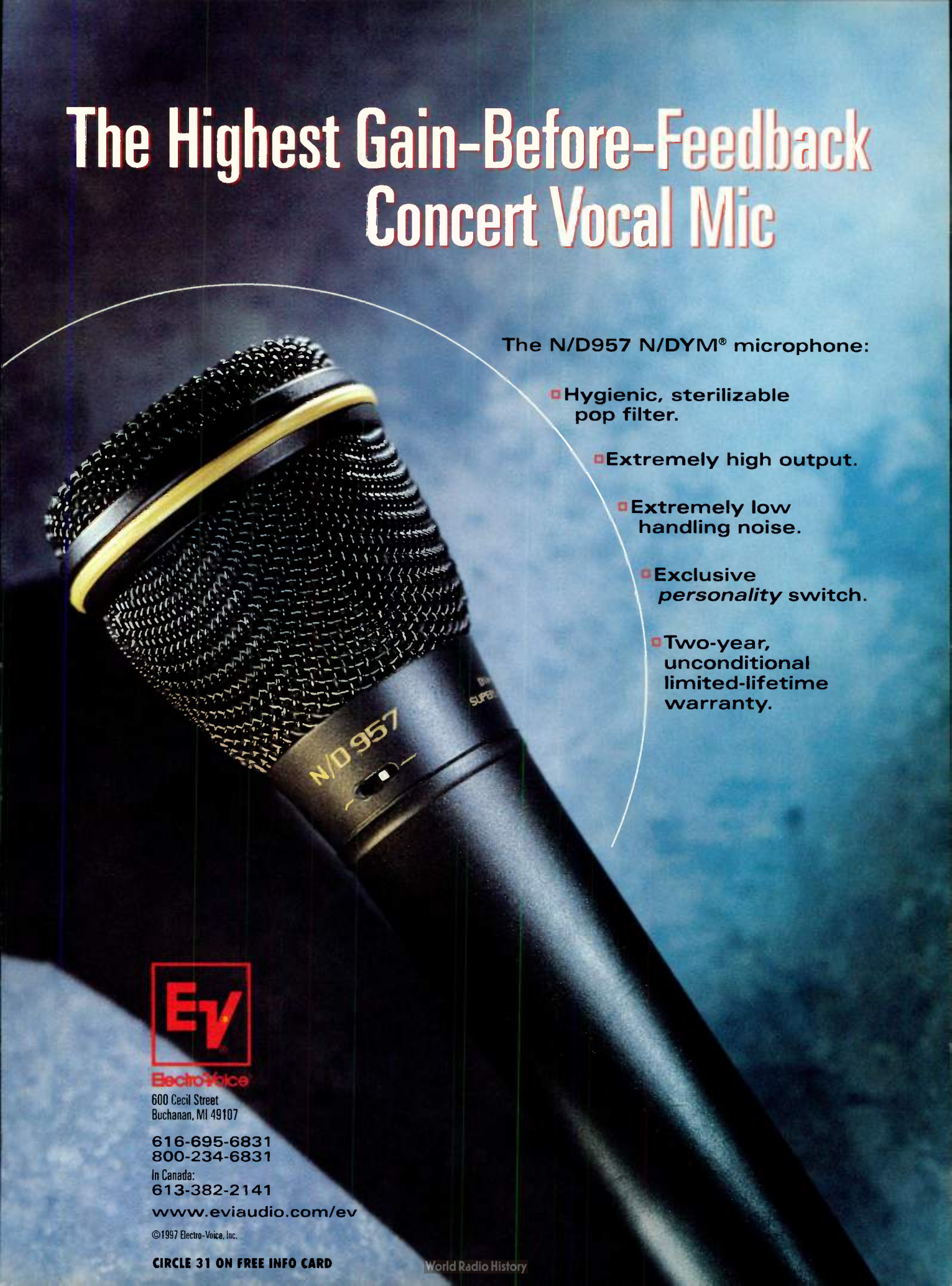
Signal Transport has expanded its Project Patch line with the addition of the new PP-96-2, 96-point bantam patchbay. The PP-96-2 fits in a single standard rack space and features a jumper system that allows each of 48 jack pairs to be configured for any one of five different normalling options. The PP-96-2 is fully compatible with all existing Project Patch studio wiring systems, utilizing the same multipin connectors that carry input and output audio signals in 8-channel groups. Normalling options include nonnormal, half normal, full normal, reverse normal (use of bottom row maintains normal connection), and double or "monitoring" normal (use of both jacks maintains normal connection). For further details, contact Signal Transport, 3219 pierce Street, Richmond, CA 94804. Tel: 510-528-6039. Circle EQ free lit. #111.

IS THERE A DOCTOR INTO HOUSE?



Boss' SP-202 Dr. Sample is a compact sampling unit that features high-quality 16-bit, 31.25 kHz sampling accessed via eight onboard pads (each with user-selectable sampling grade), giving users up to 4 min. 20 sec. of internal sampling time. The onboard pads light red when in use, confirming when tracks are on. The unit also features an enhanced BPM function that automatically calculates and displays beats per minute from the sample length; six built-in effects, including pitch adjust, filter 1, filter 2, time stretch, delay, and ring modulation; a tap tempo button; a built-in mic; and can be battery operated. External sample storage is provided via 2 MB or 4 MB SmartMedia cards — each 4 MB card can store up to 37 minutes of samples. For further details, contact Roland Corporation, U.S., 7200 Dominion Circle, Los Angeles, CA 90040. Tel: 213-685-5141. Web: www.roland.com. Circle EQ free lit. #112.

The Highest Gain-Before-Feedback Concert Vocal Mic



The N/D957 N/DYM® microphone:

- Hygienic, sterilizable pop filter.
- Extremely high output.
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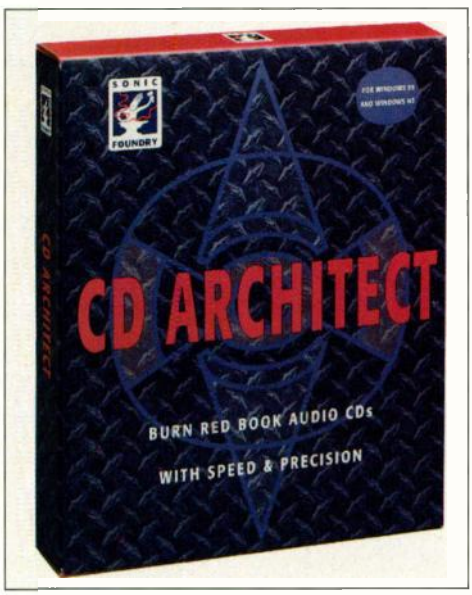
EQ STUDIO WARE

HOW SUITE IT IS

AlterMedia, Inc. has designed Studio Suite to organize, manage, and simplify the studio environment. Modules include: Click-n-Book Calendar, Contacts, Calls & Letters, Production Orders, Sessions, Invoices, Recording Budgets, Tape Library, Tape Labels, Tape Release, Track Sheets, Tape Stock, Recall Sheets (80+), Equipment Inventory, and more. The all-inclusive software also features built-in relational, cross-platform (PC/Mac), network capabilities. Studio Suite is available for a retail price of $349. For more information, contact AlterMedia, Inc., 2850 Delk Road, #55B, Marietta, GA 30067. Tel: 800-450-5740. Web: www.studio-suite.com. Circle EQ free lit. #113.

MIKE BRADY WOULD LOVE THIS

With CD Architect from Sonic Foundry (see full review in *EQ*'s June '97 issue), users can import audio from compact discs, record from digital audio tape, or digitize through any Windows-compatible sound card. CD Architect writes CDs to Red Book specifications on the Windows 95 and Windows NT platforms and offers a wide range of effects and processing tools. The software can optionally function as a Sound Forge 4.0 plug-in as well.



Up to 99 tracks with 99 sub-indices per track can be included on each disc. The software utilizes the disc-at-once method of burning, which offers the ability to add pause times between tracks or to run tracks together. CD Architect offers full support of PQ-code editing. CD Architect is available for an MSRP of $395. For more details, contact Sonic Foundry, 754 Williamson St., Madison, WI 53703. Tel: 800-57-SONIC. Web: www.sonicfoundry.com. Circle EQ free lit. #114.

FORM AND FUNCTION

The CD-2601 4X stand-alone CD-R Duplicator from MediaFORM delivers both simple one-button operation and unattended duplication of up to 36 CD-Rs. The MediaFORM "Smart Controller" automatically identifies formats including ISO, Hybrid, Mixed Mode, HFS, Red Book CD-Audio, and all standard CD formats. The CD-2601's Batch Copy Mode allows for several masters to be loaded into the unit's hopper, and the system will automatically identify the master CDs, allowing for multiple jobs to be duplicated unattended. The system also provides separate accept and reject bins to easily sort recorded media. For further information, contact MediaFORM, 400 Eagleview Boulevard, Suite 104, Exton, PA 19341. Tel: 610-458-9200. Web: www.mediaform.com. Circle EQ free lit. #115.

HOME STUDIO ON A DISC

The latest version of Cakewalk Music Software's Home Studio, Version 6.0, features digital sound processing, including reverb and chorus, and supports Microsoft DirectX audio plug-ins. Version 6.0 also adds support for Progressive Network's RealMedia file format, which allows users to publish their Cakewalk MIDI and audio files on the Internet with ease. Cakewalk Home Studio also offers real-time display of notation while you record along with other advancements in staff printing, and new, in-depth, tutorials. Home Studio 6.0 has an estimated street price of $99. Registered Cakewalk Home Studio users can order their upgrade to Version 6.0 by visiting www.cakewalk.com or by calling 888-CAKEWALK. For more information, contact Cakewalk Music Software, P.O. Box 760, Watertown, MA 02272. Tel: 617-926-2480. Web: www.cakewalk.com. Circle EQ free lit. #116.

Gina™ Digital Multitrack.

So cool, you just might like your computer again.

install your audio card with absolutely no hassles • plug into it via ¼" jacks mounted in a rugged breakout box record two audio tracks through the latest 20-bit 128x oversampling ADCs while simultaneously recording two other tracks via the 24-bit S/PDIF digital input and playing eight tracks back through state-of-the-art 20-bit 128x oversampling DACs while playing two more tracks through the digital out with 24-bit resolution (Whew!) • build megatrack masterpieces, tweak them to perfection, and master them to DAT or CD using your favorite Win 95 audio software • hear your tracks with thumping bass, crystal-clear mids and sparkling highs (frequency response: 10Hz–22kHz, ±0.5dB; THD+n: 0.003%) and stunning dynamic range (greater than 98dB) • do all of the above and still have plenty of money left over to serve the good champagne at your signing party

Gina™ by ECHO®
Multitrack Digital Audio Recorder / $499

Includes Syntrillium Software's
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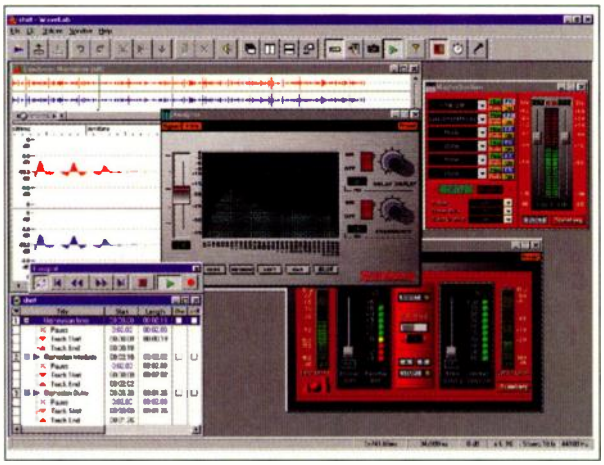
EQ STUDIO WARE

ON THE GO

E-mu's EMU8710 PC audio card is for both musicians and professional presenters who need to take professional-quality audio on the road. The EMU8710 is a PCMCIA card designed for Windows 95 laptop computers. The board features 16-bit/44.1 kHz stereo audio record/playback capabilities, as well as a 32-voice, 2 MB general MIDI wavetable synthesizer with built-in effects. Using SoundFont technology, the EMU8710 can be loaded up with 512 kilobytes (RAM) of new sounds. For more information, contact E-mu Systems, Inc., P.O. Box 660015, Scotts Valley, CA 95067-0015. Tel: 408-438-1921. Web: www.emu.com. Circle EQ free lit #117.

WAVE DWELLER



WaveLab version 1.6 from Steinberg North America offers musicians, audio engineers, and sound designers an interface for real-time 24-bit audio editing, processing, and archiving. New features in 1.6 include full-featured graphic waveform editing; CD-burning with full PQ code editing; six spaces of real-time plug-in effects processing; 24-bit audio processing; support for Active X Movie Plug-In architecture; real-time processing of a live input; batch processing, database functions, and spectral analysis; the award-wining Grungelizer plug-in; and the ability to import audio from CDs via CD-ROM or CD-R. WaveLab Version 1.6 carries an MSRP of $499. For more details, contact Steinberg North America, 9312 Deering Avenue, Chatsworth, CA 91311-5857. Tel: 818-993-4161. Circle EQ free lit. #118.

RUN IT BIAS

Berkley Integrated Audio Software's (BIAS) newest version of Peak (1.60), the digital audio editing program for Macintosh, expands the large repertoire of digital sampling instruments with which Peak communicates. Owners of Akai S1000, S2000, and S3000 samplers and Roland S-760 samplers can now use Peak 1.60 to send and receive both individual and groups of samples to and from their instruments. Peak 1.60 also increases SMDI throughput by almost 1000% for many samplers. Another enhancement available with Peak 1.60 is that it now works as the external editor from within Mark of the Unicorn's Digital Performer and Steinberg's Cubase Audio/VST. Additional enhancements include the ability to create mono, stereo, 8- and 16-bit System 7 Sound Resources, revised Scratch Disks dialog, the addition of View and Selection Memory, which can store up to 32 previous zoom and selection settings per audio document, and option-dragging in the Overview window, which allows users to navigate within the Overview without initiating playback. BIAS is offering this upgrade to owners of Peak 1.5x at no charge (end-users can download the upgrade from the BIAS Web site, www.bias-inc.com). For more information, contact Berkley Integrated Audio Software, P.O. Box 2481, Sausalito, CA 94966. Tel: 800-775-BIAS. Web: www.bias-inc.com. Circle EQ free lit. #119.

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**Requires V1.1 ROM Upgrade.*

Lexicon

Heard In All The Right Places

Lexicon, Inc. 3 Oak Park, Bedford, MA 01730-1441. Tel: 617/280-0300 Fax: 617/280-0490 E-Mail: info@lexicon.com Web: www.lexicon.com

There's lots of hype these days about PCI digital audio recording systems. Companies spend a ton of money on advertising, claiming future support by a myriad of different software companies. What are we supposed to do? We need instant solutions! Our projects are due now not "soon".

Emagic, known for it's integrated professional MIDI, Digital audio and Scoring software has created a cross-platform, PCI busmaster digital audio recording card with 8 discrete outputs for less then $800: Audiowerk8. Since the product's launch last Spring, thousands of users worldwide have attested to the incredible ease of installation and use and the warmest ana log to digital conversion in the business. The Audiowerk8 works on both Windows and MacOS computers just like Logic Audio, the sequencing software it was designed to work with from the start.

Version 3.0 of this award winning music production tool now offers a rich compliment of real-time DSP effects such as Equalizers, Filters, Reverbs, Chorus, Flangers and Delays with up to 8 inserts and sends per track, depending on your CPU.

The combination of Logic Audio 3.0 and Audiowerk8, allows the completion of professional production jobs on a very tight budget.

There's a whole slew of new features such as: punch in on the fly, cycle recording, contiguous synchronization of audio to MTC and much more. You can even use 2 Audiowerk8 cards and get a total of 24 physical audio tracks and 16 outputs.

Rather than calling a dozen companies to get a technical issue resolved, make a single call to a single source and get back to work. Compatibility and support problems become a thing of the past.

So what's the deal? Logic Audio & Audiowerk8, true integration, guaranteed compatibility, professional results. See your dealer or give us a call. The choice is simple. One company, one complete solution.

What's the deal?

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CIRCLE 14 ON FREE INFO CARD

The Late **Shift**

A commercial studio vet sets up shop in suburban New York

STUDIO NAME: Late Nite Studios
LOCATION: Plainview, New York
KEY CREW: Kevin J. Kelly
PROJECTS & CREDITS: A freelance engineer in the New York City area since 1989, Kelly originally found himself working in the R&B and dance genres with a list of artists that included Madonna, Mariah Carey, Glen Jones, Teddy Riley, and Guy, as well as Steve Winwood and the Del Fuegos. Kelly has worked in most of the major studios in NYC, including The Hit Factory, The Power Station, Soundworks, Soundtracks, and Electric Lady,

and was on staff at the Record Plant when it closed its doors. Kelly returned to his roots of loud guitars, drums, and rock 'n' roll when he began working out of his own project studio.

Kelly recently completed working with Flytrap Records newcomers One Groovy Coconut on their debut release, *Havin' A Good Time,* as well as the Serial Poets' *Broken Nose* EP.

CONSOLE: Mackie 32•8

MONITORS: UREI 809 time-aligned studio monitors; Yamaha NS10; Auratones

AMPLIFIERS: Yamaha A-500

RECORDERS: Alesis ADAT [3] with BRC autolocator; MCI 1-inch 8-track with an Ampex transport

DAT MACHINES: TASCAM DA-30; Sony A-6

OUTBOARD GEAR: Pultec EQF tube EQ; UREI 1176 LN compressor/limiter; Lexicon PCM 60 digital reverb; Lexicon Reflex; Ibanez SDR-100 digital reverb; Yamaha SPX-90 II digital effects processor [3] and REV7 digital effects processor; Alesis MIDIVERB and Quadraverb GT; Korg SDD-3000 Sampling Digital Delay [3]; TC Electronic 1216 stereo chorus/flanger; Audio Logic Quad noise gate; Kepex Noise Gates [4]; Gain Brain Compressors [4]; dbx 160X compressor; Ashley SC-53 stereo compressor [2]; Rane 2/3-octave stereo EQ [2]; stereo Aphex Aural Exciter

MICROPHONES: Shure SM-57 and 58 [7]; AKG D112 [2]; Sennheiser 421 [3]; Crown PZM [2]; Neumann U87, KM85, and KM86i shotgun; EV PL77AA condenser [2]; Altec "Saltshaker" [2]; CAD SA-70 [3]

INSTRUMENTS: Tama/Gretch 5-piece drum kit with Zildjian cymbals; 1978 Marshall 50-watt JMP (all original) w/4x12 cabinet; Boogie 1x12 cabinet; mid '70s MusicMan 2x12 combo; Ibanez bass, 12-string acoustic guitar; Washburn acoustic/electric HB-335 guitar; Fender custom shop Stratocaster; vintage Silvertone/Dan Electro Bass

COMPUTERS AND SOFTWARE: IBM Pentium 133 with 40 MB RAM and 22 GB hard drive; Turtle Beach CD-R recorder; CardD Editor Plus digital editing and mastering software

MIDI GEAR: Korg DSS1; Casio FZ 10M sampler; Alesis HR-16; Roland Octopad

STUDIO NOTES: Kelly states: While working in Manhattan's best rooms for many years, I took note of what I liked and disliked about each particular studio. I kept all of that in mind — from acoustics right down to the lighting — when I designed and built Late Nite. Comfort is the key here. An artist *can not* perform at their best unless they are comfortable, and my job is to make the recording process as invisible as possible. Players should feel at least as comfortable as they do at rehearsals, if not more so, to get the best takes possible. I kept a large control room because most people spend most of their time there. I'll usually have one person in the live room while the rest of the band is in the control room.

EQUIPMENT NOTES: Kelly adds: The other thing that's stressed here is vintage gear and minimalist tracking. I try to get the instrument sounding its best before miking it — I try to get the best sound with mic placement before EQing and/or compressing to tape. My Pultec and UREI coupled with my U87 is my favorite recording chain. They're all from the NYC Record Plant and share an incredible history, including sessions with John Lennon, Aerosmith, Paul Stanley, and Bruce Springsteen. There is a tremendous aura associated with this gear. **EQ**

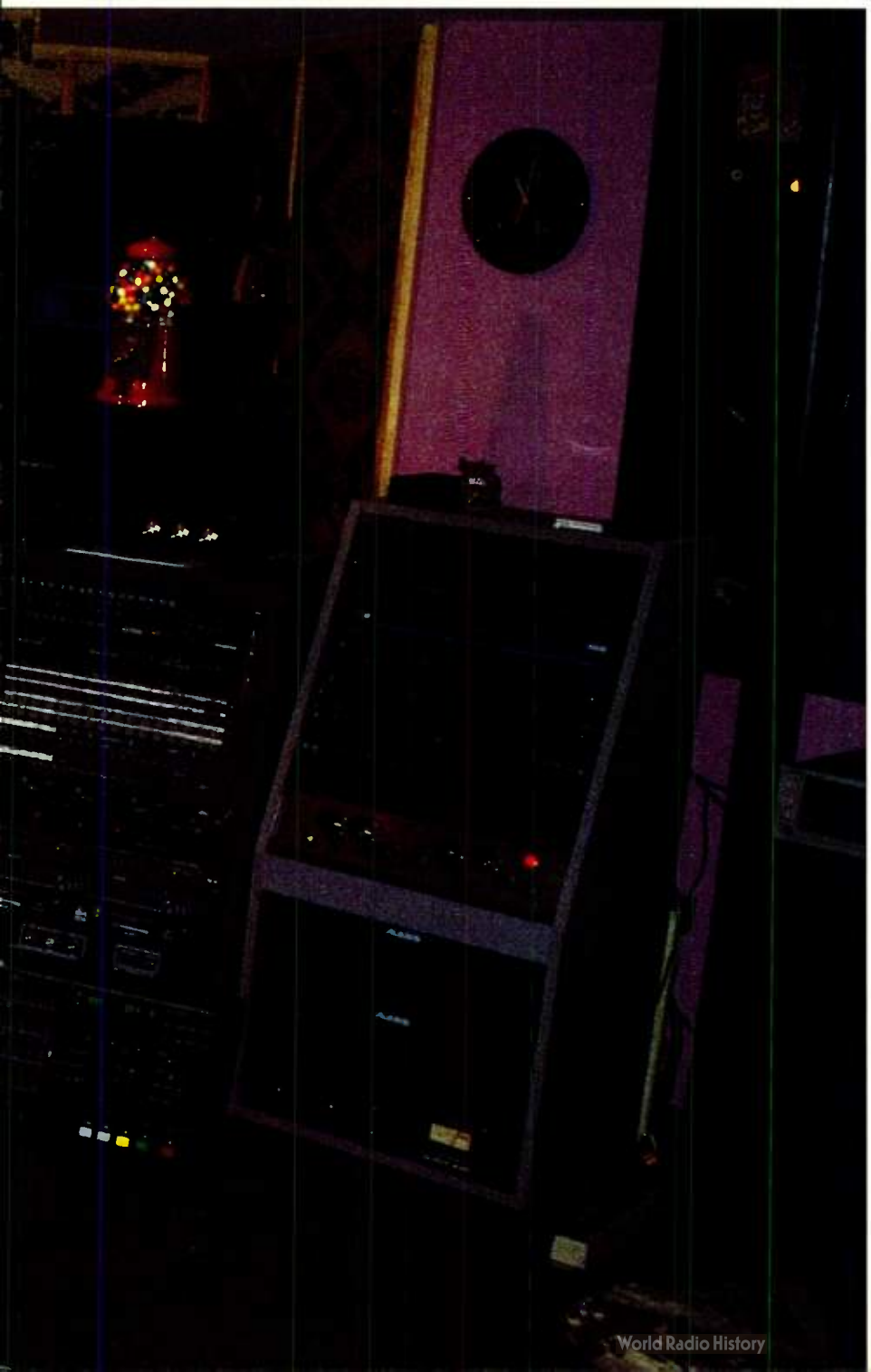

PHOTO BY STEVEN J. MESSINA

Electro-Voice 666

This odd-shaped mic was designed for in-your-face vocals

MICROPHONE NAME: Electro-Voice 666
FROM THE COLLECTION OF: David Sanders, professor in the Broadcast Department at Montclair State University and director of the National Music Council.
DATE OF MANUFACTURE: September 1965 to August 1969
PRICE WHEN NEW: Approximately $255
TYPE OF MIC: Dynamic moving coil
POLAR PATTERN: Cardioid
FREQUENCY RESPONSE: 40 Hz to 15,000 Hz
IMPEDANCE: 50 ohms
CASE MATERIAL: Cast aluminum
DIMENSIONS: 7.5 inches (length) x 1.75 inches (maximum diameter)
WEIGHT: 11 ounces
MIC NOTES: A classic example of form following function, the Electro-Voice 666's unusual shape is the result of engineering efforts to increase front-to-back discrimination. Three rear sound entrances each possess a phasing network, and combine to effectively form a single rear entrance that varies in distance from the diaphragm inversely with frequency. The 666 employed Electro-Voice's extremely rugged Acoustalloy diaphragm, which made the mic suitable for a wide variety of uses including boom shots in TV and film work, as well as vocal pickup. Proximity effect was intentionally minimized in the 666 to provide uncolored close-miking of vocals. Electro-Voice also manufactured a 666R that had the same physical and polar response characteristics as the 666, but had a 4.5 dB rise in frequency response from 100 Hz up to 2000 Hz. Accessories for the 666 included the 366 shockmount and the 420 desk stand.
USER TIPS: Although the 666 was shipped from the factory with its impedance set to 50 ohms, it could easily be adjusted by the user. There's a small internal jumper board attached to the XLR connector that can be removed by pressing down on the locking pin of the connector. Gently pulling the connector pins will then reveal the jumper board, which has taps for 50, 150, and 250 ohms.
Technical data courtesy of Frank Spain, national service manager for Electro-Voice.

PHOTO BY EDWARD COLVER

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* Available Third Quarter 1997

Logic Audio Discovery: Digital Audio and MIDI made easy!

Logic Audio Discovery is a great new addition to the award winning Logic System. Offering true integration of Digital Audio recording and editing, DSP, 960 PPQ MIDI Sequencing and basic Scoring, all non destructively and in real-time. Additionally, Logic Audio Discovery includes a simplified version of Emagic's groundbreaking Environment, allowing you total control over your individual home studio. All at a musician friendly price.

Integrated real-time digital audio & MIDI recording and editing. Affordable, available and very musical. MSRP $299.00

When used in conjunction with Emagic's new Audiowerk8 PCI digital audio recording card, you can achieve up to 12 tracks of digital audio. But there is much more. Just look at a few of the powerful features of Logic Audio Discovery:

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CIRCLE 140 ON FREE INFO CARD

Nikon Beluga AV MO Drive

Magneto-optical disk recording just got faster thanks to Nikon's new technology

BY STEVE LA CERRA

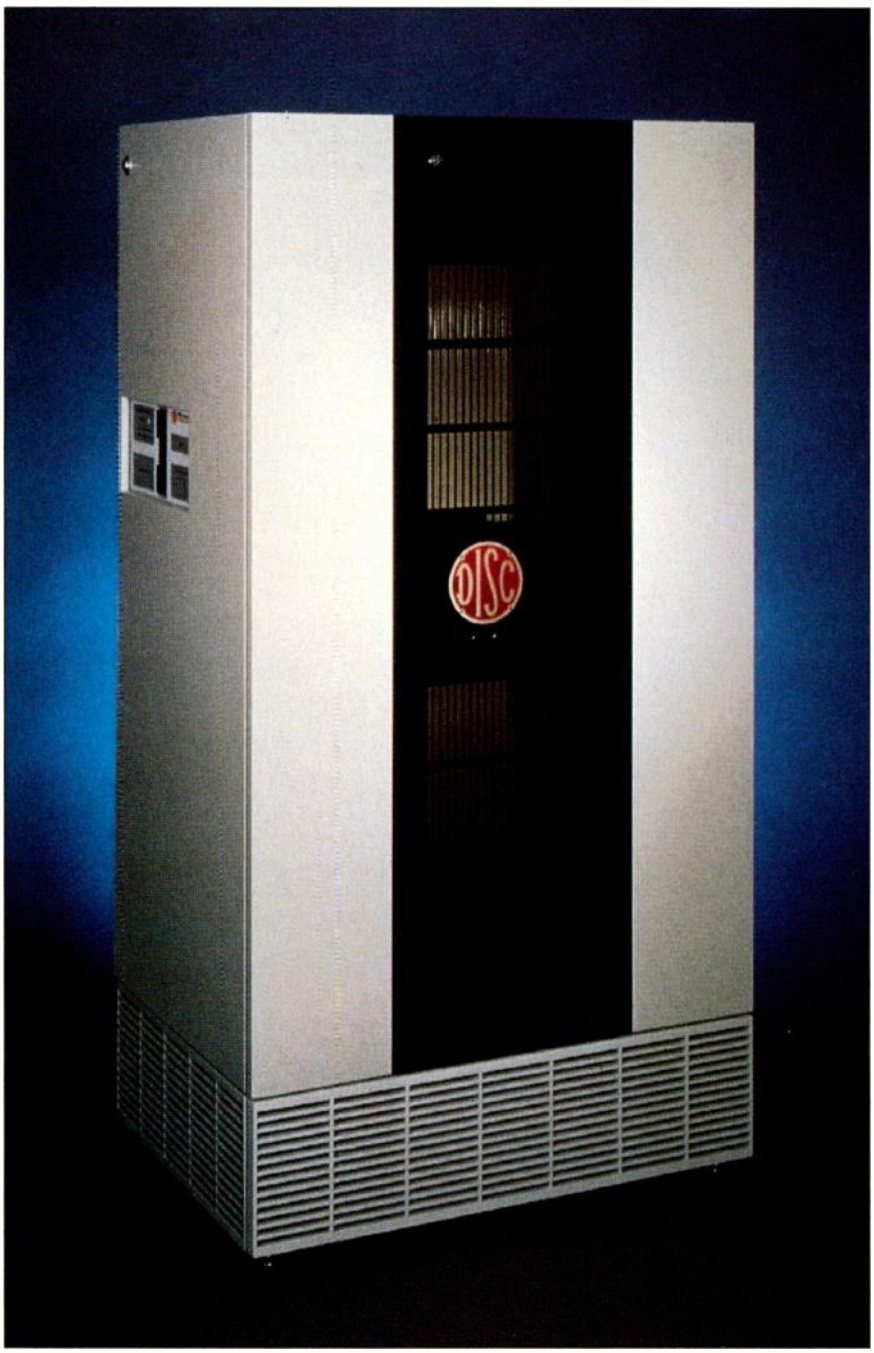
Nikon is a pioneer of the technological advancements in electronic imaging and optical storage. In fact, Nikon Optical Storage has developed a new magneto-optical (MO) drive specifically intended for use in pro audio and video applications: the Beluga AV™.

Removable magneto-optical drives are already a viable digital audio format and offer many advantages over other storage formats. MO disks have a much longer data life than tape, are not subject to head crashes, are more reliable than removable hard drives, and (of course) provide random access. But their performance has generally been slow.

Based on their award-winning Beluga drive, the Beluga AV employs Nikon's LIMDOW (Light Intensity Modulation Direct-OverWrite) technology, allowing it to achieve a write-transfer rate twice as fast as other optical drives. Storage capacity of the Beluga AV is 2.6 GB, and the drive is write-performance rated at up to 4 MB per second (10 MB per second burst). Combined with the Beluga AV's 4 MB cache, the write-performance rating helps provide uninterrupted data flow, eliminating pauses, video motion flicker, and audio distortion. Since the disks are removable (and affordable), studios will find the Beluga AV a smart candidate for high-speed, high-capacity recording and storage.

In order to really understand what Beluga AV's technology has to offer, you need a quick reminder of the MO recording process. Current MO technology writes data to disk using a laser to heat the disk surface to the "Curie" temperature. Approximately 200 degrees F, this is the temperature at which magnetic polarity of the disk can be reversed. Once the media is properly heated, a magnetic head records the data as ones or zeros. While MO media has the ability to handle a tremendous number of write and erase cycles — most have been demonstrated to perform more than a million cycles — conventional MO drives need to make a separate "erase" pass to put the data bits into a sort of "null" state before new data can be recorded. After this erase process has been verified, the media is ready to be recorded upon with the next pass under the laser. This characteristic has, in the past, limited applications for MO.

Beluga AV's most exciting and important feature is that, using LIMDOW



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- MIDI clock/MTC/MMC
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- Note Variation slider for control of level, pitch, attack, decay or filter

Options

- Multi-8/Dm expander increases outputs from 2 to 10, plus S/PDIF digital I/O $299
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- SMPTE reader/generator* $299

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*to be supported in v1.3 O/S software

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CIRCLE 2 ON FREE INFO CARD

technology, Nikon has overcome the cumbersome operational constraint of needing a separate erase pass. Direct OverWrite technology uses multiple media layers (each having different magnetic characteristics) and variable laser power to record new data directly onto LIMDOW disks while erasing the previously stored data "on the fly."

