Special PC QUARTERLY Report

# EQ

THE PROJECT RECORDING & SOUND MAGAZINE

AUGUST • 1997

From Oxford to O2R: Roger Nichols's Digital Console Update

# Growing Up Zappa

*Dweezil moves into a project studio all his own*

- *Yamaha 03D In Review*
- *Live Recording Techniques*
- *Ambience Au Natural*
- *Building a Studio Network*

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World Radio History

# World Class Reverb Within Your Reach

Sure, you can reach for your rack to get great multieffects. But for the most dense, natural-sounding reverb and ambient processing, you don't have to leave the sweet spot ever again. The Alesis **Wedge**™ provides a fast 24-bit DSP engine, four real-time sliders for quick, easy editing, balanced inputs and outputs and the convenient Impulse Audition™ button. More importantly, it offers the most realistic hall, room and plate reverbs you can imagine. All in an affordable package that stays right where you need it most.

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It's at your Alesis Dealer today.

## WEDGE™

*For more information about the Wedge, see your Authorized Alesis Dealer or call 800-5-ALESIS.*
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ALESIS

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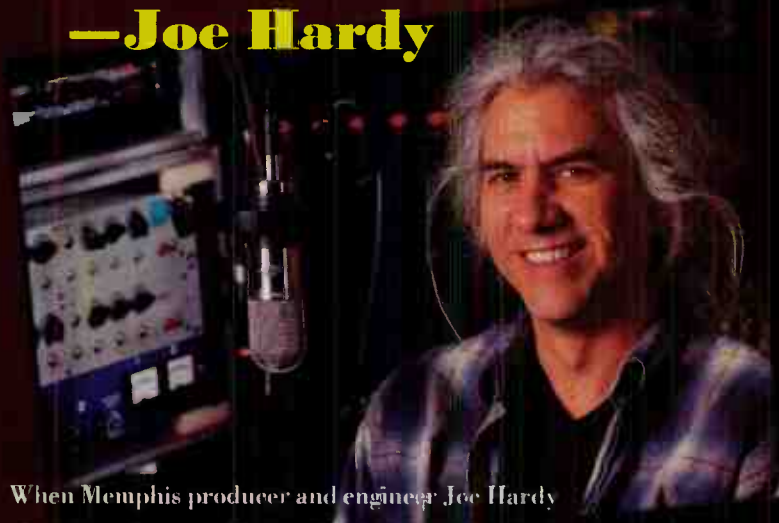
CIRCLE 07 ON FREE INFO CARD

# "An indispensable tool for digital recording..."

## —Joe Hardy



When Memphis producer and engineer Joe Hardy (ZZ Top, The Jeff Healey Band, The Radiators, etc.) is working to capture an artist's unique sound, he relies on the Peavey PVM™ T9000 condenser tube microphone. With its self-polarized condenser capsule and vacuum tube preamp, the PVM T9000 mic gives him the mellow warmth that can only come from a tube.

The uniform cardioid polar pattern makes it perfect for studio vocals, and because it easily handles SPLs up to 137 dB, Joe can count on it when high SPL instrument applications are required.

The PVM T9000 also includes a 10 dB attenuator and 200 Hz low-cut filter switches to control the variables that could hex an otherwise good session.

To complete the package, the system comes with shockmount/heat-sink, special cable and power supply.

The PVM T9000 tube microphone from Peavey Audio Media Research. Trusted by the best!

# PVM™ T9000

PEAVEY
Audio Media Research

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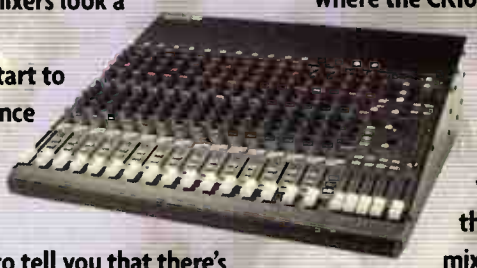
CIRCLE 43 ON FREE INFO CARD

CR1604-VLZ

# More professionals channel their creativity through

When you page through this magazine, you're going to see a multitude of ads for compact mixers. Some of the mixers look a lot like our CR1604-VLZ™. Heck, even some of the ads for other 16-channel mixers look a lot like Mackie ads[1].



Pretty soon, you may start to wonder how much difference there really is between all the various mixer makes and models.

Naturally, we're going to tell you that there's a VAST difference between the CR1604-VLZ™ and other 16-channel mixers[2].

[1] Dense, fine print type. Lots of lines and arrows pointing to features. Textured backgrounds.

[2] There ARE vast differences too numerous to mention without resorting to dense, fine print...with textured backgrounds.

But luckily, you don't have to take our word for it. One of the best, unbiased benchmarks of mixer performance is who uses it. And that's where the CR1604-VLZ™ blows the competition in the weeds. We're the overwhelming choice of professionals who can afford any mixer they want. And who have taken the time to listen to every mixer on the market.