Basically, the LIMDOW operating principle works like this: while the disk's Memory layer (the area where data is stored) passes under the drive's read/write optical mechanism, the laser's intensity is altered from medium for erasing (4 to 6 milliwatts) to high for writing (8 to 12 milliwatts). This modulation occurs within nanoseconds. LIMDOW disks also have a separate Writing layer that controls magnetization of, and thus transfers data to the Memory layer through an Intermediate "buffer" layer. By employing these separate disk layers, immediate and direct rewriting occurs without requiring "resetting" of the media. The Memory layer instantly assumes the polarity characteristics of the Writing layer's magnetic field.

Once the new data is written, Beluga AV can read it back by reducing the laser power level to 1.25 milliwatts. As with conventional MO media, the new data will not be affected by stray magnetic fields or contamination — which can easily destroy data on a standard hard-disk drive. Running at half the duty cycle of other drives doubles laser life of a LIMDOW drive, and the drives are built with a non-motorized loading mechanism designed for faster spin-up times and longer service life. Perhaps most importantly, LIMDOW drives provide both read- and write-compatibility with ISO-standard 650 MB, 1.3 GB, and 2.6 GB MO media, as well as CCW (write-once) media. This backward compatibility means that studios can upgrade to a LIMDOW drive without having to convert previously recorded discs. The Beluga AV has a SCSI 2 interface to integrate with just about any OS, including Macintosh, Windows, Windows NT, Windows95, OS/2, Irix, and UNIX-based systems. Available now, the Beluga AV drive is priced at $2295; a 2.6 GB LIMDOW disk is priced at $99.

For more information contact Nikon Optical Storage at 1-888-88-NIKON or 415-508-4674. Circle EQ free lit. #120.

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CIRCLE 97 ON FREE INFO CARD

linear activation LA

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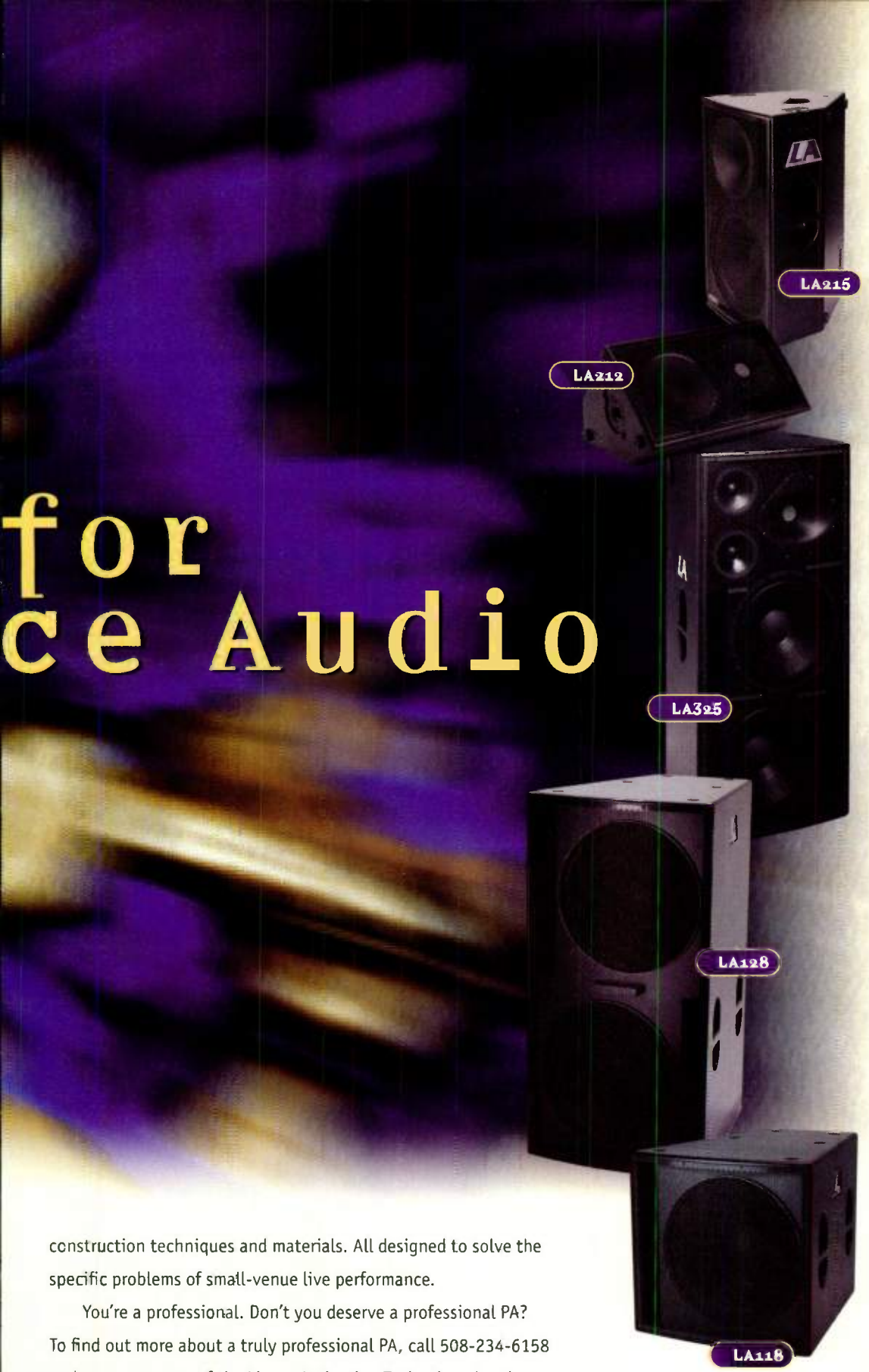
LA offers a complete line of PA systems engineered by EAW – the world standard in professional touring sound. LA features the same professional cones and compression drivers, the same heavy-duty, computer designed crossover and the same road-proven



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CIRCLE 15 ON FREE INFO CARD

Sound Effects With Guitar

Synthesizers aren't the only way to get weird and unique sounds

BY CRAIG ANDERTON

Samplers and keyboards make it easy to come up with FX: load a disk or CD-ROM file, punch up a preset, and hit a key. Yet electric guitar, in conjunction with a good multieffects processor, can make sounds that are more organic and complex than what you get from a bunch of canned samples. No, you can't generate car crashes and door slams, but for ethereal pads, suspense music, industrial noises, alien backgrounds, and much more, guitar is the instrument of choice.

Why let keyboard players do all the cool sound effects? Here are my top 10 tips for creating truly weird guitar sounds. Just remember Rule #1: *Extreme effects settings produce extreme sounds.* Generally, you're looking for the boundaries of what an effect can do; all those +99 and –99 settings you've been avoiding are fair game for producing truly novel effects.

Is everything in order? It's essential to be able to change the order of effects, either by repatching individual effects boxes or by using a multieffects with customizable algorithms. For example, a compressor generally goes early in the chain, with chorusing added later on so that the effect processes the compressed signal. However, suppose the chorus has a ton of resonance to create some really metallic sounds? This could produce such drastic peaks with some notes that in order to tame them, you would need to place the compressor later in the chain.

Industrial reverb. For a really rude sound, play a power chord through a reverb set for a fairly long time delay, then add distortion after the reverb. The resulting sound has the added bonus of being able to rid you of any unwanted houseguests.

Wet is good. It's usually best to set the effects mix for wet sound only. Having any straight guitar sound in there can blow your cover since a guitar attack is such a distinctive sound.

Attack of the pedal pushers. Add a pedal between the guitar and your multieffects, not at the multieffects output. You can cut off the guitar attack by fading in the pedal at the beginning of the note; with effects like long delays and reverbs, you can fade out the source signal while the "tail" continues on.

Found sounds. The guitar itself can generate noises other than those created by plucking strings. Hold a handheld calculator or other portable microprocessor-controlled device up next to the pickups and you'll hear a bunch of science-fiction sounds worthy of the bridge of the Enterprise. Some more favorites: feed a high-gain effect (such as compression or distortion) and tap the back of the neck with your fingertips, drag the edge of a metallic object (like a screwdriver or butter knife) along wound strings, use extreme amounts of whammy, and tap the body smartly with your knuckles to create percussive effects.

Turn up the heet. The Heet Sound

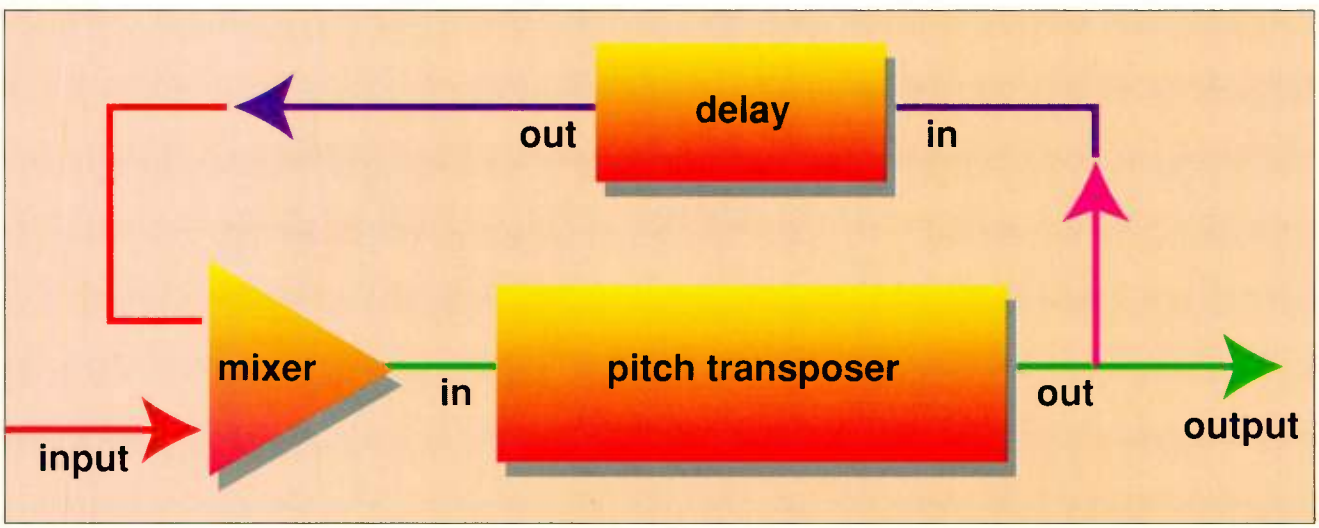
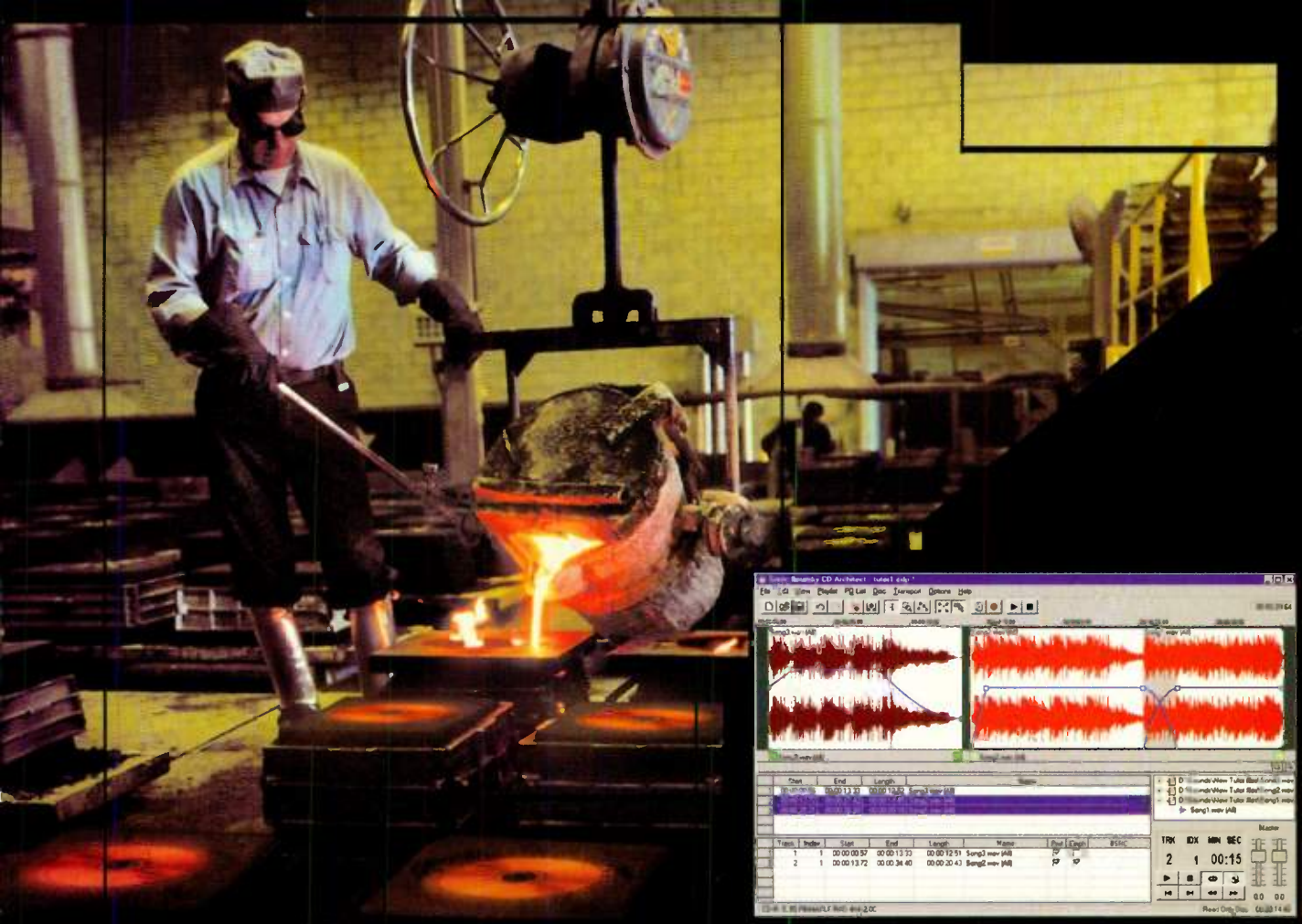


FIGURE 1



Build Audio CDs by the Book

Design professional audio CDs to Red Book spec with Sonic Foundry's new CD Architect. Tracks in the PQ List can be assembled with regions from single or multiple sound files. Full PQ code editing allows even the most sophisticated mixes and crossfades between tracks. Used as either a stand-alone editor, or as a Sound Forge 4.0 plug-in - CD Architect is ideal for building audio CDs on Windows 95 and Windows NT.

- Supports 99 tracks per disc (99 sub-indices per track)
- Allows single or multi-file playlisting
- Verifies PQ list for Red Book compatibility
- Fully supports PQ code editing including track and index positions and pause times
- Includes dozens of audio processes, tools and effects with multiple levels of undo/redo
- Provides independent-channel master volume faders and adjustable envelope controls
- Burns disk-at-once premasters suitable for creating glass masters
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- Previews multiple tracks or ranges of audio before extraction
- Auto-detects the full range of CD-ROM drives, CD-recorders, and auto-loaders it supports

CD Architect includes native versions for Windows 95, Windows NT-compatible (x86, Pentium, Alpha systems) on a single CD-ROM.

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SONIC FOUNDRY®

THEORY MEETS PRACTICE

The following patches for the Peavey TubeFex produce sounds that I guarantee you haven't heard before (unless you've attended some of my guitar seminars). Parameter values for each module in an algorithm are listed in the order in which they appear on the LCD, going from left to right.

"Timegate" is a sustained, ethereal sound; like something Brian Eno would enjoy.
Algorithm: CM > RV > CF > 5B > PH > P1 > CT
CoMpressor: Xfast • Slow • 0 • 27% • 1
ReVerb: Plate • Huge • 44 ms • 21s • 8 kHz • 54%
ChorusFlanger: 0.1 • 100% • 21.7 ms • –75 • +50
5BandGraphic: +0.0 • +2.5 • –4.0 • +4.5 • +5.5
PHaser: 1 • 50 • 67
Pitchxpose1: L=50 R=50 • 0 ms • –5 • –9 • 0% • 71% • 71%
CoilTap filter: 5 • +66

"Meltdown" is sort of a bass gamelan sound, with a bell-like, metallic quality.
Algorithm: P1 > CM > CF > RV > NG > DL
Pitchxpose1: L=50 R=50 • 0 ms • –2 • –50 • 63% • 100% • 100%
CoMpressor: Medium • Medium • 1 • 21% • 1
ChorusFlanger: 9.9 • 0% • 20.4 ms • –88 • +100
ReVerb: Revrs • 365 ms • 73%
NoiseGate: 0 • 11 • –70 • 4
DeLay: Stereo • 213 ms • 33% • 361 ms • 67% • 2K • +100

E-Bow (Tel: 213-687-9946) is a very cool sustaining device for individual strings. This handheld device picks up vibrations from the string, amplifies them, then drives the string with those vibrations to create a feedback loop. The E-Bow rests on the strings adjacent to the string being "e-bowed"; moving the E-Bow further away from or closer to the string can create all kinds of interesting harmonic effects. If you want to approximate that famous blissed-out "Frippertronics" tape loop sound, use the E-Bow to drive a delay set for long echoes (greater than 500 ms) with lots of feedback (more than 80 percent).

Shifty pitches. Pitch shifters are a treasure-trove of weird sounds. One favorite is to feed some of the output back to the input, but through a delay (fig. 1 shows how to patch stand-alone boxes to do this; with a multieffects, a pitch shifter will usually include predelay and feedback parameters, which will accomplish the same result). Suppose there's a 100 ms delay and pitch shift is set to –1 semitone. The first time the input reaches the output, it comes out 1

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semitone lower. It then travels back through the delay, hits the shifter input 100 ms later, and comes out transposed down another semitone. This then goes through the delay again, gets transposed down another semitone, etc. So, the sound spirals down in pitch (of course, with an upward transposition, it spirals up). With short delays, the pitch change sounds more or less continuous while there's more of a stepped effect with longer delays. The delay's level control sets the amount of feedback; more feedback allows the spiraling to go on longer. However, if the delay level produces gain, then you could get nasty oscillations (which have their own uses, actually).

Lord of the ring modulators. Don't have a ring modulator? If a tremolo or autopan rate extends into the audio range, the audio modulation "slices" the signal in a way similar to a ring modulator.

Fun with flangers. Like pitch shifters, chorus/flangers are extremely versatile if you test their limits. Start off with the slowest possible LFO rate short of it being stopped, so that any pitch modulation is very slow. Then set the depth to maximum and feedback to the maximum possible, short of distortion. Edit the output for wet signal only, and try a relatively long initial delay time (at least 20 ms). You'll get metallic, morphing sounds that sound like, for lack of a better description, ghost robots — an unearthly, mechanical effect. If I were doing effects for a movie and building tension for the part where the psycho killer is stalking his next victim, this sound would get first crack at the scene.

Parallel universe. Some advanced multieffects let you put effects in parallel. One example of how to use this is to create ultra-resonant sounds. Most guitarists know that you can take a flanger, boost the resonance to max, turn the LFO speed to zero, and end up with a very metallic, zingy sound. But you can go one step further with parallel effects: patch a stereo delay in parallel with the flanger, set each channel for a short (but different) delay (e.g., 3 and 7 ms), feedback for each channel to as high as possible short of uncontrolled feedback, and output to (of course!) wet only. You'll now have three resonant peaks going on at the same time.

And that's our 10 tips. Until next time, may your computers never crash and your strings never break. EQ

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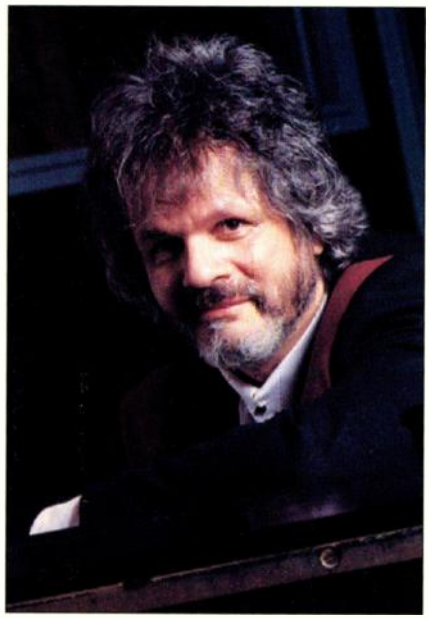

PHOTO BY JIM HERRINGTON

Is it quality or quantity that makes a songwriter a genius?

BY AL KOOPER

Recently, in an Al Kooper forum that I participate in online, this discussion took place by E-mail. The editors were kind enough to let me post it here as a column, even though it's not technical mumbo-jumbo about how to make your project studio sing. It's intellectual mumbo jumbo about letting your freak flag fly. The names have been changed to protect the possibly innocent:

Subj: Songwriting Question
From: Participant One
Al, reading about all your records got me looking at my CD collection and I pulled out Rhino's *Loving Spoonfuls Greatest Hits*, which I hadn't played in a while. Great stuff. Anyway, my question is this: Why do musicians, like your friend John Sebastian, write an incredible amount of classic songs ("Summer in City," "Do You Believe in Magic," et al.) over a relatively short period of time and then can't come up with anything of that quality later on. I'm not attacking John — I know he had a few more classics like "Welcome Back" and "She's A Lady" — but how come the songs stop churning out for musicians? Rod Argent is another example. Is it because they just don't want to write any more songs of that genre/style?

Subj: Songwriting Question
From: Al Kooper
In answering your question, I have to take exception to it. I am not directing this at you personally, you're only a product of a society with no appreciation or understanding of "the muse."

If you look back, historically you'll find that all great talents had their "periods of greatness." From Shakespeare to John Milton; from Rimbaud to Kerouac; from Little Richard to Ray Charles; from Bob Dylan to John Fogerty; from Neil Young to Van Morrison; from Sly Stone to Robbie Robertson. I think it's the norm rather than an unusual occurrence.

So does their audience thank the God that blessed all those people with their windows of extreme creativeness? *No!* They are *lambasted* for not keeping up with a standard that the people that write or complain about it, like yourself, couldn't even possibly attain.

So, thank God you have Shakespeare's greatest works to still enjoy, and the great stuff that all the other people I mentioned spewed out in incredible creative thunderstorms that blew through them and then left them calm and satisfied.

Why can't the public be satisfied and revere these people for their great work?

Why can't the public be satisfied with that and revere these people for their great work no matter what time frame it was in? Maybe Buddy Holly and John Lennon were lucky to die rather than to face criticism for later work that was judged less artistic by an ungrateful fan base.

Shame on you — stop taking these wonderful people for granted!

Subj: Re: Songwriting Question
From: Participant One
You're entitled to your opinion. I'm not criticizing these people, but what I don't understand is how does one go from a great standard to *nada*? That's what I don't understand.

Are you basically saying that a songwriter capable of writing classics can only do so for a short period of time and then that it's impossible to continue attaining that level?

Subj: Re: Songwriting Question
From: Al Kooper
No. I'm saying why not just sit back and enjoy what you can from their output and then seek out whatever your taste is elsewhere if it's not being met at the same source.

I'm saying what difference does it make? Accept it and move on. The source does.....

Subj: Re: Songwriting Question
From: Participant Two
I think the question needs to be rephrased. (John Sebastian and the Blues Project are among my favorites. My 4- and 8-year olds know this music.) I'm transported by this stuff and I often wonder: "Do these guys know that we're all still out there, loving this stuff, that in this moment it's as alive as the day it was written/recorded?" And I find myself wishing I could have written just one song to nest in people's hearts or make their blood rush. Just one.

The question is, how did these guys write so *much* — not so little. I don't mean this disparagingly Participant One, really I don't, but here goes.... Have you written one song that you know is being played and loved by someone every minute of every day, somewhere? Just one would be a life's pride — these guys wrote *dozens*.

I guess Participant Two shut me up at that point because he/she responded more soulfully than I could have. Case was closed and new vistas were explored. Hope this cools out some other people who have never had The Muse run through their body and therefore can't understand it. Some people call it the hand of God. See ya next month from Boston for the first time! EQ

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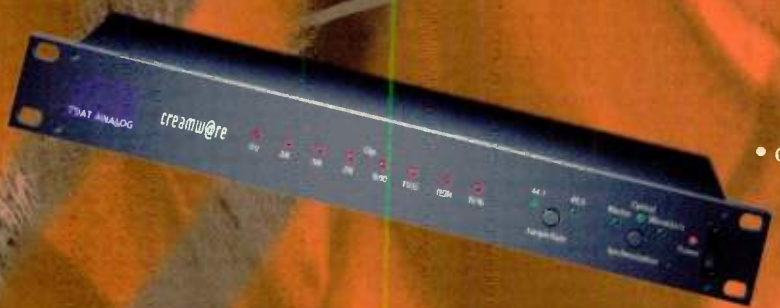

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Mitchell Froom

PHOTO BY ED FREEMAN

The noted producer and engineer prepares to release his first solo album

BY MR. BONZAI

Mr. Bonzai: Why did you choose Tchad Blake to produce your solo album?
Mitchell Froom: You look for what you need, and he was the only person who could do it. We recorded it over a three-year period, and just grabbed free days.

You wrote music and presented it to the singers for your album?
Yes, and they wrote their own lyrics. Sometimes I provided a little bit of guidance, but usually they would ignore it and do something much better. For example, I gave Ron Sexsmith this piano piece. I thought it might be a little square, and I was prepared to just throw it away. He heard it, liked it, and two days later we gave him a microphone. He sang it once and all of a sudden it was there. I'm not a singer/songwriter, and that's the single most interesting thing to me about popular music — the way that a person reveals a personality to you, the way they sing, and the words they have to say.

What's the concept of your album?
I was trying to get at this raging party always going on in my brain. It keeps me up all night; I get stuck on one bar and it just keeps cycling all night. The album is like interior brain music, even though it's quite aggressive. What's your impression?

It's a *Naked City*, film noir jazzy groove, and then the record explodes with Sheryl Crow's "Monkey Mind." How did that song come about?
I was explaining to her about the pounding in my head, and she said that's called "monkey mind." And she has it, too. She drove to the studio, sat out in her car for about an hour, and when she came in she had it. She sang it once, put the harmony on, and she was done.

Isn't this a rather breezy recording style?
If it is really good, you need the confidence to accept it and not work it fur-

Suspect: Mitchell Froom

Occupation: Composer, Producer, Arranger, Keyboardist

Ancestry: Romanian/Russian Jewish

Residence: New York, sometimes L.A.

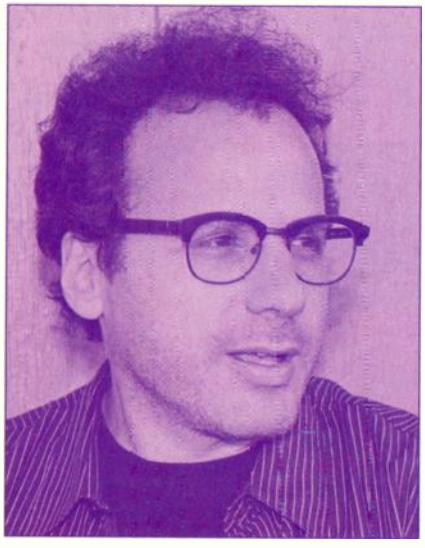
Spouse: Suzanne Vega

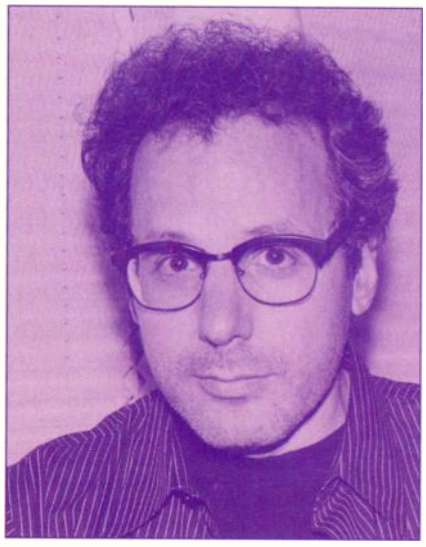
Vehicle: 1976 Cadillac Fleetwood. "This car is 29 feet long — largest American car ever made."

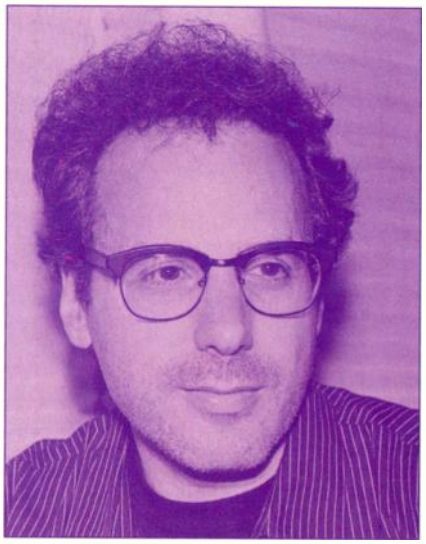
Diet: No meat

Peculiar Habits: Refuses to eat the last hors d'oeuvre

Notes: Froom and engineer/coproducer Tchad Blake are known for Los Lobos, Crowded House, Elvis Costello, Richard Thompson, Suzanne Vega, and Ron Sexsmith. Froom is currently coproducing with Bonnie Raitt her next album, and has co-penned/produced Sheryl Crow's theme song for the next James Bond film. He is one of the Latin Playboys and will release his first solo album, *Dopamine* on Geffen Records in early 1998, with vocalists David Hidalgo, M. Doughty, Lisa Germano, Suzanne Vega, Mark Eitzel, Sheryl Crow, Miho Hatori, Louie Perez, Jerry Stahl, and Ron Sexsmith.







PHOTOS BY MR. BONZAI

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a way to glorify themselves, or get in the way of the purity of where the music wants to go. If music is going to succeed it requires that you come to it with a very generous spirit and a humble attitude. If you get in the way, it's destroyed.

Can you imagine a world before recorded music?

Being able to hear music at any moment has had an adverse effect on the way that music is made now. It has to grab you by the throat and entertain every second. People often don't leave any real space in music, thinking they have to fill it all up to keep you interested. The result is just numbing.

If you could produce anyone in the world, who would it be?

If I hear someone who is really great, I don't want to suggest that I go in and change it.

How do your projects come about?

Most of the time an artist gets in touch with me — that's my favorite way. Sometimes an A&R person will play some of my work and the artist is interested. That's fine. But when it's just the record company's idea and you are faced with the artist, they look at you like you are almost part of the corporate structure. I don't like those situations.

Any tips about the music business?

When I decide to work on a record, it is made very clear that the artist, me, and Tchad make the record. We're not looking for anybody's advice. If you make that clear, then everyone is happier. If you look for advice, you're getting yourself in trouble. I have never had a good musical suggestion from anybody in a record company.

Do you know who you were in a past life?

That whole concept is one I despise, because people use it to glorify their present existence. They always think they were someone famous like Napoleon. Maybe I was the crack in somebody's ass, or the armpit of a monkey.

Are there any old sayings that give you inspiration?

Thelonius Monk once said to a sax player: "Make the drummer sound good." If everybody would just take that little bit of advice, music would be a million times better.

Do you identify with any animal?

The closest would be a bear. Hibernation. A bit gruff at times. I like the cave-like scenario and I like to get my back scratched.

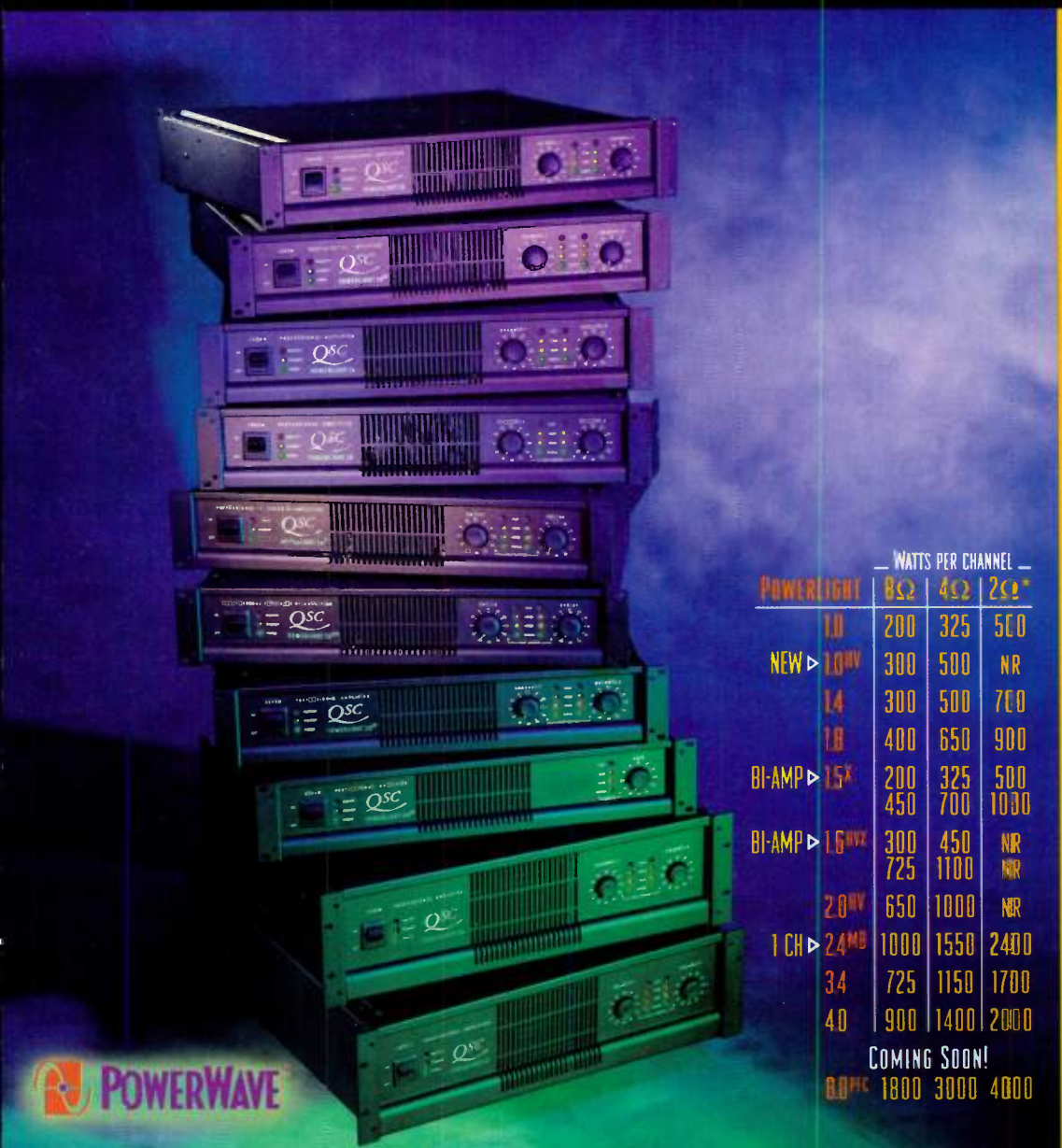
What's the biggest mistake of your life?

It depends on who you talk to.

Any advice for getting a start as a musician?

continued on page 151

10 POWERPOINTS, 1 COLOR.



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The Art of **Conversation**

How I used my project studio — and plenty of safety copies — to make my new album

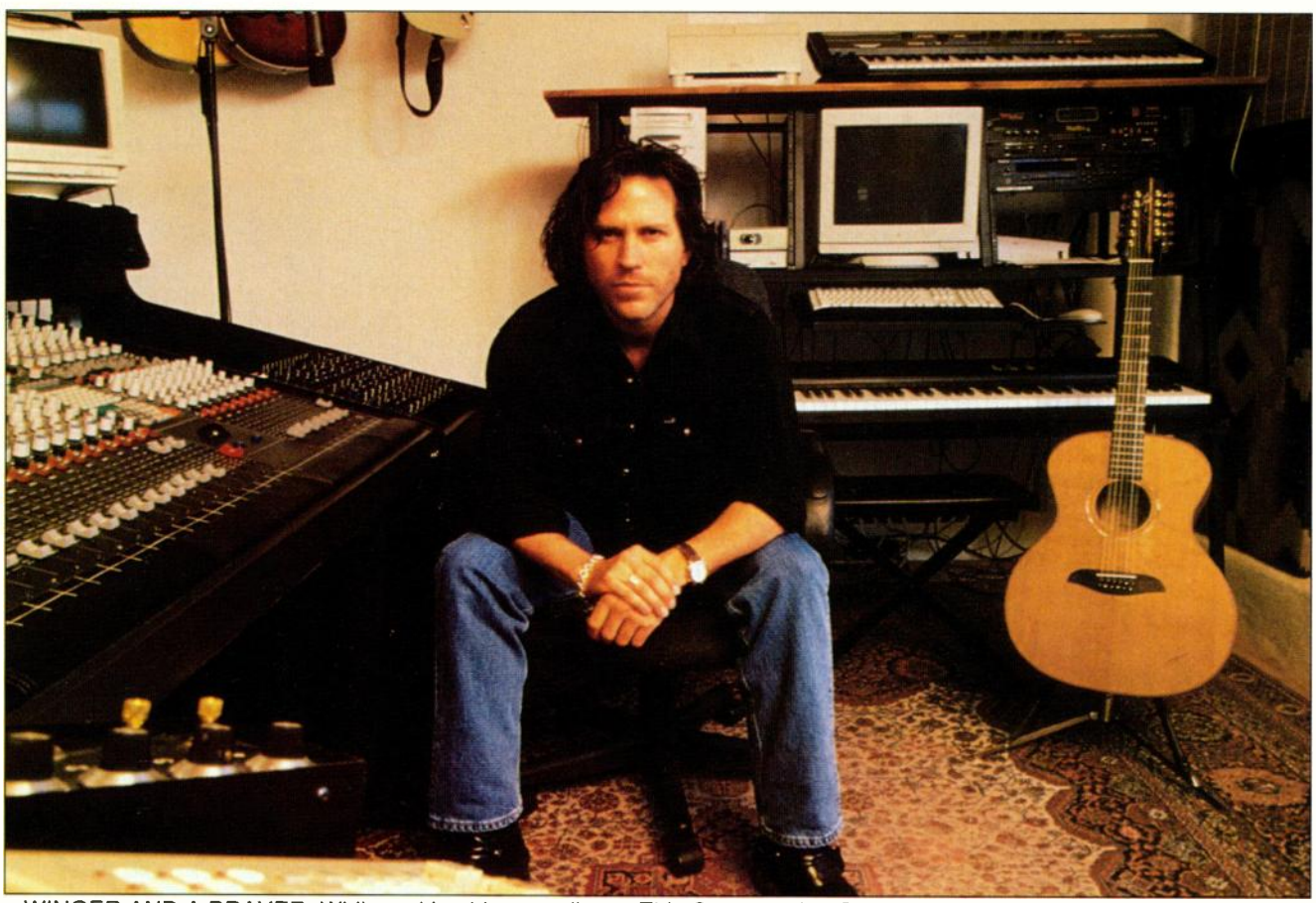
BY KIP WINGER

Before I go into the full production of my new album, *This Conversation Seems Like A Dream* (Domo Records, Inc.), there is one important idea that I would like to stress: It's no secret that making a record takes hours and hours in the studio, where invariably — at some point — something gets screwed up, usually within a matter of only minutes. That's why it's so important to make safety copies of the tapes. It doesn't take a lot of time to make a digital copy of a tape, and that small amount of time making the copy can save you hours of trying to re-create a part that accidentally got erased. And even if you redo the part, you're not getting the same inspired performance that you wanted to keep in the first place.

The whole idea of safeties really came from all the records I have made on analog tape. We'd have safeties of the drum tracks and do a lot of comping to slave reels. That kind of mentality trickled down to my project studio (Rising Sun Studios, Santa Fe, NM), and I used it when making my most recent record. I have four TASCAM DA-88's, and we were always comping and making safeties to avoid having any disasters during the recording process.

On a lot of the songs, we tracked drums first, with Rod (Morgenstein, drummer) playing to some kind of a rough demo of the song for reference. Sometimes the demo was a sequence in Emagic Logic (which runs on a Apple Power Mac 9500), but the sequenced parts would always get replaced with real players. We cut drums on 16 tracks (two DA-88 tapes) with separate tracks for kick, snare top and bottom, each tom, hihat, cymbals, and room mics. Kick and snare mics (AKG D12E and C-414, respectively) went through Neve 1066 preamps and then straight to tape, while the overhead mics (C-414's) went to Telefunken mic pres and then straight to tape. Room mics were Neumann U87's.

When we recorded the drums, the toms — miked with Shure SM57's — were gated to tape, which is something



PHOTOS BY WILLIAM HAMES

WINGER AND A PRAYER: While making his new album, *This Conversation Seems like a Dream,* Kip Winger increased his creative freedom by keeping plenty of safeties on hand — just in case.

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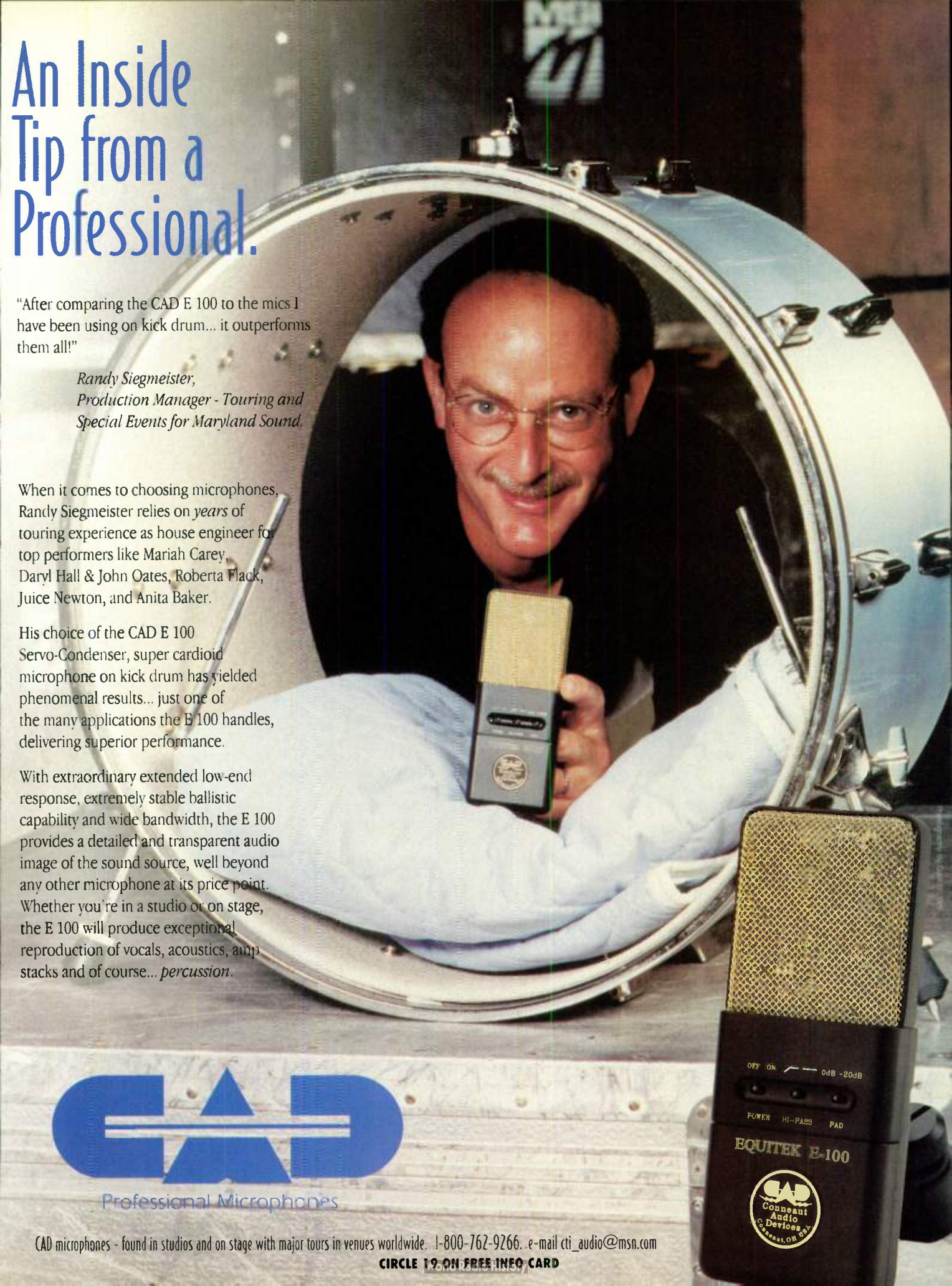

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that I wouldn't do again. You can hear the gates opening and closing, and since they were recorded that way, I was stuck with it. This could have been avoided by gating the toms in the mix.

The rest of the drum mics were connected to the mic inputs on my AMEK Einstein console. Just recently I've purchased a bunch of Neve 1272 modules, so on the next CD we can run all of the drum mics through outboard preamps to tape. The idea was to use my four machines for the tracking and overdubs, and then borrow another two DA-88's for the mixdown. During tracking I used the stock DA-88 A/D converters, though I'd like to try out some outboard converters for tracking. The mix was done through a pair of Prism Sound A/Ds.

Basically, the way it went was that we'd cut the drums and then submix them down to a stereo pair. That stereo pair was recorded onto a blank tape that became the foundation for a "working master" tape. The original drum tracks went up on the shelf until final mixdown, when we would have the extra machines and bring out the original tapes. Of course, we made digital safeties of the drum track tapes and the working master.

After the drums were down, the next instrument to be recorded would depend on the song. I like to build the elements of a song so that it can stand strongly on its own. It might be some chords and a scratch vocal, and then I can work everything around the vocal melody. Bass was usually the thing that came last — I'd put a scratch track down, go back and redo the bass after the entire song was recorded — an old trick that Paul McCartney used to do on the later, studio-heavy Beatle records (like on "With A Little Help From My Friends"). It allows you to get a better feel and to make the bass part speak more appropriately for the song.

Generally I like to cut bass from beginning to end of the song. I'll play through the song four or five times to get myself loosened up on the part and then start to cut section by section. I rarely cut two bass tracks unless I do some lick that is amazing and I don't want to forget it. In that case I'll go down on another track and try to incorporate the lick.

I gave all my basses a test run, but the Warwick and the Pedulla sounded the best. I plug into an SWR Redhead head, take the direct out and go to the line input of a Neve 1066. From the 1066, the signal goes to the input of a UREI 1176 limiter. To me the 1176 is the greatest compressor for bass because it has a very fast attack time and a sound that I really like. The output of the 1176 goes straight to DA-88. I also run the bass through an old Ampeg SVT for a dirty sound and mic it with a U87. This signal goes down to a separate track.

MORE THAN A FEELING: During recording, Winger went with what "felt right" more than perfection.

That chain turned out to be a formula for me. If you are looking for anything in the vicinity of good sound, you need a really good preamp, preferably class A. In my opinion it would be better to come out of your bass head and literally go right to the tape machine than to go through a cheap mic pre because you end up losing too much. One good pair of preamps is the best investment that anybody can make.

While tracking, I used two pairs of speakers: Genelec 1031A's and Yamaha NS10M's. I would compare the sound of the instrument between the two pairs. I'd play an instrument and continually tweak the sound until it was identical between the two speakers — which was really hard, especially for bass. There's a lot of bass buildup in the Genelec's and when I would go to the NS10M's, they would totally woof out. When I got the sounds to exactly match, then I knew I was really there; everything came into focus. It was a three-day exercise but I did it.

Mike Shipley mixed the record and turned me on to an interesting point about the NS10M's. There are two different tweeters available for the speaker: the older one, which has sort of a concave shape, and the newer one that kind of sticks out from the cabinet a bit. Everybody used to put a tissue over the old tweeter, and when Yamaha came out with the new one, they tried to simulate that effect, but I don't think it sounds the same. The old tweeters sound much better, and that's the key to getting the honk out of the NS10M's. Yamaha still sells the old tweeter, so we ordered a pair, put them in, and it made all the difference in the world.

We used a similar approach when it came to recording guitars. With the working master in machine #1 — which had drums, scratch vocal and bass, and maybe some guitar chords — we loaded blank tapes into machines #2 and #3. Basically, I'd tell Andy (Timmons, guitarist), "Here is a song in A. I don't want to tell you what to do, but just jam with this wah-wah pedal from beginning to

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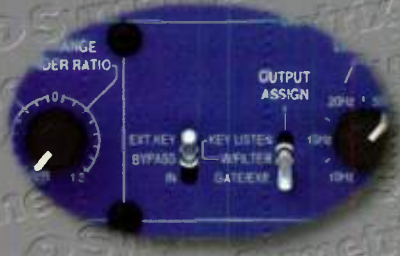

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end and give me anything you've got." He'd inevitably jam with the tracks and sink into a groove on some parts. I can grab those and sample or loop them or whatever. But, ultimately, it's those inspired parts that I'll use. Rather than sit around, try to work out a part, and get all freaked out about the commerciality of it and all that crap — I kind of blow all that off in favor of the feel.

We would record 16 tracks of Andy jamming with the tune. It's hard work to sift through 16 tracks of guitar. You have to really know what you're looking for and drink a lot of coffee! I do take notes on each track, but I also have a photographic memory for music, so it's a little easier for me — I can take mental notes on certain things. From those 16 tracks, I'd comp down the parts I want to keep and then make a safety of the comp. If anything happens to the comp, I have a backup. Or if I find that I don't like a certain section, I can go back to the original tracks to find other parts because the original two tapes of guitar parts are still sitting on the shelf.

Of course, nowadays you could put [it] into a hard-disk recorder, cut it up, turn it backwards, and all kinds of weird shit. I didn't do any of that on *Conversation*. But I am now using Emagic's AudioWerks, which is an amazing 24-track hard-disk recorder. It's similar to Pro Tools, but it is not as deep, which is fine because I don't want it to be — I don't use it for master recording. I just use it to load stuff in, cut it up, and dump it back to tape.

Background vocal overdubs proceeded in a similar manner. On some of the songs, vocals stacks went as deep as 24 tracks. I'd load up three blank tapes and have the working master in the other machine. All of the vocals on the record were recorded using a U87 into the Neve 1066, through the UREI 1176, and then to tape. I did sample some background parts and flew them in here and there, but mostly — even when it came to my background parts — I would sing from beginning to end. I don't like the same backgrounds on every chorus.

[Mixing] is almost like impressionistic painting where you suggest an image instead of showing it clearly.

After I was done recording the parts, I'd comp, bounce them down to stereo, and then make a safety. During mixdown, if I found that I had misjudged the vocal comp (maybe the comp was a little too heavy on the low vocals), I could just go back and recomp the parts because the original tracks were still available.

Mike and I mixed the record on my AMEK Einstein with Supertrue automation and monitored through the NS10M's and a pair of ProAc's. We had six DA-88's going, and we rented a couple of pieces of outboard gear such as a Lexicon LXP-15 and a couple of Yamaha SPX90's. We also had a couple of PreSonus ACP-8 eight-channel compressor/gates for the mix. The mixes went through the Prism converters down to Panasonic SV-3700 and TAS-

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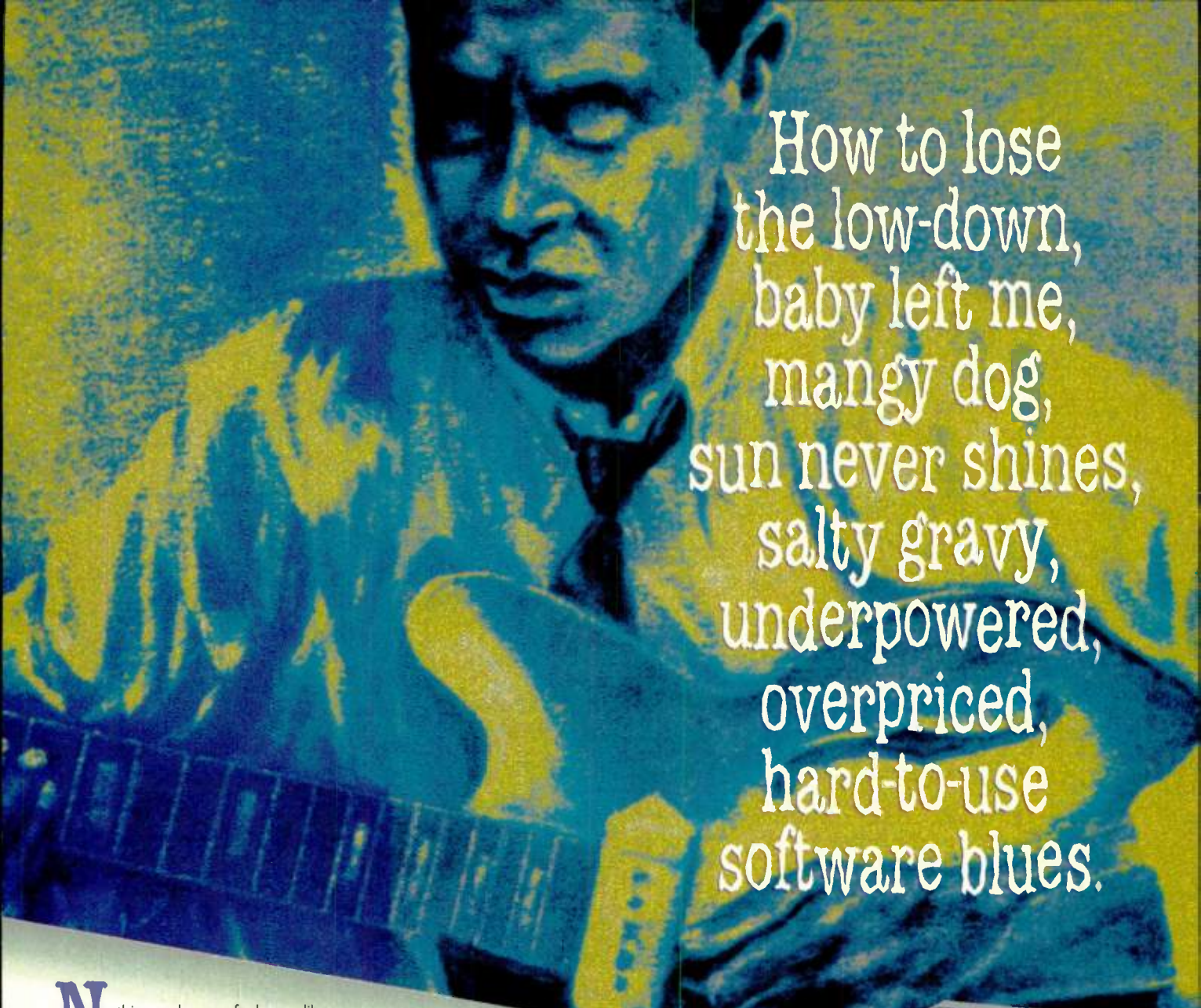
On a few of the songs we used a sampled snare that we took from a CD-ROM called *Drum Tools*. We sampled the snare into an Eventide DSP4000 and then triggered it from the original snare. The Eventide was the fastest sampler we could find, and it was 4 milliseconds late. The sample came out of the DSP in stereo and we recorded it onto blank tracks. Then, once it was recorded, we used the track shift on the DA-88 to place it on-time.

I learned some interesting things from Mike about what really matters in the mix. For example, you want a vocal sound to be rich and carry into the listener's soul. But you don't want, say, a mandolin to come across like that. It should be a little sauce, stinging through the mix. Sometimes we'd solo an instrument and the EQ would sound like crap. But if Mike was trying to fit a part in, he'd EQ it to the frequencies that no other instrument was using so that it came through. It's almost like impressionistic painting where you suggest an image instead of showing it clearly.

If you have a mandolin, it doesn't matter what kind of mic you're using as long as you get the certain frequencies that register in someone's head as, "OK, that's a mandolin." You don't necessarily need to go for super-hi-fi quality. It just needs to be a mandolin, and it needs to be sitting in the mix somewhere. For example, take Queen's "We Will Rock You"; you think it's a kick drum, but it's not — it's a hundred people stomping their feet on the floor. But the sensation the listener gets is that it's a kick. I'm really into that kind of recording and I'll go out of my way to try and create things like that. It ends up adding a bit of surrealism and leaves a deeper impression. The lingering image is what matters. Think about how your favorite records sound in your mind. You're thinking, "Oh yeah, that was awesome. I have to go back and listen to it." It won't be what you remembered. You'll go back to hear it and the snare will be really wimpy or something. But there's a lasting impression in your mind, which means that you identify with a sound. And that's really what counts. EQ

KIP SERVICE: Winger's project studio allowed for plenty of experimentation during songwriting and recording.



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The Basics of Digital Audio

Understanding the nuts and bolts of zeros and ones makes it easier to work in the digital domain

BY DAVID MILES HUBER

If we understand the basics of how something works, we'll have a better insight for applying it to our everyday working lives. In light of this, perhaps we should from time-to-time check how the innards of some of our toys work. Let's start with a biggie: digital audio.

Digital audio theory isn't difficult to understand. At its most basic level, it is a means of encoding data through the use of the binary number system. Just as humans communicate by combining any of 26 letters together into groups known as words and by manipulating numbers using the decimal (base10) system, the medium of choice for a digital device is the binary (base2) system. The binary system provides a fast and efficient means for manipulating and storing digital data. By translating the alphabet, base10 numbers, or other information types into binary form (represented as on/off, voltage/no voltage, magnetic flux/no flux, or logical 1 and 0 conditions), a digital device can perform calculations and tasks that might otherwise be cumbersome, less cost-effective, or downright impossible to perform in the analog domain. After a task has been performed, the results can be changed back into a representative form that we humans can readily understand. See fig. 1.

Before moving on, let's take another look at this concept. If you were to type the letters C, A, and T into a word processor, the computer would translate your keystrokes into a series of 8-bit digital words that would be represented as "0100 0011," "0100 0001," and "0101 0100." These "alpha-BITS" don't have much meaning when examined individually. However, when placed together into a group, they represent a four-legged animal that's either seldom around or always under foot. When these overall word groupings are pieced together so that they flow in a logical manner, a meaningful message is conveyed. Similarly, a digital audio system works by sampling (measuring the instantaneous voltages of) an analog signal and converting these samples into a series of digitally encoded words. Upon reproduction, this stream of words is converted back into a series of voltages that represent the original analog signal.

SAMPLING

Just as the two most basic characteristics of sound are frequency (the component of time) and amplitude (the overall component of signal level); digital audio can similarly be broken down into two analogous components: sampling (time) and quantization (level).

Analog recording technology implies the recording, storage, and reproduction of changes in signal level that are continuous in nature. The digital recording process, on the other hand, doesn't operate in a continuous manner. Rather, digital recording takes periodic samples of a changing audio waveform and transforms these sampled signal levels into a representative stream of binary words that can be manipulated or stored for later reproduction.

Within a digital audio system, the sampling rate is defined as the number of measurements (samples) that are taken of an analog signal in one second. Its reciprocal, sampling time, is the elapsed time between each sampling. For example, a sample rate of 48 kHz corresponds to a sample time of 1/48,000th second. Because sampling is tied directly to the component of time, the sampling rate of a system determines its overall bandwidth, with higher sampling rates yielding an increased upper-frequency limit.

During the sampling process, an incoming analog signal is sampled at discrete time intervals (determined by the sample rate). At each interval, this analog signal is momentarily "held" for observation and therefore represents a specific, measurable voltage level. During this "sample-and-hold" period, a mathematical conversion process is used to generate a digital word of n-bits that represents this signal level as closely as possible at that instant in time. After this conversion has been made, this digital word may be processed or

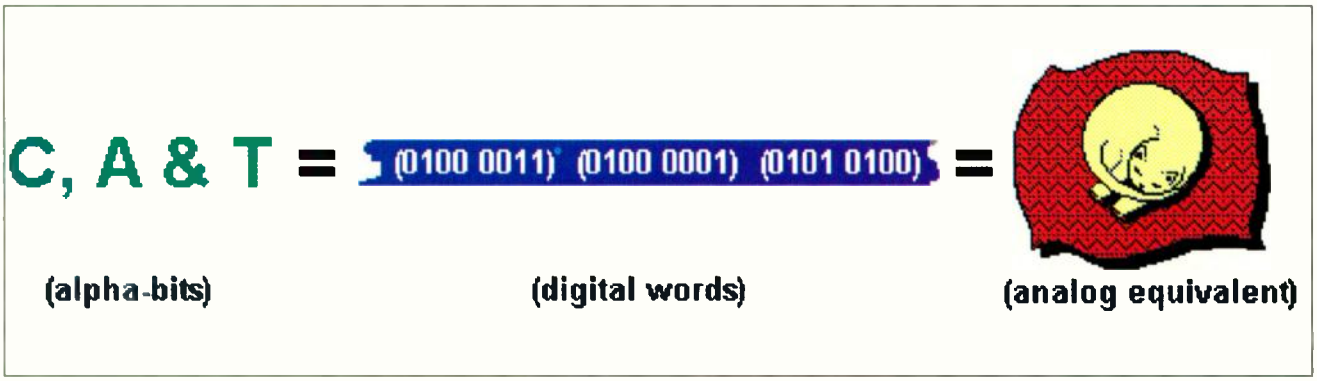

FIGURE 1

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CIRCLE 34 ON FREE INFO CARD

Getting the Most From the drumKAT

Used properly, this innovative product can add significantly to your tracks

BY TIM TULLY

Creating live-sounding drum parts with MIDI instruments is tough. Neither stepping the part in with the computer nor banging it out on a keyboard cuts it for either drummers or nondrummers. The most popular solution for several years was the drumKAT, an effective alternate controller from a company that eventually went out of business.

Now E-mu Systems is marketing new versions of KAT products, including the drumKAT and its little brother, the DK10. Both devices can help make better MIDI drum parts, but are deep enough to require some exploration, especially concerning connections and programming.

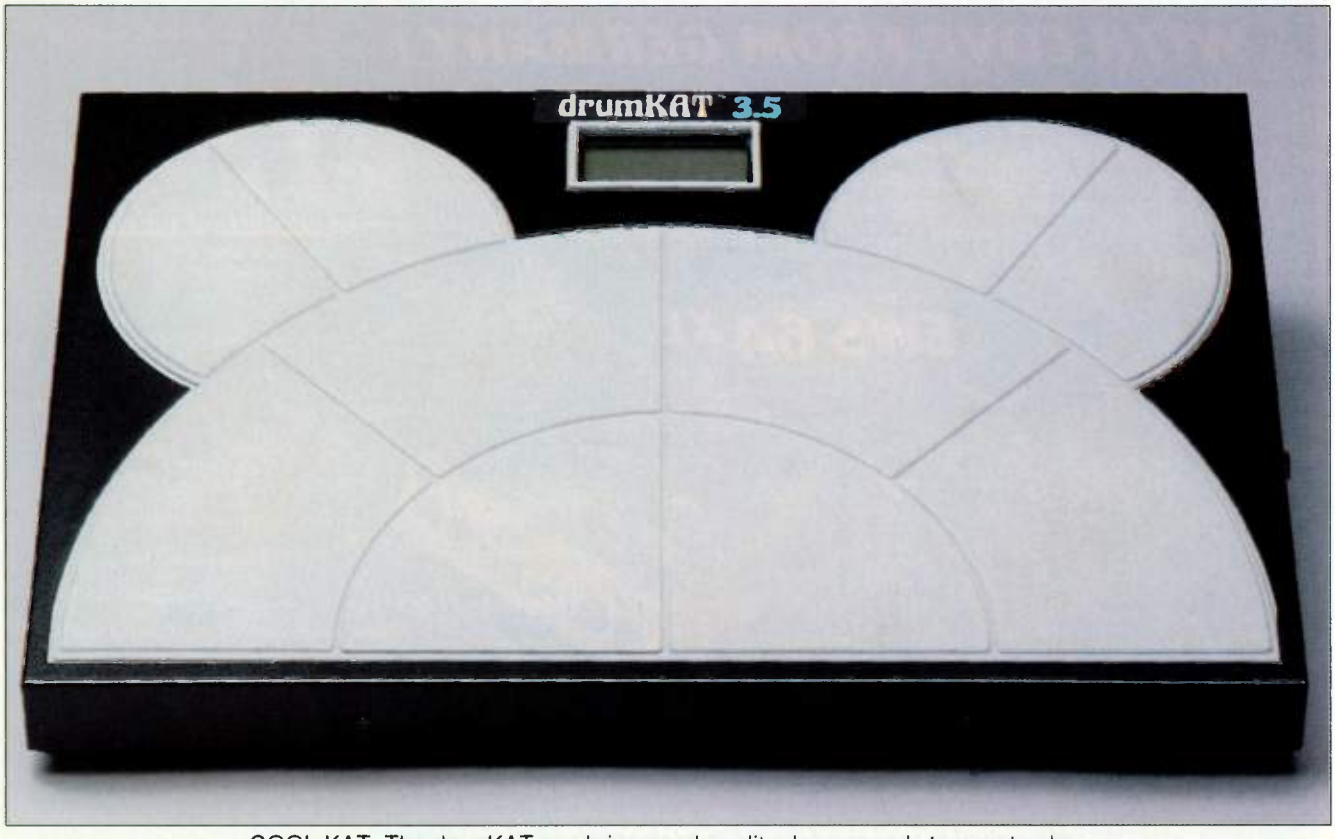
TOP HAT

Two great KAT options are the H.A.T.pedal and F.A.T.pedal. The H.A.T.pedal in particular gives you amazing control over hihat playing, but setting it up can be tricky and documentation is slim.