Send for our thick, color tabloid brochure[1] and we'll include a comprehensive list of distinguished CR1604-VLZ™ users. It includes familiar names like the Tonight Show, The Late Show and Saturday Night Live bands, The Presidents of the United States of America, Ronnie Montrose, Microsoft®,

A short Grant Reeves bio: Music for Sony, U.S. Navy, Anheiser, Busch, Apple, Fujitsu, Hewlett-Packard, Hitachi Data Systems, NASA, Siemens, UNISYS, United Way, Airborne Express, LSI Logic, McKesson Health Systems, Pyramid, Las Vegas Chamber of Commerce, Austin Chamber of Commerce, Applied Materials, Weyerhauser, KIRO-TV, KICU-TV, KMPG Peat Marwick, among others. Six Gold Tellys, Joeys and other industry awards. For more information, log onto www.GrantReeves.com.

[3] Mention in this ad is intended only to denote useage or ownership as reported to Mackie Designs. Mention is in no way intended to represent a specific or implied endorsement by the individuals, groups, programs or production companies listed.

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World Radio History

# CR1604-VLZs than through any other 16-channel mixer.

sound design wizard Frank Serafine, Jet Propulsion Labs and all four national TV networks[3].

The list also includes a lot of folks you may not have heard of... a huge group of pros who make their living creating music for ads, documentaries, corporate videos and multimedia. Real live, bonafied electronic musicians like Grant Reeves, shown below with his CR1604-VLZ™, sequencer and air guitar.

Bottom line, part one: Everything you track and mix down goes through your mixer. It needs the low noise floor, maximum mix headroom, pristine microphone preamps, and musical, natural EQ for which Mackie is renowned.

Bottom line, part two: You spend more session time in front of your mixer than you do with any other single component in your studio. You want a console that's intuitive, flexible and easy to use... for thousands upon thousands of hours. Ask somebody who owns a Mackie CR1604-VLZ™ and one of the first things they'll probably mention are the "little things," the myriad small details that make the mixer a joy to work with.

Then visit your nearest Mackie Dealer and start channeling your creative impulses through a real CR1604-VLZ™.

One of the six industry awards won by the CR1604-VLZ.

No way were we going to get this ad past Greg Mackie without at least SOME informative fine print. First, the CR1604-VLZ basics: 16 x 4 x 2 configuration with 16 mic and 16 line inputs ■ 16 inserts & 8 direct outs ■ 6 aux sends per channel ■ 2 master aux sends & 4 aux returns ■ 4-band EQ with wide sweepable midrange ■ AFL/ PFL solo ■ Large emitter geometry discret mic preamps. There's more! Here's a list of CR1604-VLZ features and components NOT found on other comparably-priced 16-channel mixers. ■ Unique multi-way rotating input/output pod ■ In-place stereo solo ■ Constant- loudness pan pots ■ UnityPlus gain structure for easy level setting, low noise and high headroom ■ Negative gain mix amp architecture to handle 16 simultaneous HOT inputs without distortion ■ Wideband sweepable midrange EQ ■ Sharp, 18dB/octave low cut filters on every channel ■ RUDE solo light ■ Control Room/Phone source matrix ■ Effects To Monitors on Aux Returns 1 & 2 ■ True logarithmic-taper 60mm faders ■ Balanced inputs & outputs (except headphone, tape in/outs, and direct outs) ■ Comprehensive, easy-to-read manual.

Below: a few of the 100+ folks and one uncontinent Chihuahua (not shown) who work at Mackie Designs in Woodinville, WA, 20 miles northeast of Seattle.

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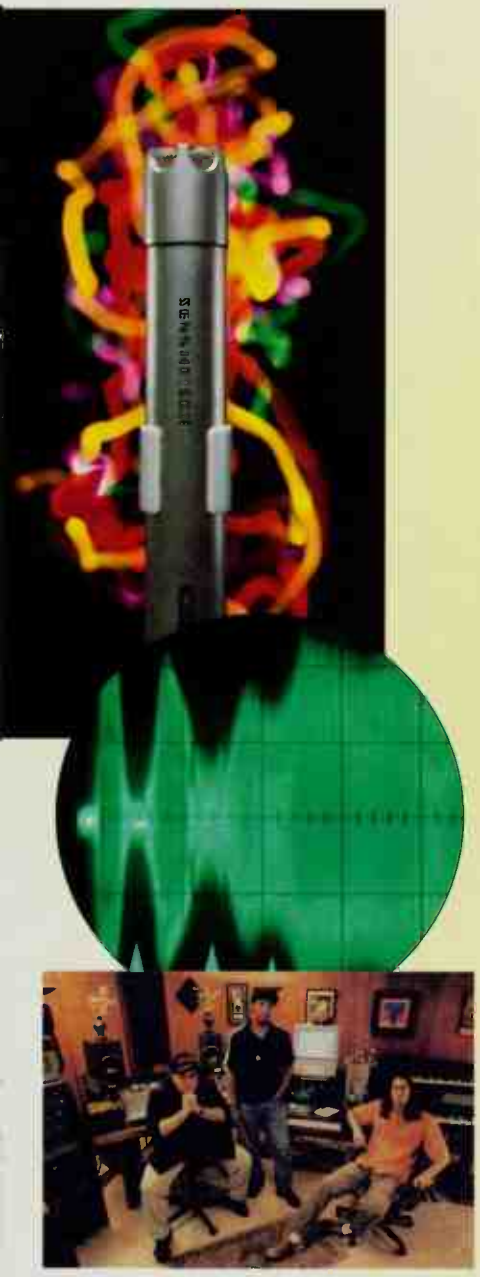