The drumKAT has three hihat modes that determine how it responds to the H.A.T.pedal, and they can be confusing. The "normal hihat mode" works with a simple momentary footswitch, giving you one open and two closed sounds. Plugging the H.A.T.pedal into a footswitch jack can do this, but underutilizes the H.A.T.'s potential.

"Controller 04" mode adds more functionality, but only with a sound module whose timbre changes when it receives different MIDI controller 04 values. Pushing the pedal down sends a stream of controller 04 values that increase as the pedal goes further down. However, the only devices that respond appropriately to controller 04 are the Roland TD5 and TD7. (The E-mu Procussion does this with controller 01, to which you can map the pedal's 04 values in a sequencer.)

The most useful mode, especially if you're using a synth or sampler with the H.A.T.pedal, is the HATNOTE mode. Connect the H.A.T.pedal's CNTL output to the side jack of the KAT. This way, as you push the pedal down, it sends a continuously varying voltage to the KAT. You can program any pad on the KAT to be controlled by the pedal and assign up to eight sounds to that pad. (The manual explains how to do this.) When you hit that pad, it will play one of those sounds, depending on the pedal's position when you hit the pad. Players typically use hat sounds sam-



COOL KAT: The drumKAT can bring good-quality drum sounds to your tracks. This article tells you how to use it most effectively.

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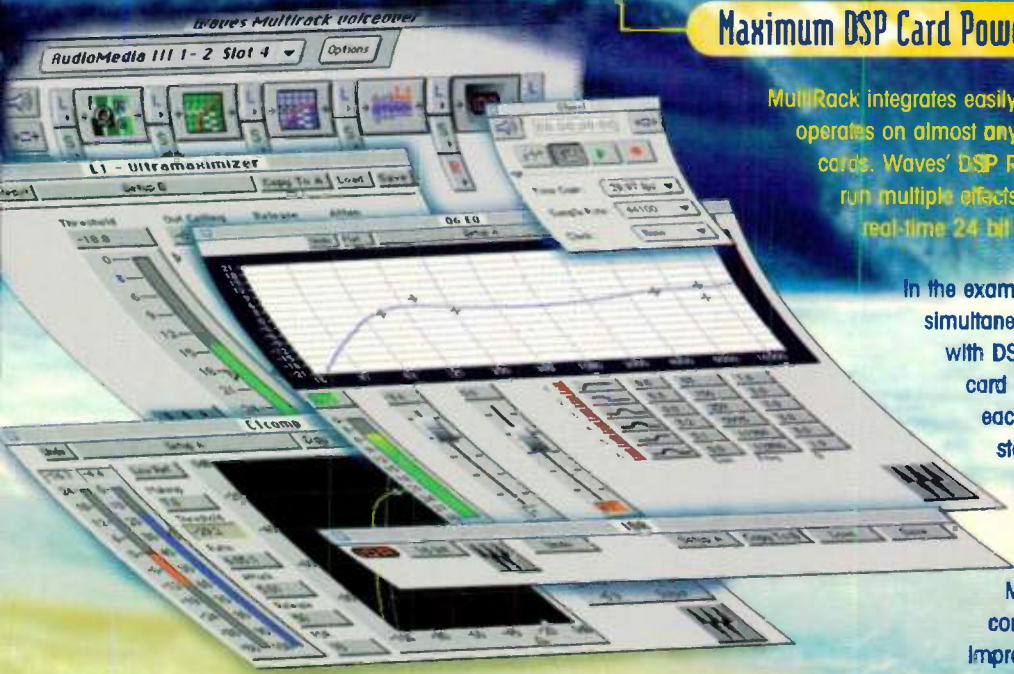

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pled at different stages of openness, but if you're using a sampler, you can assign any sounds you'd like.

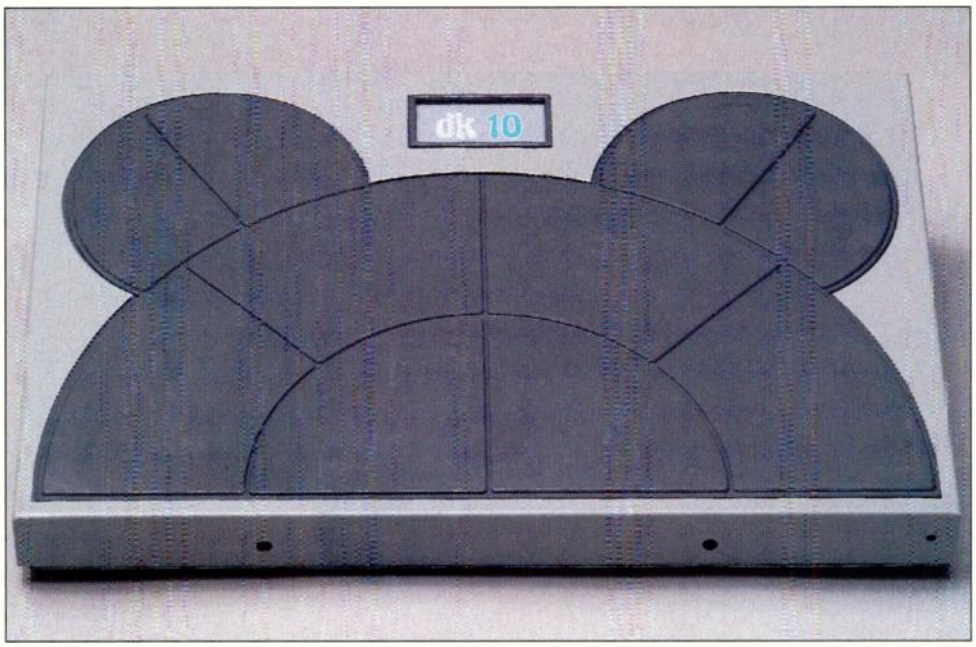
A couple of caveats about using the hat pedal in HAT-NOTE mode: Make sure the pedal is not sending out gobs of controller data whenever you move it — especially if you're using the KAT with a sequencer, as this can clog things up. Go to Kit edit screen 8 (ftcntrl) and make sure the second line reads: "pressure Nch01."

The channel number at the end is unimportant in HAT-NOTE mode, but there must be an "N" (not a "B," "R," or "L") before the "ch." This means no controller information is sent when you press the pedal, a function normally useful only in controller 04 mode.

The other potential gotcha is the gate time on the hihat pad. If this is not set to Off, any open sounds you play on the hat pad will not stop when you close the pedal, as they would with a real hihat, but will continue to ring. You can set any gate time you want (the gate time is the same for all sounds assigned to the hat pad). But it's probably best to set a nice long value to be sure none of your sounds are cut off when they should sustain. This way, if you just hit the pad once, the note sustains for the duration of the programmed gate time. But if you hit the pad a second time before the gate time elapses, it sends a note-off before it fires the new note, cutting off any of the eight notes assigned as open sounds.

The second way this pedal works is as a velocity-sensitive note generator. When you push the pedal all the way to the bottom, it sends a MIDI note-on that can play yet another sound, usually a "chick" or closed hat sound. The faster you push the pedal down, the louder the note.

In addition to its CNTL output, the pedal has two other outputs. Connecting the "TRIG" out to one of the KAT's Trigger inputs turns the pedal into just a velocity-sensitive trigger (like E-mu's F.A.T.pedal bass drum pedal). The FTSW output is for connecting to drum machines (like the Alesis D4 or DM5) that have no continuous controller input for their hihat. The pedal here works like a simple momentary footswitch.



SWINGIN' PAD: Both the drumKAT's and dk10's pads are arranged in an easy-to-use pattern.

One of the few shortcomings of the KAT is that it has no way to automatically stop an open hat sound when you close the H.A.T.pedal. This function has to be set up in the sound module, generally by putting the open and "chick" sounds in a monophonic group.

DYNAMICS

The KAT gives superb dynamic control, but only if the three pertinent settings (MIDI velocity range, pad/controller dynamic range, and threshold) are optimized for your playing style.

Velocity range: Every hit on the KAT generates a MIDI note-on message with a velocity value from 0–127, depending on how hard you hit the pad. If you set a pad's velocity range "wide open" (0–127), your lightest hits will send an 01 and your hardest hits an 127. Keyboard players usually like a wide dynamic range for maximum expressiveness, but a drummer may want some help in preventing some hits from being too quiet. The KAT provides a kind of "dynamics compression" by guaranteeing a certain minimum velocity for each pad. For example, setting the kick for a minimum velocity of 42 means any velocity messages softer than that are converted to 42. A maximum velocity of 100 means that even if you bash the thing with a hammer, the velocity value won't exceed 100.

Dynamic Range: You can "train" a pad's dynamic range by giving the KAT your hardest and softest typical hits. This automatically creates high and low settings that are meant to define the range of your personal touch and pro-

DRUMKAT VS. THE DK10

Both the drumKAT and DK10 have the familiar "mouse-ears" pad arrangement, housed in the same road-durable steel chassis, and pads with a reliable, responsive feel. But the DK10 can play only one sound per pad (except for a pad designated as a hihat pad, which can play one sound when a connected hihat pedal is open, another when it's closed), and it has only four footswitch jacks and two MIDI ports.

The drumKAT is another story. With the new version 3.5 software (installable on any version of the drumKAT), each pad can play up to four individual sounds, controllable by various factors. It has nine trigger ins, four footswitch ins, a hihat pedal in, two MIDI ins, and four MIDI outs. Options include the H.A.T.pedal and the F.A.T.pedal, a pair of durable pedals that connect to either KAT for realistic hat and kick playing.

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BUTCH VIG

After solidly establishing himself as one of the most influential producer/engineers in alternative rock (Nirvana's Nevermind, *Smashing Pumpkins'* Siamese Dream), *Butch Vig jumped into the spotlight himself when he formed the band Garbage. With a platinum album and major tour under their belts, Vig — along with bandmates Steve Marker (guitar, bass), Shirley Manson (vocals, guitar), and Duke Erikson (guitar, bass and keys) — are currently recording their second effort. Butch took time out to talk with* EQ *about their recording process.*

EQ: Where are you recording the new Garbage album?

Butch Vig: We're working in Madison, WI at our studio, Smart Studios.

What kind of setup do you have there?

It's two rooms. There is a tracking room downstairs with a Trident 80C console, a Studer A827, and a lot of old tube stuff. It's set up from years ago when Steve and I did a lot of punk records, so we have old guitar amps and analog gear. Upstairs we have another room primarily designed as a mix room, with two Harrison 32-channel boards that have been linked together and fitted with Uptown moving faders. When we started this record, we bought a 48-track Digidesign Pro Tools system with Apogee AD-1000 converters that we basically use for editing and sound processing. We dump everything back to analog tape eventually.

Do you track on the Studer, edit on Pro Tools, and then bounce back to 2-inch?

Every song has been different. When we're cutting live instruments on some songs — like live drums — we track on the Studer. If we're working on some kind of noise loop, we might record directly into Pro Tools because more often than not we end up processing quite a bit.

What kind of processing are you doing in Pro Tools?

We have a lot of plug-ins that Digidesign has been kind enough to let us beta-test. There are a couple of new programs that act like ring modulators, weird digital filters, or new overdrive and distortion boxes. We'll insert an Eventide DSP4000 into the chain or run an output from Pro Tools through analog guitar pedals and run that back to another track in Pro Tools. We're not concerned with whether a signal stays digital or analog. We'll go back and forth to experiment as long as it sounds cool.

And you're using the analog guitar pedals for more than just guitar-type sounds...

We run drums through them, bass, Shirley's vocals. Our main engineer and guitar tech Billy Bush started collecting them while we were on the road last year. Plus Duke and Steve had a pretty big supply of old funky pedals. They all have their own character to them and in some ways sound better than the digital stuff. Steve has also been using an old rack-mount Oberheim synth module that accepts external audio. He's been playing guitar through it and has been getting some very bizarre sounds, kind of like a mix between a guitar and a synthesizer.

When you're tracking a lot of guitars or drums — especially when you are doing a dense mix — tubes seem to be sonically more forgiving while still keeping the sound intense and in your face. To my ears, it sounds better. To me, everything sounds better when you go back to analog.

When you go back to analog tape, do you print hot?

Yes, to get some additional tape compression and just to keep the S/N high.

Do you think that adds to the density factor? It sounds like some of the mixes on the first Garbage record are quite dense.

It's that, but the songs also have tons of drums loops that have been submixed to mono or stereo. Some of the songs probably have eight to ten drum tracks going at any particular moment. I'd have a drum track that originally might have been kick, snare, toms, ambient mics, and cymbals. I'd submix it all, and if I decided it was taking up too much space sonically, I'd mix them down to mono and pan the mono track all the way left, for example.

Were those loops played or sampled and programmed?

It's a combination. We might use a certain segment of something I played, but if I don't like the bottom end, I'll just keep the hihat, snare, and overhead mics, and then program kicks. Or I'll find another loop from somewhere else and put that underneath. Some of the drums on the last record aren't even drums — they are just noises that we would run through some kind of guitar effect or a Tech 21 SansAmp. Or we'd overload a preamp, noise gate it, and trigger it from the acoustic sound. We did that with a lot of the noise tracks.

Do the noise elements start as real instruments or just completely bizarre sounds that you have warped and twisted into using percussively?

Both. As an example, take "Stupid Girl," which started in Steve's basement. We had an Akai S1000 there and an ADAT. Steve came up with the Clash sample from "Train In Vain" and started playing a bass line over it. While Steve was playing bass, I was manipulating the sampler and Duke was playing some of the ringy guitar riffs at the start of the song. Shirley was ad-libbing the vocals. I'm not sure what happened, but Steve tried to bounce something on the ADAT and started get-

PHOTOS BY CHARLIE HOSELTON/SHOT IN THE DARK

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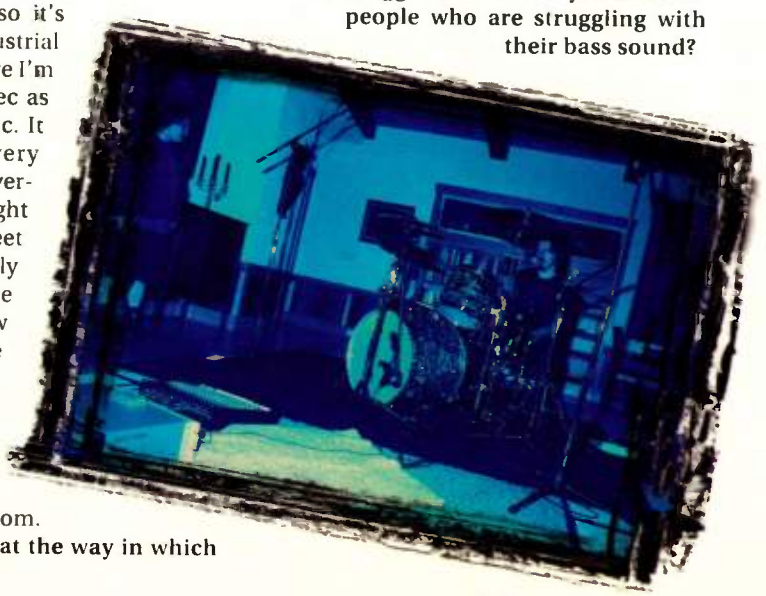
BUTCH VIG

pler. I'll put one mic on the kick and one on the snare. A lot of times I don't even mic the toms, and I might put up a pair of overheads or I'll use an ambient mic on the drums.

I try to get more of an overall sound versus an individual sound. I think that's because on the last record I moved away from having all of the drums individually tracked — it wasn't as important to me to have a snare on a separate track. I'm more interested in the sound of the kit or the performance, and I want the ability to add another eight tracks to that. On this record I have been using a Calrec Soundfield mic, which is an amazing stereo mic. A lot of times it's just kick and snare mics, and the Calrec is the predominant sound of the drums.

Where do you place it?

It depends on the song. The tracking room at Smart is fairly tight, so I'll just put it ten feet away, aimed at the drums, and then dial in a pattern in to make it wider or tighter, depending on how loud or soft the cymbals are. For some of the songs we have been recording on location at an old warehouse on the east side, not too far from the studio. It used to be called the Madison Candy Company. It's vacant at the moment, so it's just a raw industrial space, and there I'm using the Calrec as an ambient mic. It might be very close, like an overhead or it might be 30 to 40 feet away, especially on some of the quieter, slow songs where there's a lot of space. We can really open the mic up and use the sound of the room.



Do you find that the way in which you apply compression to that microphone is crucial to the balance between the cymbals and the toms?

It is actually. I have been using Geoff Daking's stereo compressor. I also bought a pair of his preamps a couple of years ago that I like a lot. The compressor is great because it has variable attack and release and is very transparent. You can kind of duplicate some of the old Fairchild or Neve sounds. A lot of times by tweaking that around in the song you can really make the toms speak or make the kick and snare pump down the rest of the kit. It depends upon the style of the playing. It has worked very well so far.

How do you go about recording guitars?

Usually Duke or Steve will plug into an amp to get a basic sound without processing at first. Then they'll start chaining things up, whether it's an analog fuzz pedal or bringing the mic up on the board and running it to a Space Echo or a '4000. Sometimes they'll plug in effect pedals before the amp. I usually use one mic on the amp.

I'm not a big fan of multimiking techniques for guitar amps, though there are a couple of songs that we have done that on. Typically we'll set up three or four microphones, listen to them, and pick the best one. Sometimes when it sounds good but it's not quite there, we'll just move the mic around so it sounds better. We usually put up a 57, 421 and a FET 47, which has a thick midrange. Occasionally I might use a (AKG) 414 or 451. We also have used the Calrec about two or three feet away for a stereo thing, but that's more for acoustic guitar or clean rhythm tracks.

What suggestions would you make to people who are struggling with their bass sound?

the guitar. Hopefully it all fits together and makes some kind of sense as a song! We felt at some points that we were in danger of overproducing the record to a certain extent, but we decided to err on the side of going too far with it. Luckily, Shirley's voice allowed us to really overdo it in spots and try to push it sonically as far as we could.

How do you manage to keep Shirley's voice front and center with all of that stuff going on?

Number one, she has a great voice and a lot of persona. When I was doing Freedy Johnston's record a couple years ago, I bought a 1957 (Telefunken) ELA M 250, which is an amazing microphone. It has a lot of high-end presence that comes from tube saturation. Sometimes I run that through a Summit preamp, but I have a tendency to use my API Lunch Box with the 512b mic pre. I've had that for a while and dragged it around while I made *Nevermind* and *Siamese Dream*. I know I can set those up and get a clean path to tape. My favorite vocal compressor is the Summit TLA-100 because you can kick the vocal down like, 10 dB, and it still seems fairly transparent. It really allows the dynamics of Shirley's voice to move around within the track, but yet it still stays in your face. If the songs got too noisy or too busy in the mix, it was a conscious decision to pull things out so Shirley could be front and center.

How do you record drums?

I used to get very meticulous with a lot of the rock records I made. I'd put a couple of mics in the kick, like a Sennhesier 421 in tight and (Neumann) FET U47 ambient, a Shure SM57 and AKG C451 on the top and bottom of the snare, top and bottom mics on the toms, close and ambient mics like U87's on the cymbals...Now it's much sim-

Bass is hard to record. And in the mixing process you're still tweaking it so that it sits in the track where it needs to. That's not easy. Depending on what you're adding or subtracting in the bottom end — especially if you have a lot of drum loops going — it can get very muddy. We tend to use an Ampeg SVT amp, which I think helps. For mics, it's usually either a (AKG) D12E, a FET 47, or 421, and I also like to use the original SansAmp. It has a little more character than a DI. I'll run that to a separate track and tweak it up for a bit of overdrive. I had it modified so that I can run a line from the bass to the SansAmp and also out to an amp without loading down the pickups or the amp. I'll use the amp as 60 to 70 percent of the sound and bring in a little bit of the SansAmp to fill in a certain frequency range.

Do you compress bass much when you record?

I usually compress the bass pretty heavy when it's going down so that it kicks down three to five dB and evens out the bottom end. If it's a slower track and there's a lot of space or the notes are held long, I might use an LA2A or the Summit compressor. If it is a faster tempo, then I might use a dbx 160 or a UREI 1176. Sometimes you need a compressor with a really quick attack and a quick release. The Daking compressor works well on bass, too. We used that on one of the new songs and it seemed to really keep the bass even.

Do you ever run the bass directly through the compressor?

On one track we used the new Summit MPC-100A compressor/preamp. You can plug straight in and use the drive control to saturate the bass. We also used it on a couple of drum loops. It can thicken up the sound and has a lot of variables.

What can we expect from the next Garbage record?

Some of the songs sound similar to the last album and some sound fairly different in terms of how we have approached the rhythm tracks and the arrangements — they're not quite as much pop arrangements. Shirley is trying a lot more things vocally. After touring all year and making the last record, she now has a wider range to her approach in singing. When it's all said and done — whether the songs are minimal and organic or dense and saturated — her voice will be front and center. This record will make sense to anybody who is a Garbage fan. We hope! EQ

Project Post Quarter

Okay, you bought all that gear to be a rock 'n' roll star. Sure, we all did. But reality sinks in (sooner or later) — you gotta eat or, more importantly, you gotta buy more gear. So you check out this thing called audio for video and it's kinda cool. Scoring for commercials, TV or Hollywood, not to mention all that game and multi-media business that's floating around. Welcome to the world of Project Post.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Let Me Jump In Your Game

Audio for video games offers unparalleled opportunity for the project studio

BY SIMON AMARASINGHAM

In 1996, American consumers spent approximately $7.7 billion on interactive entertainment and edutainment titles. The game industry is big business. More importantly, perhaps, is that it needs sound and music, most of which is recorded in project studios — so the "games game" just might be in your future.

Unlike the film industry, there are no set working methods. With games, programmers are constantly updating their *engines* (parts of the program that run a particular game element, such as a graphics engine or sound engine) to bring players more impressive graphics, gameplay, and, of course, sound. At the start of each project, even the way the audio material plays back is up for possible redesign. Consequently, different people use different approaches; so to balance out my own experiences, several other game composers provided many valuable insights. (See the sidebar for their bios and some words of wisdom.)

SOUND PLAYBACK

A game program can play back audio in various ways. With General MIDI music (for PC games), standard MIDI files trigger sounds from the PC's sound card. This restricts the composer to the GM instrument set and to the PC's sound card quality. While MIDI files take up little storage space, digital audio recordings provide more creative control.

CD-ROM titles can be "dual format," with program data on the first track (e.g., the game installation program) and Red Book audio for the remaining tracks. During gameplay, the program data resides in RAM and/or on a hard drive, so the CD-ROM can serve as a CD player for music playback.

Red Book guarantees 16-bit, 44.1 kHz, stereo sound, but allows limited control over the music. Also, this is no good for sound effects, where many need to be played back at once, synchronized accurately with action on the screen. The solution is generally to store the audio material as data (e.g., WAV files) and use an audio engine to control playback.

In any event, much of what happens to your audio material is in the hands of the game's programmers, and part of the gig is about communicating with them.

DIRECT SOUND: AN AUDIO ENGINE

Microsoft's Direct Sound is a Windows sound engine. It can play multiple WAV files simultaneously, mix them in real time, and output via a sound card. The files do not have to be the same format; for example, sample rates and number of bits can vary. Also, the output format is adjustable independent of the original file formats. Therefore audio can play back at 8-bit, 22 kHz, mono for slower computers, or 16-bit, 44.1 kHz, stereo for faster machines.

Each WAV file's pan, level, and pitch are editable in real time, and a loop mode can be turned on or off. So music tracks can fade in and out, have multiple sound effects (each with panning and volume altered according to the on-screen action), as well as, for example, some Doppler effects (which involve pitch changes) for objects moving quickly "past" the player.

SAVING SPACE WITH SOUND FONTS

When Barry Blum created the audio material for the Nintendo 64 game Robotech, he fit it into approximately 1.8 MB by using sound fonts. Sound fonts are a collection of samples with specif-

MUSIC FOR GAMES...AND BEYOND: The music from Sega's Fighter's MegaMiix game can now be heard in dance clubs, and has been released as a single.

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ic MIDI note, bank, and patch number assignments. The game program can play the samples by sending the appropriate MIDI information, as contained in a Standard MIDI File.

In this situation, the data handed to the game's programmers includes the MIDI files, which require little space, and the individual samples, which, with good design, should take up much less space than recording pieces of music straight through.

AUDIO FORMATS

When audio files are not going to play back as Red Book audio, the programmers will usually specify a total amount of space available for audio data, which is never enough! Therefore, it's crucial to reduce space requirements, yet retain decent quality. For uncompressed formats (e.g., WAV, AIFF, etc.), this means lowering the bit depths and sample rates. Note that halving the sample rate (e.g., 44.1 kHz to 22 kHz) will sound better than halving the bit depth (e.g., 16-bit to 8-bit), although they will both be the same size. A mono file will be half the size of its stereo counterpart.

While bit depths are generally either 8 or 16, sample rates vary wildly. For sound FX, Bobby Prince uses anywhere from 5 kHz, 8-bit mono to 22 kHz, 16-bit stereo; for music, the minimum he uses is 22 kHz, 16-bit mono.

File type is also an issue. Formats such as WAV, AIFF, SND, AU, etc., are uncompressed formats, whereas ADPCM, MPEG, etc., use data compression schemes to reduce the amount of storage space required, while hopefully retaining acceptable audio quality. More compression means more quality loss. The ADPCM format was used for the sound fonts in Robotech II (Barry Blum) and for the huge number of voice samples in British Championship Golf (Tom Streit).

TOOLS FOR THE JOB

Of our panel, the only musician not to use a project studio was Ron Jones, who composed for Star Fleet Academy using a combination of MIDI instruments and live musicians, recorded in a large commercial studio.

This, however, is the very high end of game music budgets, and usually the composer is also the musician, producer, engineer, and sound FX designer. Most project studios have the necessary equipment, but let's look at some requirements for game-specific tasks.

Synchronizing to Visuals. Most games will feature short "movies" that require music and/or sound FX synchronization. If you are provided with a video tape of the computer graphics, an interface that reads and writes SMPTE and a sequencer — a standard ap-

ADVICE FROM THE PROS

Bobby Prince (Doom, Duke Nukem 3-D, and many others): "Find a game development team that is starting out and needs someone to work on the sound for their project."

Ron Jones (Hollywood composer, who, with 44 episodes of *Star Trek: the Next Generation* under his belt, became the composer for the game Star Fleet Academy): "Don't try to do too much at the same time. Get lots of rest to balance the doses of stress. Work hard at listening to those you work with."

Barry Blum (Gametek's music director, who develops titles for the Nintendo 64, Sony Playstation, Sega Saturn, and the PC, including Robotech, Crystal Dreams, and Dark Colony): "It's all about file formats — learn about file formats. Find a common ground with the programmers"

Tom Streit (One of the audio leads at Looking Glass Technologies whose most recent title is British Open Championship Golf): "Critical listening skills...are valuable. Shoot for top quality [to] assure that the final product, no matter what format, will be the best you can do."

David Shaw (Featured on projects from TeamTNT, TiC's Momento Mori II, Insertion, and many others): "Write creatively. Stand out and take risks...persistence can be just as important as talent in this business."

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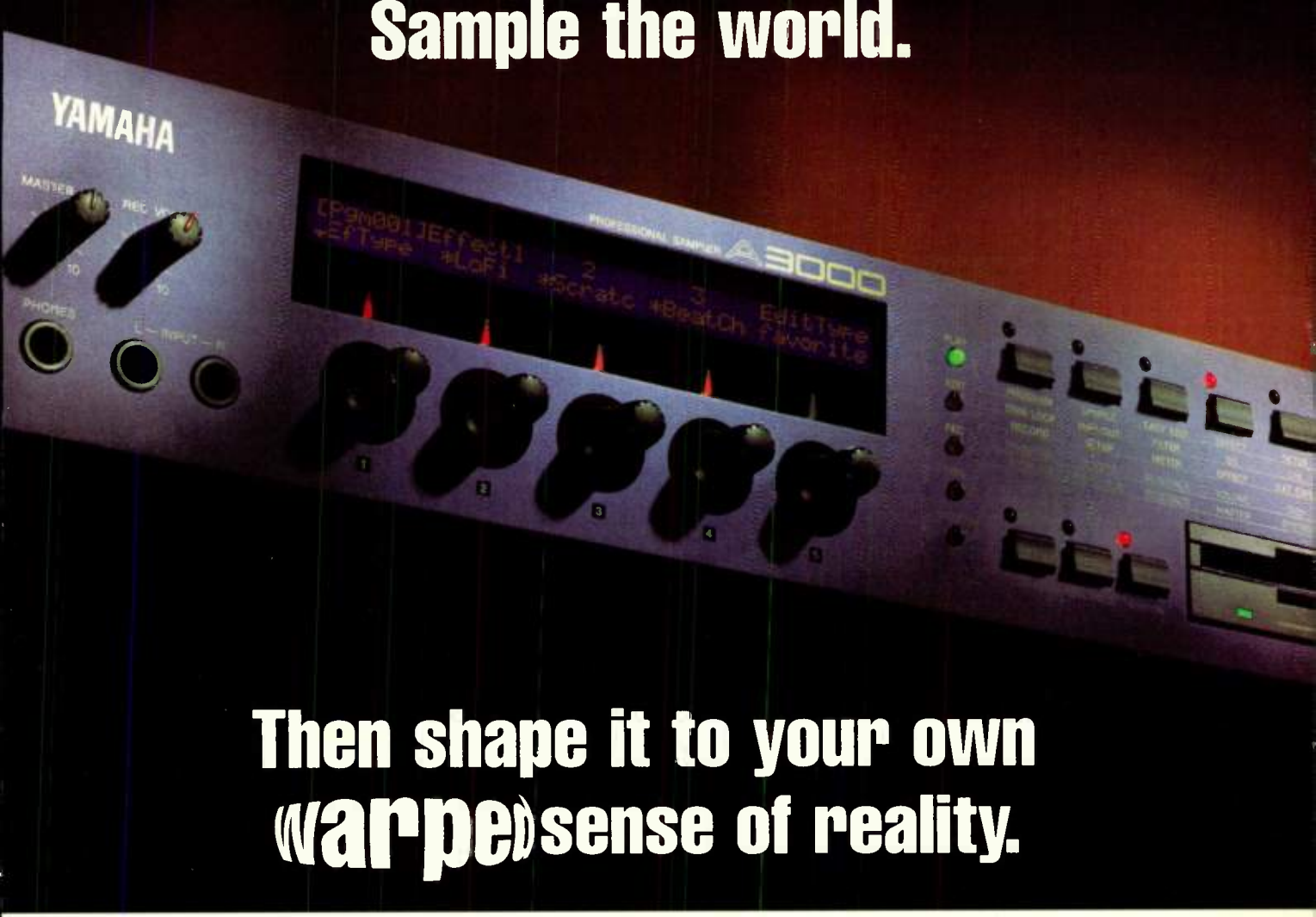

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proach for synchronizing to video — might be all that's required. Alternatively, you may receive the visuals in a computer format such as QuickTime movies or AVI files. This is more likely in the game industry, and more practical for synchronizing sound FX to the very short animations that make up character and object movements. The ability of sequencers to play back these files along with MIDI and audio data is improving, and very useful for games.

Digital Audio Editing. While MIDI/audio sequencers as well as samplers offer some audio editing, dedicated software, such as Sound Designer, Cool Edit, or Sound Forge, is a must — particularly since they can convert among many different file formats, sample rates, and so on.

Sound Effects. Recording 10 different kinds of explosions just ain't that easy to do, so a sound effects library can provide base sounds that you can then manipulate using samplers and digital audio editing software. A nibbling chipmunk dropped a few octaves and with some added flanging could turn into a growling monster.

General MIDI. It's important to play back over different sound cards, including older versions (e.g., SoundBlaster 16) to make sure the music will work on a variety of systems.

Surround Sound. Many games now advertise "3D sound" and create a surround-sound effect from two speakers using something like Roland's RSS, Q Sound, Spatializer, and so on. There's also the more-than-two-speakers approach of Dolby Pro Logic, AC3, etc., which, as consumers purchase extra hardware, may well be a standard for tomorrow's games.

Of course, there's more to the story than can fit in a single article, but the game industry is on the move and is a natural match for project studios. Just remember, there's no single right way to do things and the only rule is change...but that's what makes it exciting!

Simon Amarasingham is the composer and sound designer for the game company Blue Water Entertainment. He also works with producer Tony Saunders producing pop and R&B artists and was Project Manager for the hard-disk recording program Digital Wings for Audio at Metalithic Systems.