**ON THE COVER:**
*Dweezil Zappa sits in his project studio.*
*Photo by Mr. Bonzai.*

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*The Bonzai Beat falls into the spotlight with this insightful look at Dweezil Zappa's project studio — located within the larger project studio built by his father, Frank. Also learn Dweezil's techniques for recording guitar and writing songs.*

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You may not believe in the word new...anymore

You may not believe there are no compromises...anymore

And you may not believe you can get more than you pay for...

# One digital mixing console will be considered the #1 buy in America and you will believe

The TM-D8000 conquers the most brutal place on the planet...

## YOUR WALLET

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TASCAM
CHANGES EVERYTHING

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Miller Freeman
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# 100,000 *ADATs Later*

## How time flies when you're cutting tracks

If any single product defines this era in recording history, it is the Alesis ADAT. Sure the product has spawned hugely successful competitive and compatible products. Sure the 8-bus console and the digital audio workstation are also leading candidates for this distinction. But, when it was announced last month that Alesis had shipped one hundred grand of these hot-rodded, digital 8-track VCRs, it became loud and clear that we are, after all, recording in the ADAT Age.

The full extent of the impact of the introduction of an affordable, high-quality digital 8-track format will be felt for many years to come. Where would Greg Mackie be if it weren't for the ADAT? Would there be a hugely successful competitive format for project, commercial, and postproduction studios from TASCAM and Sony utilizing the 8 mm format? Would there be tens of thousands of project studios out there?

*EQ* came on the scene at exactly the same time as the ADAT was introduced and, no doubt, its introduction and the product's resultant impact on musicians, engineers, and producers created a vital role for our special brand of hands-on, how-to editorial.

Probably nobody will truly ever be able to gauge the full effect that ADATs have had on the music scene at the end of the millennium. How many hit records were made on ADATs? How many gigabytes of digital audio recordings are now stored on VHS tape? How many tracks of digital ADAT recordings have been cut? I guess some things we'll never know.

We do know that....

• If you took every S-VHS tape used for ADAT recording since 1992, then opened the cassettes, unspooled the tapes and spliced them together, the resulting length of tape would wrap around the earth almost 10 times.

• If you stacked 100,000 ADATs in a single rack, the rack would have to be 43,750 feet high.

• Much like the average American family having 2.3 children, the average ADAT owner has 1.43 ADATs.

• Although Alesis has always stated that 16 ADATs can be sync'd together via the ADAT Sync Interface, the company feels sure that it is actually possible to hook up 99 ADATs this way.

At some point, somebody will write a history of the development of ADAT. In fact, next month we'll be reminiscing with Alesis founder Keith Barr and his design partner Marcus Ryle about the design process. In the meantime, chew on these multitrack memories:

• The very first ADAT is owned by Ted Keffalo, now at Event Electronics. As a regional sales guy for Alesis, Keffalo was the first to take the machine home, plug it in, and put in the first tape. Unfortunately, the designers neglected to electrically ground this prototype unit, which prompted a not-too-mild shock. Ted lived to get his next ADAT (minus grounding problem) the following day.

• The second ADAT was given to Allen Wald, then Alesis's VP of sales and marketing. He took it home for testing, hooked it up to his console, and became the first person on the planet to cut a track on an ADAT. He pressed Rewind and Play, and as the tracks began to playback from the VHS tape, Allen looked around to see with whom he could share this momentous occasion. The only other witness was his dog, who sat there with a rather quizzical expression on her face.

• Most of the folks on the original ADAT design team are now Alesis execs. This crew includes folks like Don Hannah (ADAT marketing manager), Willie McGee (director of manufacturing), David Simpao (engineering product manager, signal processors), Bob McKean (chief engineer), and even Alan Zak (Alesis president).

Hey guys, thanks for putting the power of digital multitrack recording in the hands of the masses.