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CREDITS: Andromidas's client list includes The Discovery Channel, National Geographic Explorer, The National Audubon Society, HBO, ABC News, CBS, and PBS's *American Heritage Series* and *Pentagon Power Games*. He has been nominated for several Emmys, and has won numerous Cable Ace and Cine/Golden Eagle Awards.
CONSOLE: TASCAM 2600 mkII (32-input)
RECORDERS: Alesis ADAT XT; Revox B-77 1/4-inch tape recorder
DAT MACHINES: Panasonic SV-3800; Sony DTC-700
VIDEO: Sony P-2010 3/4-inch video tape deck and KV-7547R 15-inch television
MONITORS: Tannoy PBM 8; JBL 4430
AMPLIFIER: Carver PM 1.5
COMPUTERS & SOFTWARE: Apple Macintosh ci with MOTU Digital Performer and Digidesign Sound Tools
MICROPHONES: CAD E-300 and E-200 [2]; Audio-Technica ATM41a
OUTBOARD GEAR: Lexicon PCM 80; Korg A1; DigiTech TSR-24 and SRD 900 DDL; TC Electronic 1210 Spatial Expander; Valley People PR 10; Ibanez SDR-1000 digital reverbs [2]; Yamaha SPX90; Roland GP-8 guitar FX; BBE 422; MOTU MIDI Timepiece II and Video Timepiece
SAMPLERS & SYNTHESIZERS: Kurzweil K2500, K2000R, and K1000; Roland JV-1080 and D-50; Korg 01RW; Akai S-900; Proteus 1XR; Oberheim Matrix 6R; Yamaha DX-7

INSTRUMENTS: 1959 Fender Jazz bass and Statocaster guitar; Favilla acoustic guitar; Guild fretless bass; 1924 German upright string bass; BSX flip electric upright bass; Ampeg B-15 bass amp

STUDIO NOTES: Andromidas states: My main concern when building this studio was comfort. I have a fireplace and a great view of the woods outside my window. When I was on Madison Ave. and 41st St. in New York City, I had a large room and a 36-input Harrison, but no window. I had the option of upgrading to a much larger facility or downsizing to a project studio. For simplicity's sake, I decided to downsize. I have reduced my overhead tremendously, and now I work in much more comfortable surroundings.

EQUIPMENT NOTES: Andromidas continues: Burillo Sound wired my place and did a fantastic job doing it. I chose the TASCAM console mainly because of price and convenience. It's an amazing deal. I have eight sends per channel, and the EQ is really good. I also love my Lexicon PCM 80 — it's a remarkable piece of gear. I use it on everything.

And as far as bang-for-the-buck goes, the CAD microphones are the best-sounding mics I've heard. I just finished a series called "Invisible Places" for the Discovery Channel. It was shot all around the world, and the music had to reflect that. It featured a variety of instruments from violin to accordion to Vivaldi on classical guitar to snare drum for a military show to lute for renaissance pieces. It was fun for me because I got to write and produce a wide range of styles, and we used the CAD E-200 mic on all of it. EQ

PHOTO BY JULIAN JAIME

Southern Hospitality

Willie Wilcox finds a postproduction paradise in the bustling South Beach, Florida

BY C. REEDER

The heat is on, and South Beach, Florida is cookin'. Sauté in a lot of spice and tropical breezes, frame with a Monet-streaked sky, and it's *bon appetite* for any cogent cuisine lover. Once floundering with decaying deco buildings and low-rent beach rentals, the southern tip of Miami Beach has received a face-lift and a huge dollop of glitter. Wealthy patrons and artists from around the world sizzle and sway on all-night bubble dance floors or cool off at luxurious beach hotels like the Delano, a whimsical white Moroccan-style palace.

In the midst of all the hoopla, Willie Wilcox, sound designer extraordinaire and owner of Lincoln Road Studio (www.badaboom.com), a post audio recording and music production studio, is creating hot tracks and high-profile music spots for MTV Latino, Coca-Cola, Pantene, Target, Nike, Toyota, and more. Wilcox is a passion-driven man, and in the enviable position as a Renaissance man who can do it all.

As a musician, Wilcox drummed, wrote, vocalized, and coproduced with Todd Rundgren for Utopia on 12 albums. Hailing from the Manhattan School of Music, Wilcox worked in the studio with Hall & Oates, Mick Jagger, Patty Smythe, and Bette Midler, and composed songs recorded by Natalie Cole, Meatloaf, Kylie Minogue, and the Pointer Sisters, to name a few.

PHOTOS BY WES BENDER

WHERE THERE'S A WILLIE: Musician/sound designer Willie Wilcox found plenty of postproduction business for his Florida-based project studio.

Nurtured by musical parents, Wilcox at age 16 hung around Teo Macero's (Miles Davis's producer) club in his hometown, Glensfalls, New York, and sat in with Gene Krupa and other touring big bands. Wilcox realized one dream, stemming from an early love of jazz, by playing drums on stage with his hero Max Roach, at Forest Hills during a Cocker-Santana show.

For a music-industry trendsetter like Wilcox, sound design was a logical step. When he moved his studio to the Miami area several years ago, a friend suggested he might find advertising work interesting. Wilcox was struck by the similarities between creating a three-minute pop song and a :30 spot. Advertising agencies looking for new ideas landed with Wilcox. "I was initially surprised by how much advertising people appreciate it when you push the envelope," says Wilcox, "and writing songs is like writing sound design." He suggests that cultivating a clever point of view and having "the target in sight" helps.

Case in point: On a typical day at Lincoln Road Studio, Wilcox studies the video sent over by a new client, the Florida Lottery, and searches for the

Burn Rubber!

The V8 from Digital Audio Labs. It's 16 real tracks of hard disk recording and editing for the PC. It's up to 32 channels of digital mixing. It's a rack full of realtime EQ's, dynamics processors, and effects units. It's a real hot rod!

Audio Quality is Job 1

When it comes to sound quality, Digital Audio Labs cuts no corners and the V8 I/O peripherals are no exception. Take the Big Block for example: This 8 channel rack mount A/DD/A sports S/N ratios in excess of 90dB and crosstalk better than100dB! Add to that the ability to completely configure the Big Block from software, right down to the individual analog gain trims. We even isolated the ground, making the system virtually impervious to ground loops.

"I wish my mixer was this flexible"

With the V8's completely unrestricted, totally automated mixing and routing architecture, your only limitation is your imagination. If you can think of a mixer, you can build it. Want a specialized "tracking" mixer with a compressor on every input and a fancy cue matrix? No problem. Want to use that vocal input channel, including all plug-in effects settings and aux sends, on several different mixers? It's done. Create specialized consoles for each job or project and modify and build new channels and buses as needed.

300 MIPS, No Waiting

Add up to three DSP Superchargers and RAM Induction modules to the V8 and get channels upon channels of realtime, simultaneous EQs, dynamics processors, and reverbs with Gearhead Approved plug-in packages like the Waves V8 Pack®. Use them on disk tracks or stream five inputs and ADAT channels through them, transforming your V8 into a monster effects rack!

The Slickest ADAT® Interface on the Planet

Why settle for just the 8 channels of audio when the V8 gives you the whole ADAT enchilada! The V8 MDM Custom interface is the only PC system that includes 8 channels of ADAT light pipe plus full synchronous ADAT transport control. With the MDM Custom, your ADATs completely disappear into your V8 system. Remote control a single ADAT or banks of them. Fly ADAT tracks on and off the hard disk in rock solid sync. Simultaneously play back ADAT and hard disk tracks through a single mixer with full automation and realtime effects. (Hang in there, DA88 owners- we have a special surprise for you...)

The Audio Gearhead Partners: The V8's Secret Weapon

Since the V8 runs entirely on third party software, you already know how to drive it! Why shackle yourself to a proprietary software interface when you can choose your own from among a growing list of Audio Gearhead Partners? And don't worry about compatibility between programs and plug-ins; if you see the Audio Gearhead Approved symbol, they're simpatico. But what if your favorite software's not yet Audio Gearhead Approved? No Sweat. The V8's .WAV emulation makes standard windows programs think they're talking to up to four CardDPlus's. Now that's hip, Daddy!

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CIRCLE 25 ON FREE INFO CARD

point of view. The spot is a safe falling through the air toward a girl walking. Foley sounds of crunching astroturf heighten the girl walking, but what does a safe sound like falling through the air?

Wilcox rises to the occasion. Miking a safe falling from the sky isn't an option, so he uses the tools at hand. Sticking his tube AKG mic into the air-conditioning vent, he records the wind blowing past the diaphragm. Next, he puts a little EQ on it, suppresses it, and dumps it on a DAT reversed. Then he runs that through one of his favorite pieces of software, Hyperprism by Arboretum. Wilcox stirs it up with a little chorusing and flanging, locks Pro Tools to the D2 and plays the faders like a volume instrument, while watching the safe fall. Taking it all the way up to the distortion point, he rides the faders to the climax of the safe just missing the girl on the sidewalk. Add a little sound byte here and there, and *voila!* One spot ready to go.

On a recent Target spot Wilcox used the cardboard box that contained a new 27-inch TV monitor. He miked it like a bass drum and "played" the box through the entire spot.

Other days he composes music beds and arranges appropriate musical ideas for his varied clientele. To accommodate clients like MTV and Nickelodeon, who use a digital format, Wilcox purchased the Sony D2 DVR 20, a digital video recorder. A long way from Woodstock and the 8-track 1/2-inch TASCAM he started with. How does one guy do all of this? Sometimes flying by the seat of his pants.

Wilcox recalls the first time he used Digidesign Pro Tools multitrack hard-disk recording system. Wanting to use it right away, he left the client in the studio and excused himself to go to the bathroom to read the manual. A couple of cafe coladas and no one was the wiser. He says learning to "be a sponge and reacting to situations" is one way to keep working in music, and "the money is in the creative market."

Roger Guillen, a producer for the Locomotion Channel of the Cisneros Television Group, says working at Lincoln Road is convenient, and there is "nothing you cannot do."

Guillen likes working with Wilcox because he is a musician and knows how to cut and juxtapose two pieces of music that don't match. "You'd be surprised how many engineers can't edit to the beat, and Willie can." Guillen continues, "It's cool and fast working with him. I save time and meet deadlines."

Wilcox picked a good time to open Lincoln Road Studio. The entertainment industry is heading for the beach. Sony Latin America and MTV Latino opened up headquarters on Lincoln Road. The National Academy of Recording Arts & Sciences (NARAS), HBO Ole, and Universal Latino (MCA) set up shop for the proximity to Miami International Airport and its dozens of daily flights to Latin America.

WHEN LINCOLN MET EINSTEIN: Wilcox's Lincoln Road Studio is based around a 48-input AMEK Einstein console.

The billion-dollar Latin record industry is making its mark with total sales up 30 percent in 1996, making it the fastest growing region. Not all artists are singing in Spanish. Mariah Carey's "Daydream" album sold 17 million units in South America last year and Sony Latin in Miami handled the promotion. This is music to the ears at MTV Latino,

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"My mixes start in the basement...That's where the bottom end lives. And then, all of a sudden like magic, the sun comes up and the top end is born. 'Hafler Amplifiers are Fat from the bottom up!'"

Gary Lux
Recording Engineer/
Producer
Gary uses 3 Trans•nova
D.I.A.B.L.O. 9505's

"Hafler Amps: More powerful than a 2 day old diaper!"

Carlene Scovill with favorite engineer, producer, dad, Robert
MusiCanvas, SAG Inc., Eldon's Boy Records

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Howard Givens
Spotted Peccary Studios

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Wayman Tisdale
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Michael Jones, Conservatory of Recording Arts and Sciences

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Recording Artist
Producer
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Kirt R. Hamm, President
Conservatory of Recording Arts and Sciences

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MADE IN THE USA

and advertising agencies are lining up to cash in.

On weekends, Wilcox cools off by cruising Biscayne Bay in his 24-foot Searay named 2 Pop, a reference to the "pop" right before a video reel starts. Just another reelin' cafe con leche day in paradise for the one-man band called Willie Wilcox. Live from Miami Beach!

hey ho... EQ

LINCOLN ROAD GEAR LIST

Console: 48-input AMEK Einstein
Room Dimensions: Control Room 13' x 23'; Live Room 15' x 25'
Tape Machines: 24-track 3M 79; Sony 7040 timecode DAT recorder; Sony PCM 2500 DAT machine; Aiwa AD F800 cassette deck
Monitors: Meyers HD1; Yamaha NS10M Studio; KRK 6000
Monitor Amps: Hafler Pro 2400 [2]; Alesis RA100; BGW 7500
Reverb and Delay: AKG ADR 68K; Lexicon PCM70; Roland SDE 330
Compressors/Limiters/Noise Gates: Teletronics LA2A; TC Electronic Finalizer; UREI 1176LN; dbx 160A; BSS DPR 502 noise gates [4]
MIDI Rack/Sequencing: Akai S 1000 PB [2]; Korg EX 8000 and M1R; Roland D 550; Kurzweil K2500X; Mini-Moog (MIDI); Akai ASQ 10; Cubase Digital Audio/Score; Soundiver; Logic Audio
Digital Editing: Power Macintosh 9600/200 MHz/64 MB of RAM (2 17-inch Sony Monitors); Digidesign Pro Tools 4.0 digital workstation with 24 tracks and Sound Tools; Rourke Data 4 GB removables and 8 GB data backup system using Mezzo software; PLI Dual 45 MB removables; Sound Ideas 6000 SFX; Hollywood Edge "Cartoon Trax," "Hyperism," and "DPP1"
Mics: AKG Tube, D12E, C1000S, and C451 EB/CK1; Sennheiser MD 421 and MKH 60 P48; Shure SM57
Synchronization: TimeLine Micro Lynx [3]
Video: Sony DVR 20, 3/4 VD 9850, and 27-inch monitor
Digital Phone Connectors: ISDN "Telos Zephyr" (Layer 3); Gentner Digital Hybrid 1a (Phone Patch)

How to buy your next reverb without listening to it, Part 2:

Bruce Swedien, 5 time Grammy-winning engineer, producer; Credits include projects with Quincy Jones, Michael Jackson and Burt Bacharach.

"The ProR3 is one of the first new reverbs that has the clarity and density I like. I use it on vocals and strings. I love the performance."

JD Brill, Schubert Systems Group; F.O.H. Engineer for The Eagles, Glenn Frey, Don Henley, Joe Walsh, Bozz Scaggs, Larry Carlton and Al Jarreau.

"Surprisingly transparent and by far the best reverb ever from Yamaha. The ProR3 stands up to all the major processors at a much lower price. As a sound company owner and an engineer, what more could I ask for? I bought six of them."

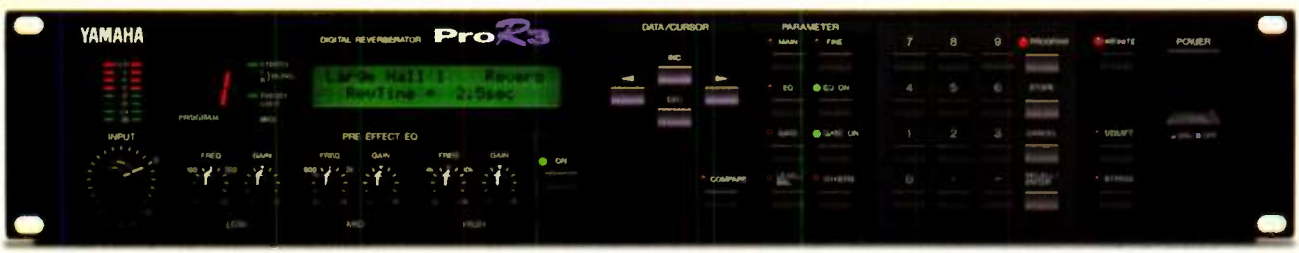
Chris Taylor, Clair Brothers; mixer for Amy Grant.

"The flexibility of the unit is wonderful for live sound. The direct access keypad lets me go straight to any preset rather than having to scroll through all the programs. I like to create great gated-drum verbs using ProR3's internal gate and eq."

Chris "Hoover" Rankin, CS&N's longtime FOH mixer.

"The ProR3's sound quality is excellent. The decay is very smooth, not grainy. It has a lot of sonic depth...It's a very rich sounding unit."

DIGITAL REVERBERATOR ProR3



Listen to those who've listened to it.

REV500

Craig Anderton, EQ

"By any standards, the sound quality is excellent, but at this price, it's awesome."

Mark Frink, Mix

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Jim Williams, Gig Magazine

"A well designed, wonderful sounding reverb at this price."

Nick Batzdorf, Recording

"An unbeatable $500 reverb with excellent audio quality."

Loren Alldrin, Pro Audio Review

"Tails are silky smooth down to the last audible decay, even with very long reverb times. One can thank the Yamaha's 32-bit processing and 20-bit converters for this refined, smooth sound."

Reverb. 32-bit digital, 20-bit AD/DA. Very smooth. Very quiet. And very easy to operate. In two pro sizes: REV500 for $499, ProR3 for $1299. Call (800) 937-7171 x681 for more information.

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Genelec 1029A & 1091A Loudspeakers

Genelec's power trio adds a new dimension to your multimedia mixes

BY STEVE LA CERRA

Genelec's new 1029A is a small (9-3/4" H x 6" W x 7-1/8" D; 12.5 lb.), biamped, two-way loudspeaker system with a 5-inch woofer and a 3/4-inch tweeter. It is intended for use in recording studios, video control rooms, and multimedia applications. Each 1029A is powered by a pair of 40-watt amps, and the entire package is housed in a sharp-looking, die-cast aluminum enclosure (quite hefty for its small size) that provides heat dissipation for the amps as well as shielding against RF interference. Each 1029A is EM-shielded for safe placement near video monitors.

The 1029A's may be purchased in conjunction with the 1091A — a matching subwoofer with a single 8-inch driver housed in a dual-vented MDF cabinet. The 1091A is powered by the same pair of 40-watt amps as used in the 1029A, but the 1091A's amps are bridged for increased power. When a pair of 1029A's is combined with a 1091A, low-frequency response is said to reach down to 40 Hz. The 1091A subwoofer is not intended for use with monitors other than the 1029A.

Unlike other subwoofer/satellite systems, the 1029A's serve as the "front end" to the trio system. Our control room monitor outputs come up on our patchbay, so we used TT-to-XLR cables (pin 2 hot, per Genelec's spec) to go from the console monitor output in the patchbay to the XLR inputs on the rear of the 1029A's. There's a second jack on each 1029A — a 1/4-inch TRS — which can be used to either feed audio out to the subwoofer (via the 1029A's front-panel gain knob) or to accommodate a second input source. Though this dual-input feature is intended more for multimedia users, it also allows the 1029A's to accept a wide variety of connectors.

Genelec provides the requisite cables to connect the 1029A's to the 1091A, as well as clear interconnect wiring diagrams in their useful manual. Input to the subwoofer is via XLR for channel one and 1/4-inch TRS for channel two; this arrangement is simply by default to the amp module design. Both the 1029A and the 1091A have IEC power receptacles, so it takes a bit of neatness not to wind up with a rat's nest of wiring underneath the board — nothing that a power strip and some tie wraps can't clear up. The

MANUFACTURER'S SPECIFICATIONS

1029A

Frequency Response: 68 Hz to 20 kHz, –3 dB
Maximum Peak Output per Pair: ≥110 dB (@ 1 meter, with music)
LF Amplifier Output: 40 watts
HF Amplifier Output: 40 watts
Amplifier S/N Ratio: ≥90 dB

1091A

Frequency Response: 38 to 85 Hz (free field)
Self-Generated Noise Level: ≤10 dB (@ 1 meter on axis, A-weighted)
Amplifier Output Power: 70 watts
Signal-to-Noise Ratio: ≥100 dB

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Brent Butterworth - CFG Labs
Home Theater Buyer's Guide (Fall 1997)

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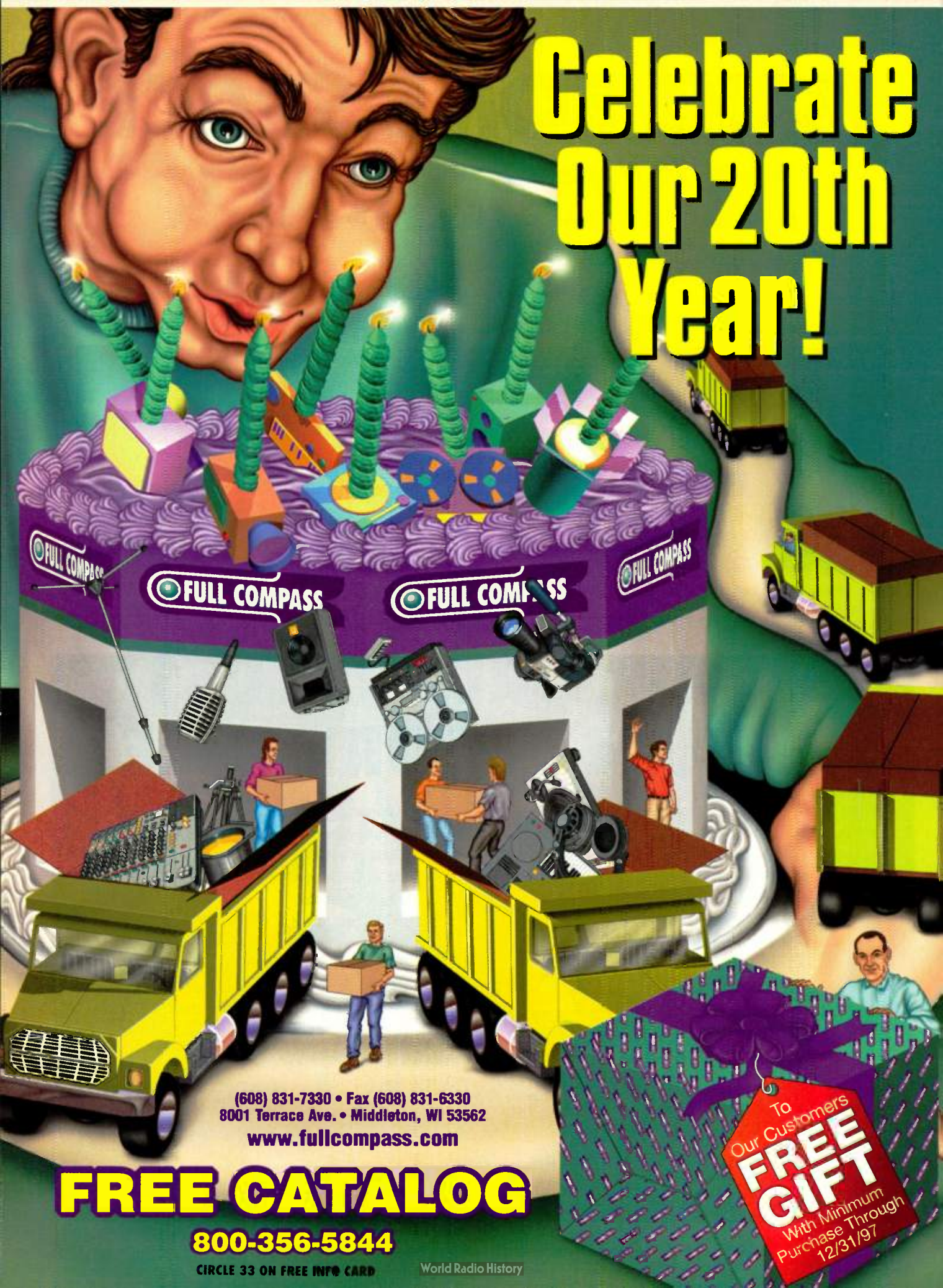


An EQ Special Report

AES GOES GOLD

PUTTING IT ALL TOGETHER As the AES Goes Gold, we initiate in these pages a three-part celebration embracing a half-century of dedicated service to music and to audio in all its many forms. The next installments will coincide with the 104th Convention in Amsterdam and the 105th in San Francisco next year, expanding on the Society's origins, its evolution, and its potential as the global forum for professional audio. As an important part of this we need to recognize the gifted individuals who have put us in touch with new frontiers. Some of them offer insights on important trends in the industry, or are honored in brief career profiles that enable us to recognize their contributions. Others are prepared to share their responses to the most significant events in their experience of audio. Finally, there are two timelines: one marking many of the signal events in audio in the last century, the other charting the parallel progress of the Audio Engineering Society. Ours is a history full of remarkable inventions and innovations, a never-ending quest to push the envelope of what's possible in audio, to ask "How?" rather than "Why?" All have contributed to what we are today. If the medium is the message, let us make certain that the medium, be it music or the spoken word, is, and remains, clearly audible.

— Committee for the 50th

A Brief History of the AES

Creating a Technology, Fostering an Industry

BOB LUDWIG
Mastering Engineer

"WHILE THE INTRODUCTION of digital audio was the most important audio event since I began working in audio, within that arena the introduction of the CD was the most significant episode.

The compact disc was a format that drove sales in the music business to unprecedented highs. It was considered so revolutionary by the consumer that the record companies could re-sell their old catalog again. For the first time, a format was available in which the playback transducer did not touch the recorded surface. The CD obviated the use of pre- and post-emphasis equalization or any other noise reduction, yet had a wider dynamic than any previous medium. Media recording overload was no longer a problem at any level, even with a frequency response from near-DC to over 20 kHz.

The CD also offered long play time on a single disc, quick and accurate cueing, easy storage, long life and convenient size. A whole new product line was created with CD players for home, car and portable personal units. Clearly, the Compact Disc has had a profound impact that reaches beyond the boundaries of our industry and touches the daily lives of men, women and children all over the world."

As we mark the 50th year of the Audio Engineering Society, an organization dedicated to the advancement of audio engineering, it's important to understand how the adventure began. Its roots go back to the end of World War II, when the term "electronics" was first being used in print. It was a time of rapid advancements in virtually every aspect of American society: medicine, science, music, communications, transportation—name it and it was undergoing change. The pace of life had picked up, as the country began feeling its collective muscle. The audio, film, and broadcasting industries were experiencing an avalanche of technological breakthroughs, although at that time audio was given scant recognition. That too was changing, thanks to the efforts of the Institute of Radio Engineers in the U.S. and similar organizations in Britain and Europe.

by Donald J. Plunkett
Former AES Executive Director (1974-1994)

The success of V-Discs (which brought the music of great American musical artists such as Frank Sinatra to our G.I.s abroad) in the Army Morale Program demonstrated that a quality audio recording had a place in the nascent modern cultural landscape. The emergence of British Decca's 78 rpm Full Frequency Range Recording (FFRR) and the introduction of the Pickering integrated playback pickup, which tracked these advanced discs, spurred the onset of quality record reproduction. Professional audio was on its way to becoming a significant factor in the average music enthusiast's life.

During the same period, a new pickup cartridge was introduced by William Buchman of GE, and economical record pickups became a reality. The groundwork was laid for improved cartridges and arms via the work of Hunt and Pierce at Harvard during World War II. Their work, released for public distribution, sparked a recovery in the record market, which had been stifled both by wartime shortages of supplies and by a bitter labor dispute pitting the American Federation of Musicians against record companies.

The LP Arrives

The emergence of the GE RPX-050 cartridge was a harbinger of even greater change. Paralleling this innovation, Dr. Peter Goldmark and William Buchman, now at Columbia Records, were leading a team that was secretly developing the "LP," a 33-1/3 rpm microgroove long-playing record. Its introduction in the late summer of 1948 augured a new era of quality audio reproduction.

Executives were awakened to the possibilities of quality recording and reproduction and their potentially huge economic impact. The professional "disc jockey" emerged as records gained acceptance in the entertainment and broadcast fields.

1947: C. J. LeBel, John D. Colvin, C. G. McProud, Norman C. Pickering, Chester A. Rackey, Ted Lindenberg, and others lay groundwork for the "Audio Engineering Society."

1948: Group creates charter for new Society. On March 11, 150 people gather at RCA Victor Studios in New York City to see what this new group is all about and to listen to a formal lecture by Dr. Harry F. Olson on loudspeaker design. Two months later other Sections are organized in Denver and Los Angeles.

1949: Under guidance of F. Sumner Hall, AES organizes first of four lecture series groups, entitled "Elements and Practices of Audio Engineering."

The first convention (40 exhibitors, 3,500 attendees) is held at Hotel New Yorker. Program features papers and staging of a live-versus-recorded demonstration.

1953: First International Section is

1877: Thomas Alva Edison, working in his lab, succeeds in recovering "Mary's Little Lamb" from a strip of tinfoil wrapped around a cylinder.

1878: The first music is put on record: cornetist Jules Levy plays "Yankee Doodle."

1887: Emile Berliner is granted a patent on a flat disc gramophonel.

1888: Edison introduces an electric motor-driven phonograph.

1895: Marconi achieves wireless radio transmission from Italy to America.

1898: Valdemar Poulsen patents his Telegraphone, recording magnetically on steel wire.

1901: The Victor Talking Machine Company is founded by Emile Berliner and Eldridge Johnson.

1910: Enrico Caruso is heard in the first live broadcast from the Metropolitan Opera, NYC.

1912: Major Edwin F. Armstrong is issued a patent for a regenerative circuit, making radio reception practical.

1913: The first talking movie is demonstrated by Edison using his Kinetophone process.

1917: The Scully disk recording lathe is introduced.

1921: The first commercial AM radio broadcast is made by KDKA, Pittsburgh, PA.

During the pre-war and war years, a group of highly regarded audio and recording engineers formed a small, elite association to contend with the shortages that had made it difficult to obtain wax and lacquer masters and sapphire styli for cutting records. This group, called the Sapphire Club, helped its members obtain vital supplies and material. Prior to the Sapphire Club's formation, little audio recording technology information had so far been exchanged. Most of the companies felt it was confidential, but as the war ended, they discovered the importance of information exchange and cooperation. This helped save the rapidly growing and vital business of recording, thus establishing a camaraderie among engineers on the east and west coasts.

The combination of listening pleasure and corporate participation helped shape the founding tenets of the Sapphire Club into a coherent society. The work of early club members like C. J. Lebel, Chester A. Rackey, Theodore Lindenberg, Norman C. Pickering, Lawrence A. Rudell, Frank L. Capps, Albert A. Pulley, Walter O. Stanton, Vincent J. Liebler, and Harry L. Bryant evolved into a formal organization that was called the Audio Engineering Society. Work on this consolidation started late in 1947 and become a reality with the first AES meeting on March 11, 1948, which featured a lecture by Dr. Harry Olson at the RCA Studios in New York City.

Concept "Spread Like Wildfire"

At that first meeting, more than 150 interested and concerned engineers involved in the fields of recording, research, manufacturing, broadcasting and product improvement and development met to exchange ideas. The concept of this interaction and intellectual exchange spread like wildfire. Two months later sections were organized in Denver and Los Angeles. During the re-

(continued on pg. 105)

The Future

When I was asked to look into the future of audio, I felt vulnerable to hubris, then humbled by the task, and subsequently liberated by the privilege of amusing myself with all of the possibilities and the knowledge that my preconceptions might prevent me from truly seeing/hearing what is to be known. What my experience tells me is that open-mindedness, awareness, and letting things be (amazed at how they unfold) is the joy of audio engineering.

The years of study and innovation give way, as in any art, "to a new capacity to let execution unfold beyond technique, beyond exertion, beyond thinking...action becomes a pure expression of art, of being, of letting go of all doing, a merging...[1] seeing, hearing those moments of grace and harmony."

by Elizabeth Cohen
AES President

Audio engineers, as guardians of the groove, must continually take chances and have faith in the freshness of the moment. As we work with musicians, we are continually conscious of how the present dissolves, evolves into the future.

In the late 20th century, scientists have been watching the brain at work. Functional brain imaging using Positron Emission Tomography (PET) and Functional Magnetic Resonance Imaging (FMRI) are revealing where the brain processes of speech, music and language reside. We can even watch the brain while people talk to themselves, silently![2] Moreover, research has shown that changing the mind can alter the physical substance of the brain.[3] The raft of new information we are receiving on perception, cognition, and consciousness will inform and direct our industry in the 21st century. Audio engineers will be building interfaces, exploring these pathways to mind and heart as musicians have done from time immemorial.

We will be creating ways to explore many modes of being and reality, and virtual environments will be alive with given life by audio. As we increase our understanding of brain circuitry, audio circuitry will develop concomitantly, with new artforms arising out of both knowledge and awe.

In the late 1990s, semiconductor companies began sponsoring audio-based events,[4] one example that marked the watershed change in audio from a totally hardware-oriented industry to a software-based industry. We will undoubtedly be generating music by the bit, transmitting it by organizing the bits efficiently, disseminating them globally, and paying for them by the bit as other measures fall by the wayside.

The AES is ready for this interconnected world. With our entire planet shrunk to a tiny globe by various forms of satellite and wired communication systems, virtual contacts will make real time with our colleagues more vital and informative. Our conventions will grow stronger as "build to market" methods of inventory allow for swifter implementation of innovations. The setting for demonstrating these innovations will continue to be the floor

(continued on pg. 106)

formed in Japan. First *AES Journal* published, pioneered by Louis Goodfriend and Vincent Salmon.

1954: AES publishes its first standard, TSA-1-1954: "Standard Playback Characteristic for Lateral Disk Recording."

1955: AES is incorporated with a "not-for-profit" status.

1957: Westrex demonstrates a 45/45 stereo cutting system at the AES Convention.

1965: The New York group becomes official Section. Facilities Committee constructs sound reinforcement/recording console for use at conventions.

1970: The Board of Governors meets with John C. G. Gilbert, John Maunder and Percy Wilson; approves formation of British Section. Central European Section, comprising Austria, Belgium, Germany, Luxembourg, The Netherlands and Switzerland, formed in Frankfurt, Germany.

1971: First European Conclave held in Cologne, Germany, with 250 registrants, 29 papers, 12 exhibitors. First workshop ("A Workshop on Studio Tape Recorders") held at the 41st Convention in New York.

1925: Bell Laboratories develop a moving armature lateral cutting system for electrical recording on disk.

1926: O'Neill patents iron oxide-coated paper tape.

1927: The Jazz Singer is released as the first commercial talking picture, using Vitaphone sound on discs synchronized with film.

1928: Dr. Georg Neumann founds a company in Germany to manufacture his condenser microphones. Its first product is the Model CMV 3.

1929: Harry Nyquist publishes the mathematical foundation for the sampling theorem basic to all digital audio processing, the Nyquist Theorem.

1931: Alan Blumlein, working for EMI in London, in effect patents stereo.

1932: The first cardioid ribbon microphone is patented by Dr. Harry F. Olson of RCA, using a field coil instead of a magnet.

1933: Magnetic recording on steel wire is developed commercially.

1935: AEG (Germany) exhibits its Magnetophon Model K-1 at the Berlin Radio Exposition. BASF prepares the first plastic-based magnetic tapes.

1936: BASF makes the first tape recording of a symphonic concert during a visit by the touring London Philharmonic, with Sir Thomas Beecham conducting Mozart.

1938: Benjamin B. Bauer of Shure Bros. engineers a single microphone element to produce a cardioid pickup pattern, called the

ROBERT SCHULEIN

Etymotic Research

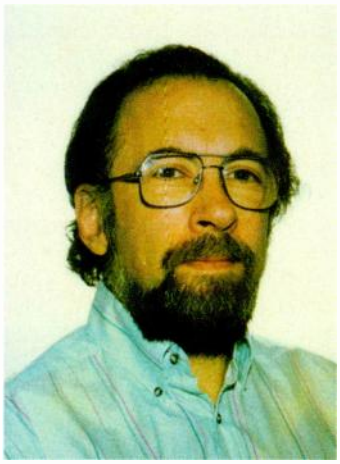
I BELIEVE THE MOST significant audio event in the area of microphone technology (starting in approximately 1962) to be the development of the stable electret-biased condenser microphone element with integrated solid-state FET impedance converter.

Condenser microphones using this biasing technique are typically constructed from materials such as Teflon, which have the ability to store and maintain an electrostatic charge over a wide range of temperature and humidity conditions. In addition, the integrated FET impedance converter allowed for the efficient coupling of the output of such high-impedance transducers to a wide variety of lower impedance audio devices, completely eliminating the fragility, bulk and power consumption of vacuum tubes or the size and complexity of RF biasing techniques.

A wide variety of microphones has evolved based on these enabling technologies, offering performance advantages over previous microphone types. Significant performance attributes include: small size with excellent signal-to-noise-ratios, extended and smooth frequency response, low vibration sensitivity, and low sensitivity to electromagnetic fields. Microphones based on these enabling technologies now dominate the recording, sound reinforcement, communications and computer industries.

The Birth of Digital Audio

The Right Place at the Right Time



by Dr. Barry A. Blesser

Consulting Engineer; AES President (1982)

Johnny Cash has observed that in the mid-1950s, when he, Elvis, Carl Perkins, and Jerry Lee Lewis were tooling around the south in their cars, pioneering the most traditional strain of rock 'n' roll, and in the process altering an industry, none of them had any idea they were doing anything more than trying to make a living. "Now," he notes, "that's become the important stuff."

The same might be said about digital audio. Its early history has been little recorded, because those of us involved did not perceive that we were doing anything very profound. Look now at what we have wrought: a revolution in sound that has altered an entire industry.

The initial milestone in this historical progression would be the development of the first viable A/D and D/A converter in the early 1940s, a subject on which I wish I could provide more personal insight; however, I was at that time non-verbal, being a mere babe in my mother's arms. The converter's existence did not answer the question of what to do with a digitized audio signal, but it did set the stage for the advance of the following decade.

In the late 1950s Manfred Schroeder, working at the Bell Laboratories Research facility, was interested in the relationship between physical acoustics and human perception. Next door to his office was one of the earliest and largest computer software development projects of the time. One of Dr. Schroeder's pet projects, unrelated to his main professional activities, was the creation of synthetic acoustic reverberation to test some of his perceptual models.

Because those models were based on audio delay lines, and because there were no other technologies available to get audio delay, he used the computers to implement his models. It took more than 10 hours of computer time to get one minute of reverberated audio.

Fifteen years later, at a point when computer technology had grown dramatically, I was sitting at MIT. A colleague of mine, Francis Lee, was actively trying to push the envelope of computer memory technology, which was perceived as being one of the major bottlenecks of that industry. Memory was based on a very expensive (by today's standards) magnetic core technology. A typical mini-computer would have 4 K of total memory. Dr. Lee had just created a magneto-strictive delay line as one of many experimental attempts to find viable alternatives. Having a strong interest in audio, I worked with Dr. Lee in creating what became the first commercial digital audio product, the Lexicon Delta-T Delay Line. The article, published in the JAES, presented to the

1973: At the fall convention in N.Y., the New York Section presents "Look What They've Done To My Song, Ma," tracing the effect of technology on recorded music. Program narrated by Michael Tapes, features John (Jack) Mullin, who illustrates the history of recording through demonstrations. The program concludes with an electronic music composition written for the event by Walter Sear, reproduced on a 16-track tape machine wired directly to 16 power amplifiers and loudspeakers placed around the room.

1975: New York Section, at the 52nd Convention held at Waldorf-Astoria Hotel, presents "Those Magnificent Men and Their Music Machines," recapping the history of electronic music, narrated by Michael Tapes and Robert Moog. Electronic music is composed and performed by Suzanne Ciani.

1977: Centennial issue "The Phonograph and Sound Recording After 100 Years," JAES volume 25, number 10/11, October/November.

1978: Board of Governors approves the formation of the Technical Council and the Technical Committees, and sets new standards procedures. First Anthologies are published: "Loudspeakers, Vol. 1" and "Sound Reinforcement."

Unidyne, Model 55. This later becomes the basis for the well-known SM57 and SM58 microphones.

Under the direction of Dr. Harry Olson, Leslie J. Anderson designs the 44B ribbon bidirectional microphone and the 77B ribbon unidirectional for RCA.

RCA develops the first column loudspeaker array.

1939: AC biasing of magnetic tape is accidentally discovered by German researchers working with an unstable, oscillating record amplifier.

Major Armstrong, the inventor of FM radio, makes the first experimental FM broadcast.

1940: Walt Disney's Fantasia is released with 8-track stereophonic sound.

1941: Commercial FM broadcasting begins in the U.S..

1942: The RCA LC-1A loudspeaker is developed as a control-room monitor.

The first stereo tape recordings are made by Helmut Kruger at German Radio in Berlin.

1943: Altec develops their Model 604 coaxial loudspeaker.

1944: Alexander M. Poniatoff forms Ampex Corporation to make electric motors for the military.

1945: Two Magnetophon tape recorders are sent back to the U.S. in multiple mailbags by Army Signal Corps Sergeant John T. (Jack) Mullin.

1946: Webster-Chicago manufactures wire recorders for the home market.

Jack Mullin demonstrates hi-fi tape recording

world a solution to the old acoustical engineering issue of how to create quality delay feeding the loudspeakers in a public address system.

The momentum began to pick up and one could see a pattern emerging. EMT, a West German company dominant in plate reverberation systems, sponsored my work in the development of an all-electronic reverberation system using digital technology. We created the EMT-250 in 1976, which was both a combination and an extension of Dr. Schroeder's reverberation computer models and Dr. Lee's digital delay line. Computer components had come down in price sufficiently that one could conceive of using them in audio.

Next in the progression was the issue of recording audio on magnetic tape or vinyl records with their inherent noise and distortion degradation. Tom Stockham started a company to do digital recording using his custom system. This demonstration, that recorded digital audio could be saved and copied without loss of quality, suggested enormous commercial potential.

The final milestone in the progression was based on the broad observation that when audio equipment was reduced to software, there would be no manufacturing cost. While the initial digital audio developments were motivated by doing things that could not be done by analog hardware, current activities are based on the sense that digital products are very much less expensive to own. An effects box can contain thousands of programs, all of which can run on the same hardware platform. Insert the equivalent of a floppy disk and you have a new product. The digital audio revolution was now complete.

To look forward into the future, we already see the networkization and virtualization being absorbed even before the technology is legitimized. We have an expression in our development group which describes this approach as that of getting a free ride on the elephant. It is big and goes where it wants to. By sitting on top, we move rapidly yet we expend only a modest effort to gain from its billion-dollar development budgets. However, if you get ahead of the elephant you get stepped on; and if you get behind it, you experience an equally nasty surprise. The trick is to stay on top and anticipate its every movement. Not so easy, but worth the effort.

The Mother of Invention

Imagine a parallel world. It is the Year of Our Lord 1948 and approximately 150 audio engineers are converging on the RCA Victor Studios in New York City. As they begin to arrive, a faulty pentode-tube power amplifier overheats, starting a small fire. The rooms fill with smoke and although the fire is quickly contained, the fire chief orders the engineers to go home, pending a full inspection. The engineers drift away; there is talk of another meeting, but they are all very busy in that post-war era, and never quite get around to it. The Audio Engineering Society is never founded.

by Ken C. Pohlmann
Professor, Univ. of Miami

Fast-forward to 1998. In many ways the technology of this parallel world is very familiar. However, the audio technology is shocking. The playback systems are all monaural; stereo recording was never perfected because companies kept their work secret and never shared information. There are no digital recorders, because there was no forum to introduce and demonstrate this technology to the recording industry. There is no optical storage, because there was no education mechanism to teach this technology to the audio industry. Finally, vacuum tubes are still widely used. Without the exchange of ideas and clash of egos afforded by scientific debate, the mysteries of transistor circuits were never solved, so transistor technology was abandoned. Ironically, vacuum tubes are still responsible for numerous fires each year in this parallel world.

Let's return to our own world, complete with stereos, digital recorders, optical discs, solid state circuitry and the Audio Engineering Society. It might be overly generous to say that without the Society, none of those inventions would have ever appeared. But it is clear that the Society has greatly expedited the evolution of audio technology. In fact, its ability to promote progress in invention is the Society's essential mission, and its greatest benefit to everyone who enjoys audio technology.

The annual conventions, first held in 1949, are perhaps the most visible aspect of the Society, and each one makes essential contributions to the industry. Workshops help to teach members about new principles and techniques, and often promote lively discussions. The tutorial value, as well as the exchange of practical information, is immense. Technical paper sessions allow individual members to present the results of their latest theoretical work, and hold it up to the scrutiny of other experts, often leading to discourse and vigorous debate. In some ways, this is the "purest" aspect of the Society because this kind of exchange is central to the scientific method. Information and hypothesis that withstand the test of peer review, and that can be independently duplicated by other researchers, may be admitted into the circle of scientific knowledge. Ideas that fail these

(continued on pg .104)

1979: "Microphones" Anthology is published.

1980: Los Angeles Section inaugurates a series of interviews with historical figures, entitled "An Afternoon With..." First guest of honor is John G. "Doc" Frayne. Standards Committee (AES/SC) reorganizes under the chairmanship of Geoff Langdon, with Daniel Queen as secretary. American National Standards Institute (ANSI) gives AES/SC jurisdiction over its S4 Committee on Audio Engineering.

Anthology "Disk Recording Vol. 1: Groove Geometry and The Recording Process" is published.

1981: Anthology "Disk Recording Vol. 2: Disk Play-back and Testing" published.

1982: First AES Conference, "The New World of Digital Audio," held in Rye, New York. Standard AES6-1982 r1992 (ANSI S4.3-1982) issued: "Method for measurement of weighted peak flutter of sound recording and reproducing equipment."

1984: Board of Governors gives AES/SC full jurisdiction over AES standards development.

Anthology: "Loudspeakers, Vol. 2" is published.

with his reconstructed Magnetophon at an IRE meeting in San Francisco.

1947: Bing Crosby and his technical director Murdo McKenzie agree to audition tape recorders brought in by Jack Mullin and Richard Ranger. Mullin's is preferred, and he is brought back to record Crosby's *Philco* radio show.

Ampex produces its first tape recorder, the Model 200.

The first issue of Audio Engineering is published; its name is later shortened to Audio.

1948: The Audio Engineering Society (AES) is formed in New York City.

The microgroove 33-1/3 rpm long-play vinyl record (LP) is introduced by Columbia.

1949: RCA introduces the microgroove 45 rpm, large-hole, 7-inch record and record player/adaptor.

A novel amplifier design is described by MacIntosh and Gow.

1950: Les Paul modifies his Ampex 300 with an extra prevue head for overdubs.

1951: The hot stylus technique is introduced to disk recording.

1952: Peter J. Baxandall publishes his (much-copied) tone control circuit.

1953: Ampex produces a 4-track, 35 mm magnetic film system for 20th-Century Fox's Christmas release of The Robe in Cinemascope and stereo sound.

1954: EMT (Germany) introduces the electromechanical reverberation plate.

Sony produces the first pocket transistor radios.

The first commercial stereo tapes are released.

MIKE GUZAUSKI

Producer/Engineer

I'VE ALWAYS THOUGHT that every step in the advancement of audio has been evolutionary—the advent of electrical recording, the advent of the transistor, the advent of stereo, and even the advent of CD as the medium of distribution. But right now I believe we're on the leading edge of a revolution in audio with DSP and computers in audio on several fronts. One is the ability to process audio in real time in a way we never have before; pitch and time are no longer tied together. We can vary pitch, we can vary time independently, we have random access, non-destructive editing. Even more important, digital signal processing along with faster communications are enabling us to assemble a team from all over the country—or all over the world—to work on a project and still work in local studios or even at home with ISDN communications and DSP compression of audio over phone lines. I would say the whole computer revolution, with particular attention paid to digital signal processing, is probably the biggest advance, and it's happening right now. It's entirely changed the way I work. I work primarily at home now. The artist listens to the work over Dolby Fax ISDN lines, so I don't have to leave. In the future I think we're going to see distribution of music over the Internet, once the bandwidth gets up there, and even interactive high-fidelity audio over the Internet.

POHLMANN

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tests must be discarded.

The convention's exhibit floor is high-tech bacchanal. Without promotion to create capital to fuel the industrial engine, audio evolution would grind to a halt. The exhibit floor is like a microcosm of the industry itself, in which products directly compete for supremacy. Each company must try to hoist its banner just a little higher than the others, and the exhibits with the biggest crowds are clearly the winners. The system is completely egalitarian. Even the largest and most powerful company, if its product offerings are jaded, can lose out to a small company with a hot new offering. One-man companies can be catapulted to fame from the exhibit floor.

Almost invisible in the convention activity, but powerfully important, is the work of standards committees. These groups of engineers meet to decide very specific technical details, and establish conventions that can be shared across the industry. Without standards, incompatibility would reign, prices would be driven higher, and progress would be slowed. Standards committees prove that the devil is in the details. Engineering pride, individual egos, scientific proof and political expediency must all be considered. In the end, with a nervous eye toward the future, the committees must decide which sampling rate to use, and which pin should be hot, so that technology can continue its advance. Even more discrete than the standards committees, the Education Foundation meets to consider the Society's role as educator; the scholarships provided for graduate study in audio engineering help to fashion the next generation of audio inventors.

As counterpoint to the conventions, international conferences provide a more focused look at specific topics of interest. The first conference, held in 1982, introduced the wonders of digital audio to the Society and in fact was organized by some of the pioneers of the technology. Subsequently, conferences have tackled topics ranging from perception and measurement to Internet audio. In each case, industry experts are invited to present their current work and their views on how these emerging technologies will influence the course of the industry. Conferences are more exclusive than conventions, and in some ways elite, because they comprise small groups of people just slightly ahead of their time.

While conventions and conferences are big-ticket items on the Society's agenda, it is the local Sections that form the Society's backbone. Their monthly meetings may ostensibly convene to hear from an outside invited speaker, and that is certainly beneficial, but the most important benefit is the cementing of the local community. Even in today's information age, it is local relationships that engineers rely on most, and Section meetings facilitate that direct kind of interaction.

While public debate and one-on-one interaction are crucial to the Society's mission, and more than one new product has been designed on the back of a cocktail napkin, the *Journal* is the scholarly record of the Society's proceedings. The *Journal* documents all Society activities, but at its core are the technical papers, representing the most outstanding papers from conventions, all subjected to peer review. The dissemination of this reference information is critical to the industry; professional engineers can study the most current and expert thinking, and students can begin to learn it. Moreover, the *Journal* represents the historical record of the progress of audio technology. In a future time, when living engineers have passed on to their own nirvanas, and when the products they designed are collecting dust in attics and museums, the *Journal* will remain (hopeful-

AES/SC issues new standards: AES2-1984 r1992 (ANSI S4.26-1984) AES Recommended Practice: "Specification of loudspeaker components used in professional audio and sound reinforcement."

AES5 sets the digital sampling frequency standard.

AES6 and AES7 set standards for tape recorder flux and flutter.

1985: AES/SC releases AES3, digital interface standard.

1986: Board of Governors approves reorganization of Technical Council with Technical Committees based on disciplines. Anthology on "Stereophonic Techniques" is published.

1988: The 85th AES Convention in Los Angeles features John T. (Jack) Mullin's historic audio equipment collection. Exhibit visited by more than 2500 attendees.

Anthology on "Time Delay Spectrometry" is published.

"An Afternoon With Jack Mullin" session is preserved on the first videotape produced for the AES Publications Department.

1955: Ampex develops Sel-Sync (Selective Synchronous Recording), making audio overdubbing practical.

1956: Les Paul makes the first 8-track recordings using the Sel-Sync method.

1957: Elektra releases first electronic music recording: Subotnick's Silver Apples of Moon.

1958: The movie *Forbidden Planet* is released, with the first all-electronic film score, composed by Louis and Bebe Barron.

1959: First stereo disk recordings appear.

1961: 3M introduces the first 2-track, closed-loop capstan-drive recorder, the M-23.

1963: Philips introduces the Compact Cassette tape format and offers licenses worldwide.

The Beach Boys contract Sunn Electronics to build the first large full-range sound system for their rock music tour.

1965: The Dolby Type A noise reduction system is introduced.

Robert Moog shows elements of his early synthesizers.

1967: Richard C. Heyser devises an acoustical measurement scheme called Time Delay Spectrometry, which paves the way for the revolutionary TEF technology.

1969: Dr. Thomas Stockham begins to experiment with digital tape recording.

Bill Hanley and Company design and build the sound and lighting system for the Woodstock rock music festival.

1970: The first digital delay line, Lexicon's Delta-T 101, is introduced and becomes

ly published on DVD-ROM) as a record of what really transpired.

While the historical record is important, so too are current events. It is fitting that this society of engineers should thus employ the newest technologies to interconnect and inform its members. The Society's Web page provides current information on conventions, conferences, standards committees, and Sections. It also contains a directory of educational programs, a selection of information from the *Journal* as well as a searchable *Journal* database, and other assets and links. Communication resources will play an increasingly important role in the Society. Appropriately, the Society's recent 14th international conference on Internet audio used its Web site to publicize the event and allow on-line registration. In addition, real-time audio and video feeds of the conference activities were streamed via this site, and then archived there along with printed papers. In the future, surely Internet streaming of Society events will become commonplace, along with on-line publication retrieval, video teleconferencing and other resources that will expedite the exchange of technical information among members.

The activities of the Society are varied, ranging in size and scope, private and public, tutorial and technical, national and international, professional and social. Together, they comprise an organization that efficiently promotes the evolution of audio technology. It would be impossible to catalog all of the new technologies, improved products, brilliant ideas, creative insights, breakthrough inventions and successful career paths that have been fostered by the Society over its fifty-year history. Clearly, the 150 engineers who met in the RCA Victor Studios that evening helped to make this particular world a better place.

Ken C. Pohlmann is chairman of the Music Engineering department at the University of Miami in Coral Gables, FL, and author of numerous books and articles on digital audio technology.

PLUNKETT

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mainder of 1948 and into 1949, growth and interest in the AES was enhanced by the publication of *Audio Engineering*, later to become *Audio Magazine*, a magazine that was the industry's communications link until the development of AES's own publication, the *AES Journal*, in 1953. The *Journal* was a joint labor of love by Lewis Goodfriend and Vincent Salmon.

During the war years, a group of engineers formed a small association to contend with the shortages that had made it difficult to obtain wax and lacquer masters and sapphire styli for cutting records.

The Society, its section operations and the *AES Journal* have been responsible for the rapid growth in membership that continues today. More than 70 AES sections have been formed throughout the world. The organization has allowed audio to become both science and industry rather than avocation. To those early pioneers we owe a debt of gratitude for a job well done; a job that has had an impact on every level of the industry, from technicians to musicians, and subsequently on the general public. If the next 50 years of audio innovations even approach the breakthroughs of the first half-century, we are heading for some exciting times indeed. As it has in the past, AES will be there to support the new ideas and technologies its members develop.

PHIL RAMONE

Producer

I WOULD THINK THE change to digital is the most significant event for me. There were so many things that were not being capable of being captured unless you had a multitrack machine or there was no sync in the way we now know it. Certainly analog had its life and still does. But digital gave me more freedom, which I think is the key to making music. Especially in the '90s when you can talk about DA-88s, or an 03D or an 02R, and you can make music almost anyplace; before digital you always had to go to a studio, to a professional situation. So that's a big change from a producer's point of view; from an engineer's point of view, it's made life much more flexible.

You could argue all day long about whether digital matches analog sound—that's what pros argue about. But the future is sitting right in front of us, and I have to give credit to the digital world for that. It's changed the approach for production.

TONY BROWN

Producer/President, MCA /Nashville

IT WOULD HAVE to be digital recording. What I love about country music is the great acoustic guitar sounds, the fiddles—when I hear an instrument I like to be able to hear it like it sounds. On the rock 'n' roll and pop sides what they love about analog is the tape compression; they like the mask, and I like it without the mask. With analog you can't get digital; but with digital you can cut your tracks analog and dump it over and actually record a particular instrument in the digital domain.

1971: Denon demonstrates 18-bit PCM stereo recording using a helical-scan video recorder.

1972: Electro-Voice and CBS are licensed by Peter Scheiber to produce quadraphonic decoders using his patented matrixes.

1973: A patent is issued to Blackmer for a VCA with a log control voltage.

1974: D. B. Keele pioneers the design of "constant-directivity," high-frequency horns.

The Grateful Dead produce the "Wall of Sound" at the San Francisco Cow Palace.

1975: Digital tape recording begins to take hold in professional audio studios.

1976: Dr. Tom Stockham of Soundstream makes the first 16-bit digital recording in the U.S.

1978: The first EIAJ standard is established for the use of 14-bit PCM adaptors with VCRs

1980: 3M, Mitsubishi, Sony and Studer each introduce multitrack digital recorders.

1981: Philips demonstrates the Compact Disc (CD).

MIDI is standardized as the universal synthesizer interface.

IBM introduces a 16-bit personal computer.

1982: Sony introduces the PCM-F1. It is eagerly snapped up by professionals, sparking the digital revolution in recording equipment.

1991: Russian Section formed. St. Louis Section formed.

The Standard AES10-1991 (ANSI S4.43-1991) "AES Recommended Practice for Digital Audio Engineering—Serial Multichannel Audio Digital Interface (MADI)" is issued.

The AES-1id-1991 AES Information Document is published: "Plane wave tubes: design and practice."

The AES11-1991 AES Recommended Practice for Digital Audio Engineering is published: "Synchronization of digital audio equipment in studio operations."

The AES15-1991 (ANSI S4.49-1991) is published: "AES Recommended Practice for Sound-reinforcement Systems—Communications Interface (PA-422)."

1992: Long-awaited AES14-1992 (ANSI S4.48-1992) issued: "AES Standard for Professional Audio Equipment—Application of connectors, part 1, XLR-type polarity and gender." (Pin 1 shield, Pin 2 high, Pin 3 low). The AES/SC establishes a secretariat-level liaison with International Electrotechnical Commission (IEC) Technical Committees.

1993: Czech, Slovenian and Croatian Sections formed.

AES GOES GOLD

DR. SIDNEY HARMAN

President, Harman Audio

PERHAPS IT WAS LESS AN EVENT and more an attitude. I recognize that I am one of a handful still active in the audio industry and identified as among "those who pioneered the high-fidelity industry." But none of us—not I, not Avery Fisher, not Saul Marantz, not Herman Hosmer-Scott—really created the industry. It was the television manufacturers, because the stubbornly refused to invest any money at all in audio.

They would not even build a then-10-cent output jack onto the chassis so that a signal could be fed to a reasonable audio system, thus creating a vacuum and an opportunity into which we plunged. Or, more accurately, into which we were pulled.

Then, as now, it was very clear that the way in which audiences perceived a picture was enormously influenced by the quality of audio. Provide seven or so identical pictures with incremental improvements in the audio and a voting audience would invariably declare one of them as "the best picture." That one was, without exception, the picture with the most enhanced audio.

Because some of us believed in the rewards of good sound, the lamentable attitude of the TV makers created and drove a huge opportunity. This was for me the "event" that generated a lifetime career in audio.

GEORGE MASSENBURG

Producer

FOR ME, THE 30-YEAR experience began with the June 1967 release of The Beatles' *Sgt. Pepper.* More than any other single record before or after, this motivated the recorded music listener to think very differently about the underlying technology. Artists, engineers and producers were awakened to the enhancement of the recorded musical performance. The search was on to discover what magic technology could bring us. Within a few short years, multitracks and larger consoles were in great demand, allowing more and more flexibility. The fruits of technical manipulation supplanted musical virtuosity. Since then, the "music-making machine" has grown in heretofore unforseeable proportions. But we have made no better record than *Sgt. Pepper* in the intervening years. It should be dawning on us that the promise that technology holds is nothing more than chimerical.

JOHN G.(JAY) McKNIGHT

Magnetic Reference Lab

I CANNOT THINK OF A "most significant event"— I have seen a continuous process of innovation and improvement. All of the "big events" are the result of perfecting small new ideas, or combining several old ideas into new and better products, or even reviving some old ideas that can be better implemented with modern knowledge and technology.

COHEN

(continued from pg.101)

The raft of new information on perception, cognition, and consciousness will inform and direct our industry in the 21st century.

of the AES conventions, which draw the international and interdisciplinary creatives that populate the audio community. Our conferences, where already participation can be either in physical or virtual space, are scheduled to present pressing and pertinent information in both tutorial and technical critical-path detail. The local sections will continue to nurture new business development, serving as the "stellar nurseries" for ideas that will have global impact.

So into the near future of cable-modem-telephones and IP broadband quality multicast signals, audio goes, the ears leading the eyes, discovering the perfection of possibility, the adventure of a sound life.

1 "Wherever you go there you are," Kabat-Zinn pp. 44-45

2 "Connection Between Brain and Mind is a Two-Way Street," George Johnson, New York Times 2/25/96

3 JAMA 2/96

4 Examples include Intel New York Music Festival, a Global Internet Gathering of 60 worldwide concert venues including concerts by both signed and unsigned bands, June 1997, and Motorola and IAMM, Spring 1995.

1995: AES24-1-1995 standard protocol for sound system control issued. AES/SC is awarded an Emmy for the AES3 Digital Interface Standard.

1996: The 100th Convention held in Copenhagen. Don Plunkett's address singles out pioneering work of Joe Ooms of Philips that sparked AES activities in Europe, work carried on by Hermann Wilms and Titia Bakker.

Three Anthologies published: "Sound Reinforcement Vol. 2," "Loudspeakers Vol. 3: Systems and Crossover Networks" and "Loudspeakers Vol. 4: Transducers, Measurement and Evaluation."

1997: AESC establishes official Category-D liaisons with IEC TC 100 subcommittees, raising possibility of joint IEC-AES standards.

The 14th International Conference, internetaudio.aes.org held in Seattle. For the first time, sessions streamed live on the Internet.

The 103rd Convention: "AES Goes Gold, Celebrating 50 Years as the Global Forum for Professional Audio," held in New York City. Beginning a year of special events that will trace our history and look forward to an exciting future for the Society.

1983: Fiber optic cable is used for long-distance digital audio transmission, linking New York and Washington, D.C.

1984: The Apple Corporation markets the Macintosh computer.

11986: The first digital consoles appear.

R-DAT recorders are introduced in Japan.

1987: Digidesign markets a Macintosh-based digital work station using DAT for storage.

1990: ISDN telephone links are offered for high-end studio use.

1991: Alesis unveils the ADAT, the first "affordable" digital multitrack recorder..

1992: Digital audio data-reduction record/play hardware and software is offered to consumers as Sony's MiniDisc and Philips DCC.

1993: In the first extensive use of "distance recording" via ISDN, producer Phil Ramone records the *Duets* album with Frank Sinatra.

Mackie unveils the first "affordable" 8-bus analog console.

1994: Yamaha unveils the ProMix 01, the first "affordable" digital multitrack console.

1995: The first solid-state audio recorder, the Nagra ARES-C, is introduced. It is a battery-operated field unit recording on PCMCIA cards using MPEG-2 audio compression.

1996: Experimental digital recordings are made at 24 bits and 96 kHz.

1997: DVD video discs and players are now commercially available. An audio version with 6-channel surround sound is expected within two years.

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How String Cheese Incident makes life on the road better by carrying their own PA

THE LATEST LIVE SOUND GEAR
PAGE 124

HAVE SYSTEM, WILL TRAVEL

TAKING YOUR OWN PA ON THE ROAD OFFERS SOUND ENGINEERS PLENTY OF ADVANTAGES

By Steve La Cerra

STRING CHEESE TO GO: The band gets mixed reactions from club owners when they show up with their own PA.

It's no big secret to readers of *EQ* that good live sound can be difficult to achieve, especially on a club and theater tour where there's no PA company touring with the band. But consistently having good sound is key to a band's live reputation and, in turn, helps build its fan base. In the case of String Cheese Incident, good sound has helped the band step from the club circuit into the small theater circuit. This concept was paramount to the band's house engineer, John O'Leary, who wanted String Cheese Incident to have the best possible production they could afford on a nightly basis.

Based out of Crested Butte, CO, String Cheese Incident consists of five musicians. Referring to themselves as the "all-weather, Latin-funk, jazz band," they currently tour the United States more than 200 days per year and have built a large following by playing yearly festivals such as the Telluride Bluegrass Festival, the High Sierra Music Festival, and the Carbondale Mountain Fair. In addition to these yearly festivals, String Cheese Incident also regularly performs sold-out shows at the Fox Theater in Boulder, CO as well as 200- to 1000-seat rooms on the U.S. club and theater circuit. While playing such varied venues, any all-weather, Latin-funk, jazz band must — of course— maintain sonic integrity. String Cheese Incident manages to carry their own PA to ensure this, but it's not the usual stacks, racks, and console. John O'Leary has found an interesting solution for tackling this problem.

NOT A CHEESY PA

"Our house system consists of four Meyer CQ-2's (one fifteen and a horn) and two Meyer 650-P's (dual-18-inch subs)," begins John. "We have a Soundcraft Spirit Live console and a Meyer LD-1A line driver — which is key to using our system in conjunction with other systems." As far as PA gear goes, that's about it. Sure, the band has some outboard processing, but really, that's it — because the Meyer cabinets are all self-powered. Since the cabs contain the limiters, crossovers, and power amps, there are no drive racks or amp racks. The PA system, along with the band's instruments and personal gear, pack into a small trailer that hitches to the back of their tour bus.

As O'Leary mentioned, the LD-1A is a key element in making this system work, both alone and in conjunction with an existing house PA. The stereo mix output signal from the Spirit console is sent into the LD-1A, which provides gain, crossover, mute, and EQ for four outputs (sub and mid/high for left and right). These outputs are run down four returns of an audio snake up to the stage where the signals break out. From the stage box, the low-frequency signals are patched to the inputs of the two 650-P's and the mid/high signals are patched to the input of one CQ-2 per side. The additional CQ-2 on each side is daisy-chained from the first with a four-foot cable and a through jack on the first CQ-2.

While the system is actually tri-amped, John needs to deal with only one crossover point (the CQ-2's are internally crossed over at 900 Hz). His preference is to crossover from subs to mids at 80 Hz. After that, "it's just a matter of listening. Depending on the characteristics of the room I might make the CQ's louder and turn the

the magic depends on the source im- cessor is as easy to use.

EQ IN REVIEW

ART 2-Channel Dual Levelar

More than just the price is right with this good-sounding compressor/limiter

BY D. W. GEORGE

EQ LAB REPORT

MANUFACTURER: ART (Applied Research & Technology), 215 Tremont St., Rochester, NY 14608. Tel: 716-436-2720. E-mail: artroch@aol.com.

APPLICATION: Compress dynamic range for individual instruments and stereo program material.

SUMMARY: It doesn't just sound sweet, the price is also right.

STRENGTHS: Classic compressor/limiter sound; no wall wart; 1/4-inch and XLR audio I/O; hard-wired bypass

WEAKNESSES: Could use more output level; knobs can be touchy to adjust

PRICE: $329 **EQ FREE LIT. #:** 127

Luckily, some classic studio technology just won't go away — like the 12AX7 twin triode tube used in everything from great-sounding old Fender guitar amps to the most modern mic pres. Or Western Electric-era, –20 to +3 dB, analog VU meters, which are still used on lots of prestige pro recording gear.

Or, for that matter, the electro-optical compressor/leveling amplifier. ART's 2-Channel Dual Levelar, a very inexpensive, 1U space, 12AX7 tube-powered (plus op amps) compressor, uses technology similar to many of the oldest and most venerated compressor/limiters.

For certain uses, nothing else sounds like an optical compressor. It's not at all transparent (compared to most VCA or especially "finite response" DSP designs), but the LDR (Light Dependent Resistor) design is musical in its effect on sound. And this ART Box is no exception.

Since different compression schemes create their own effects (and, really, compression is used as a "sound" as often as it is to prevent clipping from ruining a mix), let's look at three common compressor/limiter uses.

1. Minimize overloading while recording (e.g., keeping the singer from hitting the input channel's dynamic limits or A/D converters too hard).

2. As an effect, to "squeeze" more power out of drums and acoustical and electrical guitars (think of the Byrds 12-string guitar sound — crushed by compression), and to create more intimacy from a vocalist.

3. Process your multitrack mix before its final stereo incarnation as a mastered CD or cassette. This appl-


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SETTING LEVELS

The Levelar does not come with input metering, so here's a little trick to roughly determine when you are driving this critter's electronics too hard. As you slowly raise the signal level going into the box, leave both Threshold knobs set hard right. When the yellow "Thresh" LED starts to flicker, you are starting to go beyond what the compressor likes to see at its input to sound its very best.

cation, called "program limiting," can put a special sheen and punch on a well-mixed track, and even help a mediocre one.

The Levelar manages to do all of the above, and, generally, does them all extraordinarily well.

ANALOG OPTICAL

The Levelar uses Light Dependent Resistor technology, one of the very first methods used for audio compression. With an LDR (ART's are made by Vactrol), a tiny "photo-resistive" element is optically coupled to an LED inside a light-proof epoxy glob. The LED receives a voltage corresponding to the envelope of the audio to be compressed, so the LED's brightness fluctuates according to the music's level, which varies the photo-resistor's resistance. Inserting this special "variable resistor" in an op amp's feedback loop (or, in another design, in a attenuating input network) causes the LDR resistance to drop with loud signals, which turns down the gain. With lower-level signals, the LDR resistance rises to increase gain. This negative control feedback tends to maintain a consistent output level. So, *voilà!* Inverse feedback = steady gain = compression! Electro-optical compression. Trust me, it works.

For "limiting," the LED voltage signal is made even more sensitive to the incoming signal, so that the feedback causes even more radical feedback changes — reductions — in level, which really put an absolute limit on signal amplitude. All that's left from a circuitry standpoint is user-selected timing elements that vary the speed of the response (the Levelar offers "fast" and "auto"), as well as input/output niceties.

LDRs aren't the only way to compress — for instance, tube circuits can use separate grids within a tube to maintain or reduce gain, as in the much-sought-after classic (and wildly expensive) vintage Fairchild 670 compressors. FET control elements were also popular in pro gear, but are now mainly used in stomp box guitar sustainers. They can sound good, but usually have limited dynamic range.

Lately, the most common gain control element seems to be the VCA (voltage-controlled amplifier) integrated circuit, such as those manufactured by THAT corporation and used in dbx and Alesis, among others, limiters. Digitally speaking, DSP can create compression as well.

Of all these elements, the LDR has the most identifiable and characteristic sound. Many people would class its attack and decay characteristics, its "sound," as so pleasing as to equal the highly sophisticated and expensive classic tube models in terms of musicality. The LDR is slightly different; it is a "smidge" (technical term) less complex in nature in the sound and force of its compression compared to tube circuits. And, partly because LDRs take between 5 and 15 milliseconds to achieve their effect, there is a certain aural "motion," in stereo or mono, to an instrument processed through this type of device. For example, acoustic guitars, highly compressed this way, take on a new identity — full and rich, with an almost glisteningly, surreal sonic image.

GETTING SPECIFIC

The ART Levelar uses both 1/4-inch and XLR I/O, and there's a built-in AC supply (nice). The printed specs are +20 dBm unbalanced output and +26 dBm balanced output, but this is a typo. A call to ART confirmed that the actual output is lower. Four LEDs per channel indicate processing, which is miserly compared with some units under $400 that have 26 or more! This means you have to use your ears to get the best from the unit. But that's the fun part. Another little omission: decent-sized buttons. In fact, the whole control surface and metering are kinda sparse, but they suffice.

Now the plusses: The Levelar sounds very, very cool. The closest comparison would be the long-discontinued LA-3A. The Levelar is descended from ART's little mic pres, which are consistently popular with project studios. These are based on a hybrid mix of rather "bright" sounding and inexpensive bi-fet op amps with "warm" triode low-voltage tube technology. This mix of electronics works well for audio, and ART has applied this winning tube/chip mix to this device. Smart.

Each channel has threshold and output pots and three buttons: Hardwired Bypass, Limiting/Compression, and an Automatic/Fast switch for setting attack and decay. (There's also a Stereo button to link the two sides for program material.)

Two switches with two possible positions yield four choices; here's what the ART seems to do best with each possibility:

1. Compress/Auto selected. This works best for program material. With the Stereo switch on and both channels set to Compress/Auto, almost every final mix we had on DAT or on test CDs sounded more powerful and sometimes just much better through this box. Keep checking the bypass — this sound is so compelling that it can be overdone if not frequently checked against the unprocessed signal (and don't overload). Strapping this stereo device across the stereo output of the mix bus is where one really starts to appreciate this inexpensive box's charm and power.

2. Compress/Fast. Acoustic and solo electrical guitars loved this setting, giving a hyper-clear and almost sweet, Byrds-like effect on most stringed/plucked instruments. We ran our blond, '83, stereo, electric 12-string, model 370 Rickenbacker (reputedly *the* classic electric 12-string) through a Power Entertainment stereo direct box (1.2 meg input impedance), then through to both of the ART channels, then to the multitrack's inputs. We kept the unit's Stereo Link switch off. Switching the compression on and off on the Rick's channel's powerfully showed the "vintage" effects of which this combination is capable. (Does anyone record Ricky's without compression?)

3. Limit/Fast. This worked best for that compressed kick and tom sound, but getting the right setting was trickier. It was slightly mushy with complex instruments like synths, but very powerful on kick and some P-Bass.

4. Limit/Auto. This was the most used position for general operation (especially vocals). With the buttons in

continued on page 152

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Web Site *Quick Picks*

A look at some of the Internet's coolest spots that are just waiting for you to point your browser toward them

BY CRAIG ANDERTON

The explosion of the World Wide Web means a site for just about anything, but how do you separate the wheat from the chaff? Help is on the way.

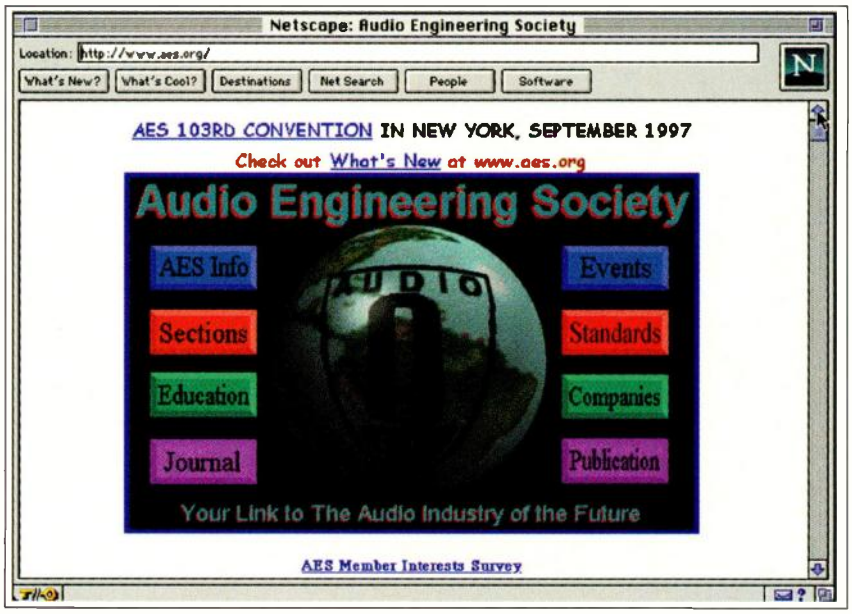
Synthcom System's Used Gear Price List (http://www.synthcom.com/cgi-bin/gear). What's the going price for that ancient effects box you want to sell? Is that advertisement for a used Pro Tools III system offering a good price or not? This site tracks price data from the *rec. music.makers.marketplace* newsgroup and collects it all in one giant database. (By the way, Synthcom is not a dealer, so don't expect to buy any of the gear; the list is for informational purposes only.)

Audio Engineering Society (http://www.aes.org). Sure, you can check out info on upcoming conventions, but there's also news about standards, a list of available publications, lots of audio-related links, and other audio-related info. If you're not an AES member and want a sample of what you're missing, this site will give you a very good idea.

Unofficial Roland VG-8 Home Page (http://asylum.cid.com/aure/vg-8/). This has reviews, downloadable patches, an edited version of the VG-8 discussion in my AOL site, FAQs, QuickTime movies, demonstration audio files (WAV format), and more. The site may not be overloaded with content, but it's well worth the visit if you have a VG-8 — and perhaps even more so if you don't, since it gives a very good idea of what the buzz is all about.

Music on the PC (http://spec.ch.man.ac.uk/~ashley/musicpc.html). Although this page is not maintained much, the excellent TR-808 and TR-909 sample sets are timeless. These were sampled from the real thing, and include several of the variations obtained by tweaking the units' knobs. Well worth the download if you need vintage drum sounds — and they're free.

Digital Domain (http://www.digido.com). Digital Domain specializes in various aspects of CD mastering and prepa-



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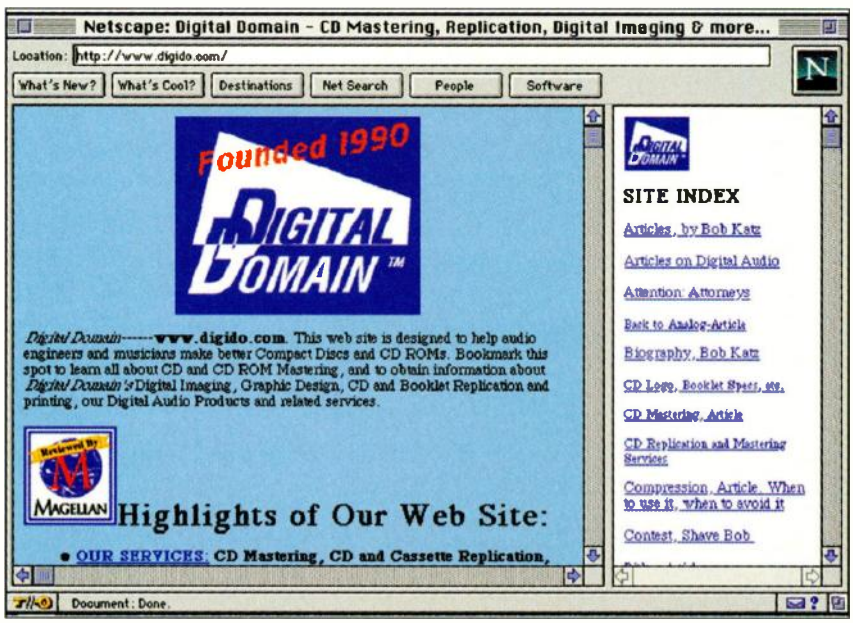

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ration, but this site is more oriented toward public service than self-promotion. There are excellent articles about CD and CD-ROM mastering, analog vs. digital processing, suggestions on how best to use compression when mastering, and so on. This is quality material, with frequent updates.

Eddie Ciletti's Tangible Technology Center (http://www.users.interport.net/~edaudio/). Yes, *EQ*'s own Eddie Ciletti has a home page, and there's plenty of information on everything from retro vacuum tubes to state-of-the-art digital mastering. Many of these are updated versions of articles Eddie did for *EQ*. While there isn't exactly a ton of material, what's there is worth reading.

East-West Sounds Online (http://www.soundsonline.com). Here's a site that takes the idea of pro audio online commerce to the next step by letting you audition samples, then purchase what you want to download (luckily, there's a search engine to help you find what you need). Want an explosion, but it's 4 AM? Dial up this site, and you're covered.

SAMPLES ON CALL: Order your samples direct from East-West's Web site.

The MiniDisc Community Page (http://www.connact.com/~eaw/minidisc/index.html). Everything you ever wanted to know about the MD and MD data media, with equal time given to pro and consumer applications. But the site goes beyond basic MD info, including all manner of digital audio material (there are even construction projects and news about a kit for optical-to-coax conversion). Bookmark this baby if you have anything to do with MD.

Ensoniq Resources on the Internet (http://www.op.net/~mikeh/ensoniq.html). This isn't an official Ensoniq page; it links to various web pages, FTP sites, patches, companies that make samples for Ensoniq products, support programs (editors, librarians, file translators, etc.), and a whole lot more. If you have anything to do with Ensoniq products, this is loaded with good stuff. Some of the links are dead, but the wheat far surpasses the chaff.

Midwest Analog Products (http://prairie.lakes.com/~map/). Okay, retro is hip. But if you're into retro do-it-yourself, resources are few and far between. M.A.P. produces a variety of kits and components for devices such as electronic drums and bass synths, as well as kits for making your own rack panels and even information on how to obtain issues of the legendary *Electronotes* newsletter. Not for everyone, but an oasis for hardcore do-it-yourselfers. EQ

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Røde Classic *Microphone*

Event Electronics hopes its latest tube mic becomes an instant "Classic"

BY STEVE LA CERRA

The Røde Classic microphone is a multipattern, dual-pressure gradient mic with a one-inch diaphragm and a tube preamplifier circuit. It comes packaged in a foam-lined, aluminum case designed to hold the mic, power supply, and a 10-meter connecting cable (all included).

One of the first things you notice about the Røde Classic mic is its considerable heft — no lightweight here, so you'd better have a competent mic stand to support it. Røde uses a 6072 tube for the preamp, which is out of production but still seems to be readily available. Cosmetically, the mic reminds me of the Neumann U47 FET, especially due to the mic stand holder/support. There are no controls on the mic itself; all adjustments are made on the front panel of the outboard power supply.

Like some of the classic multipattern tube mics from years past, the Classic operates in more than the three standard patterns. A switch on the power supply selects nine variations of figure eight through cardioid through omnidirectional, which is a nice option to have when you want (for example) just a bit of room tone from a wide cardioid pattern. A gold screw indicates the front of the Classic, and under some lighting conditions can be difficult to distinguish from the silver screw at the rear of the mic. Gold-plated Tuchel connectors are used on the ends of the cable to connect the mic to the power supply. We like the fact that these connectors screw securely into place. In addition to the Pattern-Select switch, the front panel also hosts a three-position Pad switch (0, –10 dB, and –20 dB) and a three-position Roll-Off switch, providing a multitude of combinations.

For our audition, we ran the connecting cable from the mic into the control room and placed the power supply next to the console. We really liked the fact that we could adjust the polar pattern while listening to the result without running back and forth to the studio (though larger rooms will need to make a longer cable). Changing the Polar Pattern and Roll-Off switches was totally silent, but changing the Pad switch did produce a nasty "pop." This generally seemed worse when we used the switch for the first time on a given day; subsequent switching of the control was less noisy.

the Classic on drums as an overhead/full-kit mic, placed 56 inches high between the toms (slightly towards the snare) and pointing straight

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PHOTO BY EDWARD COLVER

MANUFACTURER'S SPECIFICATIONS

Frequency Response: 20 Hz to 20 kHz, ±3 dB
Sensitivity: 13 mV/Pa
Impedance: 250 Ohms
Noise: 32 dB
Maximum SPL: 130 dB

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For information about DTS Digital Surround, please visit the Web site www.dtstech.com, or fax your mailing address to 818-879-7668 for a free information package. ■

DIGITAL dts SURROUND

Fostex

Price/performance/value have been the watchwords of the pro-audio industry for some time now, and nowhere is this more apparent than in the project studio market where Fostex Corp. of America — one of the companies that helped define the market — continues to raise the performance specifications bar and lower the price bar for the industry.

In the '80s, Fostex Corp. of America delivered a series of firsts, including the A-8 open-reel 8-track deck using 1/4-inch tape, and the X-15 Multitracker. Fostex also manufactured signal processing systems and ancillary products for the project studio market with speakers, MIDI controllers, and synchronizers while continuing to offer larger multitrack decks, such as the under-$10,000 B-16, one of the best-selling 16-track decks in history.

In the last two decades, personal and project studio recording has moved from analog tape to a variety of digital platforms, and the Fostex strategy has been to develop and adapt new recording technologies into affordable products that perform to the highest standards. Two new products the company has recently introduced, the Fostex D-90 and the Fostex D-160, continue this tradition of price/performance leadership.

The Fostex D-90 8-track hard-disk recorder and editor delivers hard-disk recording without data compression, while delivering true CD-quality sound at a price less than an ADAT. The D-160 is a 16-track nonlinear hard-disk recorder editor that is jam packed with features and options.

As new technologies emerge on a daily basis, Fostex continues to develop and market products that incorporate the best in technology and price/performance. The introduction of the DMT-8VL (8-track hard-disk multitracker @ $1295 retail) positioned Fostex with the most affordable 8-track digital multitracker in the industry. The D-90 and D-160 lead the charge of new and innovative products Fostex are currently developing, so personal and project recordists who need sound quality, features, and affordability can continue to look to Fostex for leadership into the 21st century. ■

TASCAM

For more than 27 years, TASCAM has been a leading manufacturer of innovative, high-quality professional audio equipment. As the Professional Audio Division of TEAC America, Inc., TASCAM's product line includes multitrack open reel and cassette recorders, DAT, MiniDisc, Compact Disc, DTRS® digital multitracks, mixing consoles, synchronizers, and accessories. TASCAM may best be known as the inventor of the Portstudio®, an innovative combination of recorder and mixer that is responsible for bringing multitrack recording to the masses.

Originally incorporated in 1969 as an independent operation by the same two brothers who founded TEAC, Katsuma and Tomoma Tani, TASCAM was created to identify and respond to the demanding needs of music and audio recording professionals. Employing many of today's leading-edge technologies, TASCAM continues to build upon the company's reputation for one of the most stringent quality-controlled manufacturing environments in the world.

As the recording industry has matured, TASCAM has led the way by consistently maintaining its position at the forefront of new technology. Since its inception, the company has developed many pro audio firsts. These include:

- mass-produced, 8-input, 4-bus mixing consoles
- 4- and 8-track open-reel recorders
- 4- and 8-track Portastudios
- 8-channel, 8-track 1/8-inch tape format cassette multitracks
- Hi8 DTRS digital multitracks

It is important to note that TASCAM's DA-88 DTRS digital multitrack recorder has become the de facto standard for postproduction professionals. It is also one of the world's few audio recorders to have ever been awarded the prestigious Emmy Award for technological and engineering excellence. ■

CreamWare US Inc.

CreamWare was founded in 1992 in Seiburg, Germany by 21-year-old musician and software enthusiast Frank Hund. On the power of next-generation Intel CPUs, a team of top-flite engineers was assembled to develop real-time and affordable digital audio production systems.

In just three short years, CreamWare had established itself as a leader in professional hard-disk recording systems with over 10,000 units in use. Whether it be for multitrack recording, broadcast, music, film, or multimedia production, CreamWare has a solution. The professional, feature-laden, and unique approach of the software developers has helped to create CreamWare's excellent reputation.

Frank Hund entered the North American market by joining forces with Alister Sutherland (musician, performer, and producer), Steve McKay (musician and marketing specialist), Richard Homme (musician and software engineer), and Andreas Ulfig (musician, electronic enthusiast, and business administrator) to form CreamWare US Inc. in 1996. With facilities in Washington State, British Columbia, and Ontario, an ever-expanding Web site, and a dedicated team, CreamWare US has formed a solid service- and support-based network for its dealers and end users.

The priority from the beginning has been an emphasis on software (the key to any DAW system) and how it relates to the end-users' applications and needs combined with the quality of the results, as opposed to a hardware-only and past historical viewpoint. This approach has led CreamWare's development team to the mind-boggling power of its current software, and will lead to many more cutting-edge advancements in the near future.

CreamWare US Inc. has a commitment to high-quality and an ongoing contribution to shaping the future of digital audio systems.

Contact CreamWare US Inc. at 446 Harrison St., Sumas, WA 98295. Tel: 604-527-9924. Fax: 604-527-9934. E-mail: hello@creamware.com. Web: http://www.creamware.com. ■

creamw@re©

fidelity at work.

AudioControl: A New Class of Audio Analyzer

Iasys [patent #5,555,311], a new class of audio measurement and analysis tool, is the result of an extremely dedicated group of people at AudioControl, who have invested almost 15 man years, four heads of gray hair, and two years worth of wages in lattes and espressos.

The idea for Iasys was born one typical stormy Seattle night, after many warming shots of Tequila, when a wish list of what AudioControl employees thought an analyzer should do was drawn up. The result is a useful, easy to operate test instrument that gives instant answers to everyday problems. Answers that can be addressed with the tools available to all audio professionals. Iasys gives recommended crossover points, limiter and delay settings, helps set crossover levels, indicates the equalizable spectra, and even confirms the acoustical polarity. These are just a few of the automatic tests Iasys runs. Then there are all the manual test possibilities. Signal generators built-in include a 20 Hz–20 kHz sine wave generator, programmable in 1/48 octave steps, a 20 Hz–20 kHz sweep generator, and a pink noise generator.

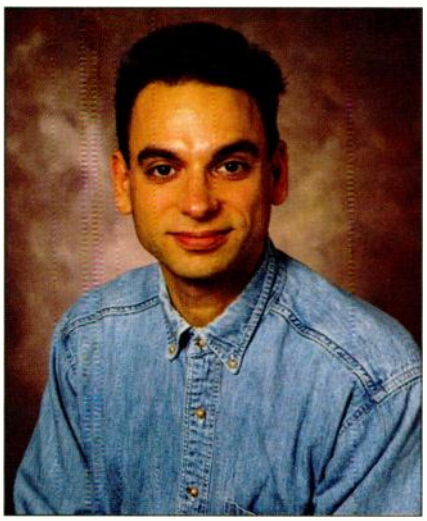
Iasys is a standalone analyzer that does not have to depend on a PC or laptop to operate. At only 9 pounds, Iasys is easy to carry in its rugged soft carrying case. The easy-to-use features of the unit do not require the operator to have a Ph.D. in electroacoustics or an enormous amount of background knowledge. When not sure what to do, use the "help" button on Iasys, and it immediately tells you what the next step is. Iasys will help every audio professional to set up faster, have consistently better sound, and a longer lasting system.

Design Team: Dwight Freeman, Dennis Griffiths, Bob Reams, and Tom Walker. ■

Digital Video Invitation

Some tips and ideas on getting started in desktop video

BY EDDIE CILETTI



Remember how much fun it was to get digital audio on your computer workstation? Ready or not, video capabilities are lurking right around the corner. At the very least, hard-disk random access makes digital workstations faster at locating and synchronizing than any tape machine.

I was lucky enough to attend Adobe's Digital Video Invitational this past summer. If you are considering a video workstation, Table 1 lists the key players. The most popular Mac-based systems are by Avid and Media 100. Both use proprietary firmware and hardware. All of the hardware — much of it for Wintel machines — is supported by Adobe's Premiere, a nonlinear video and audio editing software package. Adobe After Effects makes everything look even prettier.

Assuming that your audio expertise is the main customer "draw" at your studio, picture quality can take a back seat so long as the ability to accurately lock to picture is not compromised. If you're new to the video biz, be forewarned that the term "Broadcast Quality" is seriously overused. Suffice to say the highest quality analog video format is Beta SP and, in the digital domain, it's 10-bit CCIR-601. You will pay for image quality both in hardware and software.

Video destined for release on the 'Net is the exception. Here, quality and size are compromised just to make it work at 28.8! (And we thought CD-ROM video was bad!)

Mention "video" and the dollar signs pop up faster than you can say "real time," especially when compared to outfitting an audio facility. Video workstations are no exception, but the hidden expense — unless you are physically within an equipped facility — is the need to own a real video machine.

Standard fare is the archaic but ubiquitous 3/4-inch U-Matic format. Used decks are more affordable, but can be huge and clunky. Linear Timecode (LTC) can be placed on one of the two audio tracks or — on more expensive machines — a dedicated "address track." Vertical Interval Timecode (VITC) can be inserted into the video (at the time of transfer) and converted with a suitable reader.

A standard VHS deck would certainly be convenient. I have an older JVC consumer machine that allows timecode (or regular audio) to be inserted on the linear tracks, leaving the hi-fi audio intact. This allows me to sync to picture while tape is moving. However, the timecode is not referenced to the master, and the workstation is clueless when tape is stopped. (On professional machines, VITC is output even during "freeze" frames.)

Note: It's a good idea to have the ability to burn-in a timecode "window" over the video. (MOTU's Video Timepiece can do this.) Once recorded, frame-accurate timecode will always be displayed, even when a consumer VCR is freeze-framed. It is also helpful when using a basic AVI player, such as the plug-in provided with the Soundscape audio workstation.

At the other end of the spectrum, professional Beta SP machines start at about $5000 for the bare bones and over $50,000 for the lap of luxury. Beta SP (and better 1/2-inch decks) conform to Sony 9-pin machine control.

TABLE ONE:

A whole bunch of video-related vendors

VENDOR	INTERNET ADDRESS	PRODUCT
Adobe	www.adobe.com	Premiere and After Effects video software
Future Media Concepts	www.fmctraining.com	Training
TrueVision	www.truevision.com	video capture and export cards
miro	www.miro.com	video capture and export cards
FAST	www.2fast4u.com	video capture and export cards
Digital Production Systems	www.dps.com	video capture and export cards
Apple	www.apple.com	personal computers
Kinetix	www.ktx.com	3D *and* animation software
Intergraph	www.intergraph.com	turnkey systems
Media 100	www.media100.com	Mac-based nonlinear editor
Netpower	www.netpower.com	video capture and export cards
Blossom	www.blossomvideo.com	turnkey systems
NetShow	www.microsoft.com	Internet Video
Avid	www.avid.com	Mac- and NT-based editors

TABLE TWO:

The five video formats and their cabling requirements.

NAME	Cabling Requirements	Format Details
NTSC	Composite video via single coax cable	Combined Luminance and Chroma
S-Video	Y/C via mini DIN	Separate Luminance (Y) and Chroma (C)
Beta SP	Component (Y-U-V) Analog via 3 standard coax cables	Luminance (Y) and two color difference signals: B-Y and R-Y
CCIR-601	Component (4:2:2) Digital via single coax (serial) or via DB-25 (parallel)	Y is sampled at 13.5 MHz and the two color difference signals are sampled at 6.75 MHz. Uncompressed dynamic range of 8 bits or 10 bits.
DV	Component (4:1:1) Digital via IEEE-1394 "FireWire"	5:1 compression 3.6 MB/Sec

Luminance is the monochrome or black & white signal that contains all of the image detail. Separating the color information (Chroma) into one or more parts increases resolution and decreases artifacts.

To synchronize a workstation to a video deck, check out Mark of the Unicorn's MIDI Timepiece AV (www.motu.com) or JL Cooper's PPS-100 (www.jlcooper. com). If you don't have sync capabilities yet, consult the video capture manufacturer for a compatible card. One option is Sony 9-pin protocol, which is really a bidirectional RS-422 port that can spit out machine control while receiving timecode data from tape.

Getting video into your computer starts with a capture card. The popular video sources are detailed in Table 2. A full resolution NTSC component capture is 720 x 480 pixels (lesser cards yield 640 x 480 pixels) and requires about a megabyte per frame. Multiplying that by 30 fps will quickly generate a traffic jam (dropped frames) as the system attempts to cram 30 MB/sec on a typical hard drive capable of only 5 MB/sec or 10 MB/sec.

The two primary options for increased throughput are faster drives and data compression. Ultra-Wide SCSI drives are capable of 40 MB/sec (max). That and 2:1 Motion JPEG compression can reduce the traffic to 15 MB/sec with an undetectable loss of quality. The alternatives are standard drive arrays or serious data reduction. A Redundant Array of Inexpensive Drives (RAID) parallels two or more hard drives to increase the data transfer rate.

If size and quality are not important, simply throw away the easy stuff. NTSC sends even and odd lines on separate fields (two fields make a frame). Discarding half the lines (the height of a vertical line is equivalent to a pixel) cuts the picture size in half, typically to 320 x 240. Even the frame rate can be cut in half from 30 fps to 15 fps. Now the data rate is more manageable *before* compression. Standard QuickTime or AVI "movies" are typical of what radical compression looks like. (MPEG and motion JPEG are two examples of compression schemes.)

The most recent development is affordable digital video (DV) for both consumer and professional applications. In addition to standard analog I/O, DV also has a serial interface called IEEE-1394 or "FireWire." Using a DV camcorder to capture the signal also provides 5:1 data compression, making light work for the computer hardware (no A-to-D converter or additional compression is required).

For more information on FireWire (see the *EQ*, April '97 article by Bob Moses) and DV technology, check out the following web sites:

www.firewire.org
www.dtvgroup.com/DigVideo/FireWire/1394Page.html
www.skipstone.com/index.html
www.adaptec.com/firewire/1394ieee.html
www.ti.com/sc/docs/msp/1394/1394.html

Mr. Ciletti's e-mail address is: edaudio@interport.net or visit www.tangible-technology.com.

The Dawn of Online Commerce

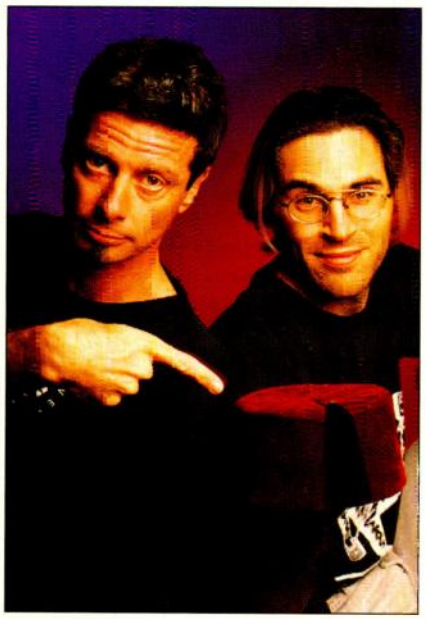


PHOTO BY STEVE JENNINGS

A look at how two different companies are selling music through the World Wide Web

BY JON LUINI & ALLEN WHITMAN

These are the times that try one's soul. Many different groups are creating many different methods to use (and abuse) the new territory of electronic distribution of music.

People have been saying for a long time that it's going to happen. Everyone now agrees it's happening, but there is, as yet, no agreement on what the time frame is and what standards to adopt. Very few of the large players want to sit down and commit time and resources. They prefer to wait and see how the mavericks will stir up the pot. They can then jump in with a large legal spoon to form the as-yet-unwritten laws.

The mavericks are in there messing around, and a number of them are likely to get the proverbial arrows in the back. One example of a maverick might be a small Web site served from an office in a suburb, assuming — mistakenly, it turns out — that they've got the rights to distribute some unreleased Jimi Hendrix material. Another might be someone with a server in a college dorm, placing enormous amounts of copyrighted music on the Web (in glorious MPEG Layer III, just because it sounds better). Both of these parties exist and have been notified by large organizations that the way they are going about distributing these files is legally wrong. Someone who has a contract with someone else is not getting paid.

That's all well and good. The accepted legal standards of financial obligation must be obliged or we have no society, or at least an environment where musicians aren't making a living. But we are working within a playground of untried possibilities. At this exploratory period in the history of audio on the Internet some have found it easier to get forgiveness than ask permission.

Historically, a CD sells through a retail outlet and everybody gets their cut. This is pretty straightforward. Full retail of, say, $15.98 means that everybody gets something tangible, even if it's just a couple of cents (usually only the artist gets that). But distributing digital media through an electronic network of computers requires a more delicate and subtle hand. Individual songs, instead of the whole album, can be purchased. (Does this indicate a classic historical reverse: the death of the album at the hands of the single?) And the meat of the matter: payment. Who gets what and how much? Experiments are being made in which downloading one piece of music will cost you, the consumer, twenty-five cents. That quarter is split evenly between the digital distribution company and the artist. But what about the label or the collection society (if, indeed, they are necessary)? Starting with a pie two-bits wide makes for some pretty small pieces to be handed around. It will require a lot of downloads to make digital distribution of recorded musical product a serious contender in the record industry's eyes.

It's clear the use of the Internet to distribute copyrighted media is changing the self-image of the music business. The important thing to remember is that purchasing music is exactly that — just the music, not the piece of plastic containing it.

Let's make some observations on a couple of groups who are attempting it right now, by whatever means available. Who died and made us The Judge? Yikes, it's another "proactive" FezGuys critique!

THE EXISTING PARADIGM FOLDED INTO THE WEB

We first visited the Web site of J-Bird Records (**www.j-bird.com**). We see a pretty simple startup page. This is good. It sucks when Web sites are a chaotic jumble of imagery and aggressive plug-ins that automatically begin screeching as soon as your presence is detected. A click away we see a simple (though rather hefty) image of an (sur-

THINGS THAT ARE NEW AND COOL

New: Headspace Audio has released Beatnik version 1.1 (**www.headspace.com**). Microsoft made another step in their quick entry into audio and video streaming by announcing a deal (that included some money!) for a minor financial stake in Progressive Networks.

Cool: A couple columns ago we told you about 9-Up, which broadcasts San Francisco bands from a rehearsal space. On the flip side of live music, also served from San Francisco, is a little place that's finally getting some attention — The Beta Lounge. Under the HotWired umbrella, The Beta Lounge has been running for some time now (though only recently got some front-page exposure from HotWired). Features include weekly audio and video streams of sharp DJs cutting live to their Web page. As you'd expect, archives of past performances make it all available all the time. Check it out at **www.betalounge.com**.

prise!) office in a record company. In this office there is a skinny blond female figure wearing a sleeveless green top sitting behind a monitor screen and not looking at you. A large message informs us that we have arrived at the location of the "First WWW Record Label." Of course, we know this is false, but it's only marketing and marketing is never intended to express (or be accepted as) truth. "Where Users Make the Hits," suggests another adline elsewhere on the page.

A "Get Signed" button attracts our attention. We figure it may be an online form for submitting your music for consideration, but what we get is a photograph of the J-Bird CEO, a man sitting on the grass with two dogs in front of a large American motorcycle. He tells us a little about himself. He used to work for two record companies: Polygram and Angel. We eventually arrive at a form. Apparently, if we, as artists, are interested in "getting signed" with J-Bird Records, we must fill this form out and J-Bird Records will use the United States Postal System to mail us a package. Here is a fine opportunity for J-Bird to take advantage of the benefits of the World Wide Web (instead of snail-mail) for more direct and efficient communication — we hope they come around to this realization soon...

Continuing our drift through the J-Bird site, we are drawn to an area called "The Lounge." Several cheesy 3D renderings make the links on this page rather difficult to find. A contest link finds us in another form in which we are promised a chance to win our choice of five CDs from the catalog of this label if we add our name to a regular mailing list. Way in the back of the "Lounge" image, nestled between clip art F-16s and flowy line drawings, is a "Jukebox." An alphabetical (by first name) listing of artists with RealAudio and Shockwave clips is provided. None of the Shockwave clips work. The first clip we try (in RealAudio) has no fade. There are no links to, or any information about, the artists and no explanation of how to acquire the music.

We visit the "Store." Here is another polygon-ish 3D rendering of a typical "record store," with signs such as classical, alternative, jazz, etc. Some are empty. If we want to purchase music we are asked to submit our request for a physical CD to be (once again) snail-mailed to us using an unencrypted order form containing our credit card information. There is a 30-day, money back guarantee. We locate some skimpy biographical information about the artists beneath the "Store" page.

There is a little "Radio" icon that, if clicked on, provides a stream of unlabeled music. On the playback window there is no mention of the title, the author, or how we can acquire it. The audio quality is RealAudio 3.0. That means you can hear it but you wouldn't want to pay money for a download with that particular quality of sound.

It's pretty clear that this Web site is not about the electronic distribution of digital media. It is a promotional tool fronting a mail-order house. Not much new ground is being broken here. There are many questions, too, that an artist may ask. What is the nature of the legal agreements? Why is this record company any better then any other? Is it really different at all?

Some of the press on the site tells

GENELEC AUDITION

continued from page 96

nets ever ran more than slightly warm to the touch, and Genelec's active circuitry added no noticeable noise to the monitoring chain.

A minor annoyance was that each of the three cabinets had to be turned on individually. We wish Genelec could have built in some kind of auto turn-on circuit, but that would certainly raise the cost. In regards to cost, don't forget that included with the speakers is a set of first-rate power amps — negating the need for an amplifier upgrade. Since the 1029A's and 1091A are available separately, a studio on a tight budget could purchase the 1029A's first and then upgrade with the addition of a 1091A.

With the 1029A/1091A system, Genelec has basically done what we have come to expect of them: deliver a great-sounding, active monitor that maintains accuracy regardless of program material and SPL. This time around the configuration and pricing are set at a price point that makes them attainable by a wider audience. And the three-piece nature of the system makes it easy to integrate into a wide variety of control rooms. Check 'em out!

MANUFACTURER: Genelec Inc., 39 Union Avenue, Sudbury, MA 01176. Tel: 508-440-7520. Circle EQ free lit. #129.
PRICE: Under $1800 for system consisting of one 1091A and two 1029A's.

ART REVIEW

continued from page 134

this position, turning the threshold provides a wide range of processing. We ended up using this setting for singer-songwriter Laura Allan, a wonderful alto vocalist, on a Polygram single remix of "Let It Go, " from the *Hold On to Your Dream* CD. Laura used a Neumann UM57 large diaphragm tube condenser mic fed directly from the Neumann line amp to the Levelar.

The mastering engineer at Sony Music Studios in Santa Monica, CA, while discussing some other digital gear used during mastering, commented on how good this mix sounded. I attribute a small but very real part of that total sound to this box.

JUST A PHASE

The Levelar's output is in-phase with the input (with pin 2 hot), both in the active and bypassed positions. While some experts think that an inverted (out of "phase") audio wavefront may not be detectable on anything other than kick drum, careful and scientific testing has proven this is not the case — even for nonexperts. Once a signal, voice, kick, snare, or guitar is "flipped" respective to real life, no amount of subtle EQ can bring it back to that same sonic reality. Fortunately that's not a problem here.

A final hint: as a new user of the device, you'll learn much from feeding any consumer CD that you know well through the Levelar and monitoring it at mid levels. By switching between settings you can get a fun, and sometimes surprising, introduction to the wonderful sound of the optical/electrical compressor. Make notes. You will use this piece of gear a lot.

In summary: It's got the optical; it's got the tubes; it's in stereo; it sounds terrific; it's not real expensive. Get one. You'll end up wanting another.

D.W. George is a pseudonym for a veteran music industry CEO who has headed the A&R departments at three major U.S. labels, and who has had a long-term interest (he was a ham radio operator at 11) in acoustics and state-of-the-art audio electronics.

RØDE AUDITION

continued from page 140

down. The polar pattern was set to one step wider than cardioid, with no pad and no roll-off, and resulted in a good tonal representation of the kit. We added some compression and a kick-drum mic and we were done — it was mono but it had that cool Lenny Kravitz retro sound, and the top end didn't wimp out under compression. Snare had plenty of smack, and the toms were full and round. Clearly heard were the mechanical rattlings of the foot pedal, so capturing detail is not a problem for this mic.

For a male vocalist, we set the mic to cardioid and noticed a very interesting thing: The Classic adds a subtle-yet-flattering low-mid coloration that fattens up a thin male voice — but not in the manner that, say, an RCA 44BX would. This is much more gentle and doesn't exaggerate the chest so much. One of the comments made by the vocalist was that the recording made through the Røde Classic sounded "more like it does in my head." Dynamics were well reproduced, and when the vocalist got in close, the Classic handled the SPL well. The same tonal quality made acoustic guitar sound a bit too big, but switching the low-frequency roll-off in all the way helped a bit, as did widening the pattern.

We also had a chance to A/B the Røde Classic with a Neumann U87 (with shock mount) for a voice-over session and observed some interesting things — one of which was that the Classic picked up a low-level buzz from the control room lighting dimmer that the U87 did not (shutting the lights cured the buzz). Both mics were connected to a Demeter H Series tube mic preamp. For identical gain settings on the Demeter unit's two channels, output from the Classic was a few dB hotter than that of the U87. The Classic, though, was also more noisy; sound coming through the U87 emerged from a more silent background. It's worth noting, however, that the U87 (which lists for about $1500 more) was a "stock" solid-state unit and, in general, tube circuitry generates more noise than solid-state circuitry.

With the voice-over artist four inches away from the mic, the U87 was thicker in the chest region, while the Classic was a bit more sibilant. The Classic's cardioid pattern was wider than the '87, which helped the Classic maintain its high-frequency response as the vocalist moved off-axis. Lack of an external shock mount made the Classic much more susceptible to stand-transmitted noise, which the U87 completely ignored. When set to the figure-eight pattern, the Classic's high-frequency response was quite uniform with only a slight roll-off of highs at 180 degrees off-axis.

Overall, the Røde Classic proved to be a solid performer in the studio. If you are looking for a high-quality studio mic that has a distinctive tonal character, check out the Røde Classic.

MANUFACTURER: Røde mics are distributed by Event Electronics, 6383 Rose Lane, Carpinteria, CA 93013. Tel: 805.566.7777. E-mail: info@ event1.com. Web: http://www. event1.com. Circle EQ free lit. #130.
PRICE: $1995.

FEZGUYS

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for the commerce of music. Whether or not that makes them a label or a distributor or some amalgamation of both remains to be seen. We're not convinced the site understands what it is, either.

Out of 65,000 individual groups, these are only two attempting to find a system that works for the business of music distribution (and sales) using the Internet. Since there is no precedent, everyone is cooking up a system with a slightly different style. Standards are simultaneously delicately considered and rushed into headlong. Hopefully these same standards will simultaneously make sense by equitably benefiting the artist and making it simple for the user. Among the bewildering smorgasbord of Internet audio entrees are many tasty and nutritious treats. You — the music lover/producer/artist/business pro — make the difference by piling your plate with audio entrees that work in real-world applications and sound good. As the quick-tongued waiter once said: "Pace is the secret to a good buffet."

May the Fez be with you!

The FezGuys encourage participation in the Internet audio community. Please stop by: http://www.fezguys.com/.

Jon Luini is a working technophile, a musician (bass player/singer) with a full-blown facility and extensive experience on the Web and no free time. He is a cofounder of IUMA, co-creator and ex-EVP of Addicted To Noise, *and cofounder and CEO of MediaCast. [jon@fezguys.com]*

Allen Whitman is a working musician (bass player/singer) with rudimentary technical knowledge and a keen, real-world interest in the practical use of the Web. He currently plays in the San Francisco-based band The Mermen and is the producer of Brine, The Anti-Surf Soundtrack. *He has been published in* San Francisco Bay Guardian, Wired Magazine, The Whole Earth Review, *and* Addicted To Noise. *[allen@fezguys.com] They welcome your comments.*

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- Switchable 10dB and 20dB pad. • 20Hz–20kHz.

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E-300

Studio Condenser Microphone

A multi-patterned side address mic that combines vintage capsule design with advanced head-amp electronics, the E-300 has an unusually wide frequency response of 10Hz to 20kHz & an exceptional dynamic range of 137 dB. It also features extremely low self noise of 11dB. Ideal for even the most critical studio applications.

Shown with optional ZM-1 Shockmount

Unique powering of all Equitek Series microphones is accomplished with a pair of rechargeable nicad 9-volt batteries in combination with 48V phantom power. This overcomes inherent current limiting associated with most phantom power supplies & can supply 10x the current.

audio-technica.

AT4050/CM5

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The AT4050 multi-pattern condenser expands upon the AT4033 to set the standard for studio performance mics.

- 2 capacitor elements.
- Cardioid, Omnidirectional, & Figure 8 polar pattern settings.
- Vapor-deposits of pure gold on specially-contoured large diaphragms are aged through 5 steps to ensure optimum characteristics over years of use.
- Transformerless circuitry results in exceptional transient response and clean output even under extremely high SPL conditions.

AZDEN

UHF Performance Series

Breaking new ground, Azden's new UHF receiver and microphone transmitters offer superb performance and features at prices far below anything you've ever seen.

411UDR UHF Receiver

- Crystal-controlled, PLL synthesized UHF receiver with 63 user-selectable channels in the 794-806 MHz band. Up to 9 systems may be used simultaneously. Features both 1/4-inch and XLR output jacks, volume adjustment and can be rack mounted.

41HT Handheld Microphone Transmitter

- Newly-designed handheld with supercardioid uni-directional mic element and 63 user-selectable channels. Uses 2 AA alkaline batteries or Azden ni-cads with the AMC-2A Charging Station.

41BT Bodypack Transmitter

- 63 user-selectable channels, input level control, standby switch, locking mini-plug connector and metal clip. Ideal for use with lavalier and headset microphones or as an instrument transmitter.

AMC Ni-cad Battery Charging Station

- Turns the 41HT into the only rechargeable UHF microphone available. (Uses Azden AN-1A nicad batteries only). Fully charged, the 41HT will run for 4 hours. Charging time is approximately 12 hours.

SENNHEISER

ME66/K6P

Short Shotgun Microphone

This road ready mic system is perfect for camera mount and other short gun applications. It's professional sound quality and affordable price combined with the flexibility of a modular setup make it a hard choice to beat.

MIXING BOARDS

MACKIE.

SR24x4 • SR32x4

Sound Reinforcement Consoles

These consolses do for live sound what the acclaimed 8-bus series has done for studio recording. Both professional grade mixing consoles, the SR32-4 and SR24-4 were built to deliver the same kind of useful features found on "bigger boards" while standing up to 24-hr-a-day use.

- Fast, accurate, easy level setting via "solo".
- 4 submix buses.
- 3 band EQ w/ sweepable mids.
- 6 Aux sends.
- Globally switchable AFL/PFL.
- Mackies "VLZ" technology for low noise.
- Tape return to main mix, mono out w/level control.

The new MS-1202, 1402, 1604 & SR Series all include VLZ (Very Low Impedance) circuitry at critical signal path points. Developed for Mackie's acclaimed 8•Bus console series, VLZ effectively reduces thermal noise and minimizes crosstalk by raising current and decreasing resistance.

TASCAM M-1600

16 & 24 Channel 8-bus Consoles

Great for modular Digital Multitrack setups and hard disk recording, the M-1600 is part of Tascam's next generation series of recording consoles. It features multiple options for inputs and outputs and uses the same, easy to install D-sub connectors as Tascam's more expensive consoles, all in "a compact design.

- XLR Mic inputs w/phantom power on 8 channels.
- Signal present/overload indicators on each channel.
- Balanced & Unbalanced tape returns & Balanced Group/Direct outputs using D-sub connectors.
- TRS Balanced Line Inputs on all channels.
- 3-band EQ with sweepable mids.
- 5 Aux sends (1 stereo)
- 4 assingable aux returns.
- Perfect for use with DA-88 and ADAT setups.

MINIDISC MULTITRACKS

TASCAM 564 Digital Portastudio

The Tascam 564 Digital Portastudio combines the flexibility and superior sound quality of digital recording with the simplicity and verstility of a portable multitrack. Using MiniDisc technology, the 564 has many powerful recording and editing features never before found in a portable 4-track machine.

JUST IN

FEATURES–

- Self-contained digital recorder/mixer.
- Uses low-cost, removable MiniDiscs.
- 2 AUX sends / 2 Stereo returns.
- 4 XLR mic inputs.
- Channel inserts on inputs 1 & 2.
- 5 takes per track, 20 patterns, 20 indexes per song.
- Random access and instant locate.
- Non-destructive editing features with undo capability include: bounce forward, cut, copy, move.
- Full-range EQ with mid-range sweep.
- S/PDIF digital output for archiving.
- MIDI clock and MTC.

SONY MDM-X4 MD Multi-Track Recorder

MD recorders are here! Offering up to 37 minutes of high-quality 4-track digital recording, the MDM-X4 is truely the next generation of personal multi-tracks. With a built-in mixer, exclusive Track Edit system, and a Jog/Shuttle wheel for sophisticated editing with ease, the MDM-X4 will encourage you to flex your creativity.

FEATURES–

- Records on high quality, removable MD data discs • 3.5-gen. ATRAC LSI for wide dynamic range.
- 10 Input / 4Bus mixer.
- 2 AUX sends, 3-band EQ. • 11-point locator.
- Random access memory for quick playback and record from anywhere on the disk.
- Editing features include Undo, Redo, & Section/Song editing for flying material between different tracks.

STUDIO MONITORS

ALESIS

NEW PRODUCT

Point Seven

DESIGNED FOR MULTI-MEDIA!

- Shielded reference monitor.
- Front ported venting system for great bass response.
- 50 watts RMS–100 watts peak @ 4Ω.
- 85Hz–27kHz, ±3dB.
- 2kHz crossover for accurate phase and a wide "sweet spot" for mixing.
- Accurate flat sound reproduction.
- Great for studio and multi-media applications.

TANNOY

PBM 6.5II

Studio Reference Monitors

The PBM 6.5 II is the industry standard for studio reference monitors. They provide true dynamic capability and real world accuracy.

- 6.5" lowfrequency driver and 3/4" tweeter
- Fully radiused and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass.

SONY

NEW PRODUCT

SMS-1P

Powered Studio Reference Monitors

The new SMS-1P monitors are perfect for post production environments. They feature 2 types of inputs with independent volume adjustment, 15 watts of power, bass/treble control and shielding for use near computer monitors.

JBL

4206 & 4208

Studio Reference Monitors

The 4206 & 4208 studio reference monitors are 6" and 8" respectively. Both offer exceptional sonic performance, setting the standard for today's multi-purpose studio environments.

- Multi-Radial baffle ABS baffle virtually eliminates baffle distortion.
- Superb imaging & reduced phase distortion.
- Pure titanium diaphragm high frequency transducer provides smooth, extended response.
- ***Magnetically shielded for use near video monitors.***

ALL ITEMS ARE COMPLETE WITH ALL ACCESSORIES AS SUPPLIED BY MANUFACTURER

CIRCLE 8 ON FREE INFO CARD

VIDEO and PRO AUDIO

Announcing our relocation on September 2, 1997 to a larger expanded facility at 420 Ninth Avenue (Between 33rd & 34th Streets) New York, N.Y. 10001

B&H PHOTO - VIDEO - PRO AUDIO

PORTABLE DAT RECORDERS

TASCAM DA-P1

- Rotary 2 head design, 2 direct drive motors.
- XLR mic/ line inputs (w/phantom power)
- Analog and S/PDIF (RCA) digital I/O.
- 32/44.1/48kHz sample rates & SCMS-free recording.
- Built in MIC limiter and 20dB pad.
- TRS jack w/ level control for monitoring.
- Includes shoulder belt, AC adapter, & battery.

HHB PDR1000/PDR1000TC

- 4 head Direct Drive transport
- XLR mic & line analog ins, 2 RCA line outs. Digital I/O includes S/PDIF (RCA) and AES/EBU (XLR).
- L/R channel mic input attenuation selector(0dB/-30dB)
- 48V phantom power, limiter & internal speaker.
- Illuminated LCD display shows clock and counter, peak level metering, margin display, battery status, ID number, tape source status and machine status.
- Nickel Metal Hydride battery powers the PDR1000 for 2 hours, AC Adapter/charger included.

PDR1000TC Additional Features–

- All standard SMPTE/EBU time codes are supported, including 24, 25, 29.97, 29.97DF, & 30 fps.
- External sync to video, field sync and word sync.

- MS1000 Master Sync module ensures drift will be no more than 1 frame in 10 hrs.
- HH1000 Headphone Matrix provides a rotary switch for selection of Stereo, Mono Left, Mono Sum, & M/S (mid-side) Stereo modes.

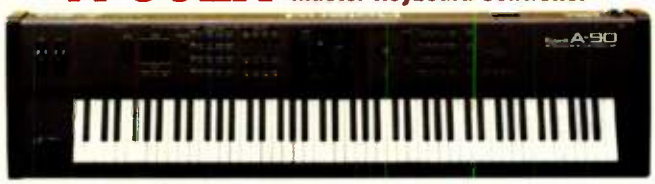
JUST IN

SONY TCD-D8

This is the least expensive portable DAT machine available. It features 48kHz, 16-bit sampling, automatic and manual recording level, a long play mode for 4 hours of recording on a 120 minute tape, & an anti-shock mechanism. It includes a carrying case, a DT-10CLA cleaning cassette and an AC-E60HG AC adaptor.

KEYBOARDS & SOUND MODULES

Roland A-90EX Master Keyboard Controller



The A-90EX is an 88-note, weighted master controller with one of the best keyboard actions currently on the market. It offers incredibly realistic piano sounds, powerful controller capabilities and 'virtual' programmable buttons which can be configured to operate your software and other devices. The A-90EX combines the majestic sound of a concert grand, the expressive action of a fine acoustic keyboard and the comprehensive MIDI functions of a master controller—all in a portable stage unit.

Roland JV-2080 64-Voice Synthesizer Module

Roland resets the standard with the incredibly expandable JV-2080 64-Voice Synthesizer Module. This amazingly powerful package offers unprecedented expandability, digital signal processing, and remarkable operational ease, all housed in a 2-unit rack-mount design.

FEATURES

- 64-Voice polyphony / 16-part multitimbral capability.
- 8 slots for SR-JV80 series expansion boards.
- 3 independant effects sets plus independant reverb/delay and chorus.
- 6 outputs, Main Stereo and 4 assignable.
- **NEW** patch finder and Phrase Preview functions for easy access to the huge selection of patches.
- Large backlit graphic display
- Compatable with the JV-1080, XP-50, and XP-80.

Roland JP-8000 Analog Modeling Synthesizer

Analog is back- FOR REAL! This synth delivers a killer array of real-time control, Roland's revolutionary new analog modeling technology, and FAT, FAT SOUNDS! The assignable ribbon controller, 4 octave keyboard, built in arpeggiator w/ external sync capability, and RPS function will make this little gem a must have for DJs and re-mixers as well as that funk musician looking for some new inspiration.

NEW PRODUCT

FEATURES–

- 8 note polyphonic, 49-key velocity sensitive keyboard.
- Newly developed DSP oscillator
- "Motion Control" recalls parameter changes in real time
- Single, Dual, & Split mode, assignable "on-the-fly".
- 128 user/ 128 preset patches, 64 user/64 preset performances.
- Tone control, 12 chorus, & 5 delay effects. *Play of soul.*

PORTABLE HARD DISK RECORDING

Roland VS-880 V2

This new version of the popular VS880 incorporates powerful additional software functions that allow you to get the most out of this baby's incredilbe creative potential.

FEATURES–

- Auto Mixing Fuction records and plays back your mix in realtime
- Easy recording with an inserted effect in "INPUT-TRACK" mode.
- Process the master output with a specific inserted effect such as total compression
- Scene change by MIDI program change message.
- Simultaneous playback of 6 tracks in MASTER MODE recording.
- Digital output with copy protection.
- 10 additional effect algorithms (30 total) including Voice Transformer, Mic Simulator, 19-band Vocoder, Hum Cancelor, Lo-Fi Scunc Processor, Space Chorus, Reverb 2, 4-band Parametric EQ, 10-band Graphic EQ, and Vocal Canceller.
- 100 additional preset effects patches
- Use MIDI program & control change messages to edit and change effects.
- In total, over 20 powerful and convenient features in editing/sync sections have been added. Some require the optional effects expansion board

Fostex DMT-8 VL

The latest in the Fostex HD recording family, the DMT-8 VL truely brings the familiarity of the personal multi-track to the digital domain.

FEATURES–

- 18 bit A/D, 20 bit D/A conversion
- Built in 8 channel mixer, Ch 1&2 feature mic & line level
- 2 band EQ and 2 AUX sends per channel
- Cut/Copy/Move/Paste within single or multiple tracks.
- Built-in MIDI Sync., 6 memory locations.
- Dual function Jog/Shuttle wheel provides digital "scrub" from tape or buffer without pitch change 1/2X to 16X.
- Divide the drive into 5 seperate "virtual reels", each with it's own timing information.
- **NO COMPRESSION!**

NEW PRODUCT

MIDI

OPCODE Studio 5 LX Macintosh MIDI Interface

The Studio 5 LX is arguably the most advanced MIDI interface on the market today. It incorporates a MIDI patchbay, MIDI processor, and SMPTE synchronizer with its interface functions, all in a 2 rack space unit.

- 15 Independant MIDI ins and outs.
- SMPTE reads and writes all formats– 24, 25/29.97/29.97DF/and 30.
- Network multiple units, 240 MIDI channels each.
- 128 patches, unlimited virtual instrument controls.
- 2 assignable footswitch inputs, 1 controller input.
- 8X speed when used with OMS.
- Internal power supply.

Studio 3 & 4 MIDI interfaces, and Vision 3.5 sequencing software also available.

JUST IN

Mark of the Unicorn MIDI Time Piece AV 8x8 Mac/PC MIDI Interface

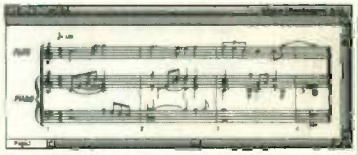
The MTP AV takes the world renowned MTP II and adds syncronization that you really need like video genlock, ADAT sync, and word clock sync, even Digidesign superclock!

- Same unit works on both Mac & PC platforms.
- 8x8 MIDI merge matrix, 128 MIDI channels.
- Fully programmable from the front panel.
- 128 scene, battery-backed memory.
- Fast 1x mode for hogh-speed MIDI data transfer.

Pocket Express Mac/PC MIDI Interface

With the pocket express you get a 2 in, 4 out, 32-channel interface that supports both Mac and PC. It also features a computer bypass button that allows you to use it ***EVEN WHEN THE COMPUTER IS TURNED OFF.***

Digital Performer Macintosh MIDI Sequencer w/ Integrated Digital Audio

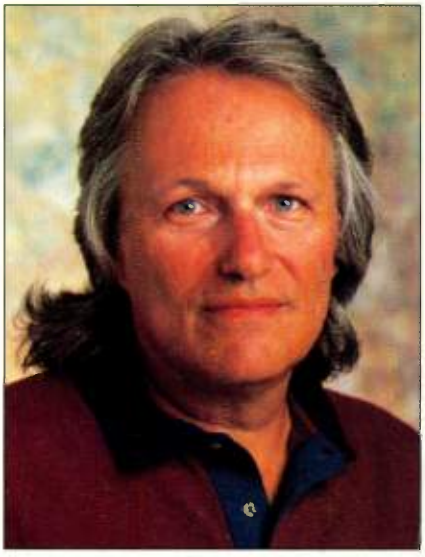


Digital Performer contains all of the sequencing capabilities of Performer V.5 and adds Digital Audio to the picture. Apply effects such as Groove Quantize, shift, velocity scaling and more- ***All in REALTIME.***

- MIDI Machine Conrol, Quicktime Video playback.
- Sample rate conversion.
- Spectral effects, pitch correction.
- Real-time editing and effects processing.
- Complete Notation.

I Feel **Used**

When it comes to being a Gear Slut, cool used gear counts, too



BY ROGER NICHOLS

Are you trying to stretch your dollar ten times its normal size to buy all of the cool gear that you want for your studio? Check out the used gear at your local music retailer. Quite often you can find some great stuff for ten cents on the dollar.

THIS MONTH, REVERBS

The one single area that can make your mixes sound like a million bucks is the reverb department. If you have just one reverb unit and send everything into it for ambience enhancement, then the mix starts to sound like you just sent the final mix through a Fisher Space Expander. (A spring reverb from the '60s, often found in the trunk of '57 Chevys hooked up to the car radio. It made a great sound when you drove over railroad tracks.) The spring reverb may sound great on one particular instrument, but not on everything all the time.

Each reverb unit has a "character" to its sound. It is like when you double vocals, or double horn parts, or double guitar parts. If you use more than one singer, the vocals sound bigger and fatter (no reference to the size of the singer). Two different sax players playing in unison sound better than one guy doubling his part. Using a different guitar for the double makes the sound "much bigger" than performing the double with the same instrument.

The same thing happens with reverbs. If you have two or three inexpensive reverbs, you can create a final mix that will sound as good as if you just had one very expensive reverb. The best possible combination would be one high-quality reverb supplemented by a couple of inexpensive units.

For project studios, the high-quality reverbs aren't actually that expensive. The new Lexicon MPX-1 costs a small fraction of its bigger brother, the 480-XL, but contains some of the same reverbs. The Sony V-77, Lexicon 300, Yamaha Pro-R3, and others are excellent high-end machines.

The one area that can make your mixes sound like a million bucks is the reverb department.

PREVIOUSLY OWNED TREASURES

One of my favorite reverbs is the Sony MU-R201. I use it on every project, including the Steely Dan mixes. This was a unit made by Sony for Ibanez. Toward the end of its marketing life, Sony sold it with Sony labels and some software updates. Ten years ago it was priced at over $1000, and worth every penny. I have seen them in pawn shops in Hollywood for under $200. The coolest feature of the MU-R201 is that it is a true stereo reverb.

Let me digress a moment and explain stereoness as it pertains to reverbs. The first reverb chambers were actually rooms with nonparallel walls coated with very hard shellac that sounded much like your shower (hopefully without the water running). For reverb, you placed a speaker in the room and sent some of the vocal signal into it. A well-placed microphone picked up the reverb and was routed back to a mic input on the console where it was added to the mix. Stereo-sounding reverb was accomplished by adding a second microphone and even a second speaker, but into the same room where all of the sound was mushed (highly technical term) together.

SIMULATED ROOMS

It took a lot of room (pun intended) for these echo chambers. Good sounding ones were worth their weight in gold. Capitol Records had the best chambers in Hollywood and rented them out to other studios via class-A phone lines.

EMT reverb plates were the next step in reverb technology. It turned out that if you stretch a four by eight foot steel plate real tight and connect a speaker coil to it, the sound field and reflections off the edge of the steel plate act much the same as they do in a live room. The first plates were mono, but a second microphone pickup was added later for stereo returns.

As technology progressed, there were smaller plates made of gold foil and the first electronic reverb, the 3-foot tall EMT-150, that looked like a close cousin of R2-D2. Once electronic reverbs hit the scene, they multiplied like mushroom spores. (Did you hear the one about the girl who only dated mushrooms because she wanted a FUN-GUY to go home with?)

WEREN'T WE TALKING ABOUT STEREO?

Yes we were. If you have an musician standing in the center of a room, the sound takes the same amount of time to get to the left wall and the right wall. If you move him closer to the left wall, those times will be shorter, but the reverb time to the right wall will be longer.

Most electronic reverbs sum the left and right inputs and use a single reverb al-

continued on page 168

Get Something More Than Just Great Sound from Neumann

SPECIAL REBATES AND NEW TLM 193 STEREO SET FROM NEUMANN

Engineers, producers, and performers all across the world demand Neumann microphones for the same simple reason: they are the best sounding mics available anywhere. Right now, however, we offer an additional compelling reason to buy Neumann. Purchase a new Stereo Set of TLM 193 Large-Diaphragm Condenser Microphones (see rebate tag) by September 30th, 1997, and we will send you a $200 rebate plus an elegant and sturdy carrying case to hold both mics and accessories. Or, purchase a single TLM 193 in the same time period and we will send you a $100 rebate.

$200 Rebate
PLUS A FREE CARRYING CASE
When you purchase a TLM 193 Stereo Set:
- Two TLM 193 Microphones
- Two Shockmounts
- Two Windscreens
- Two Cables

$100 Rebate
When you purchase one TLM 193 by September 30th, 1997.

With a frequency response of 20Hz to 20kHz, dynamic range of 130dB, self noise of 10dB-A, and maximum SPL of 140dB, the TLM 193 offers superlative performance. For a limited time, you can own a Neumann—the choice of those who can hear the difference—for a truly exceptional price.

Offers valid through September 30th, 1997 only. To receive your rebate and carrying case, simply send us your dated receipt along with the microphone warranty card(s).

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