*Martin Porter,*
*Executive Editor*



World Radio History

# The EVENT you know...

## (and love :-)

Even if you've never heard of Event (possible—especially if your last name is van Winkle), you already know us very well. Because Event is made up of folks who've been major players in the music and audio industries for a long, long time. Folks who've designed and manufactured some very highly respected and innovative pieces of gear—some of which you may very well own (all the cool people do).

EVENT ELECTRONICS

We founded Event on the principal that "the customer is precious." That means we make only those products that our customers want, need, and can afford. Products that provide access to new levels of musical expression. Products that put high-end, professional tools in the hands of us mere mortals. (That's right. We use the gear we make, so we build the stuff that we want in our own setups.)

We began our business with the microphones and speakers you see pictured on this page. Thanks to you—and to the kind support of the industry at large—these products have been tremendously successful. We want to give our heartfelt thanks to all of you who have bought a set of our speakers or a RØDE™ microphone. We hope you've gotten as much pleasure out of using them as we have.

# ...is just getting started. And now...

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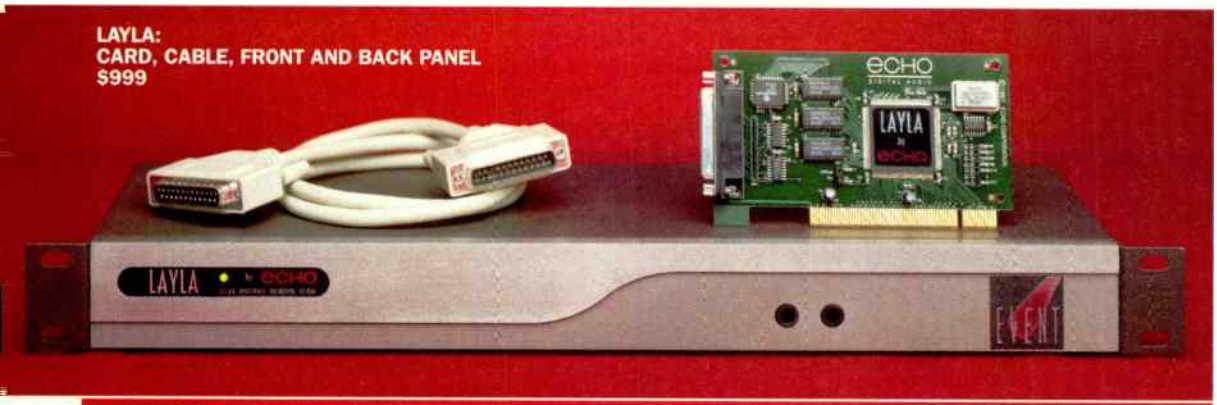
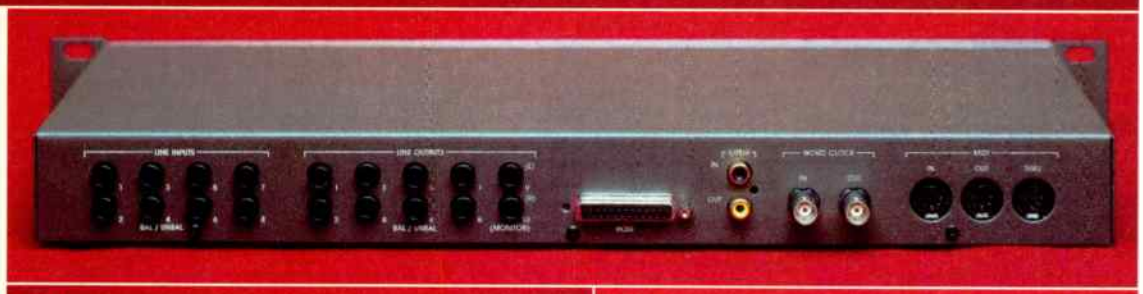
# ...the EVENT you've been



## Affordable Digital Recording Hardware

Introducing our new family of cross-platform PCI-based multitrack audio recording systems, designed by digital audio gurus (and Event strategic partner) ECHO Corporation. Our proudest offering: **Layla by ECHO™**, a rack-mount audio interface with eight balanced analog inputs, ten balanced analog outputs (ins and outs are all simultaneously accessible), digital I/O, a 24-bit signal path, massive on-board DSP, word clock (for sync and expansion), MIDI, and much, much more—all for an amazingly low $999.

Or meet **Gina by ECHO™**: two analog inputs and eight analog outputs (all 20-bit, of course), digital I/O, and on-board 24-bit DSP. Appreciate clean design? So do we. That's why all of the audio connections on *Gina* are pro-quality 1/4" jacks mounted in a rugged breakout box. Appreciate reasonable pricing? *Gina*'s $499 tag is sure to make you smile.

If you only need two analog inputs and eight analog outputs (again, all 20-bit!), on-board DSP, and a breakout box loaded with RCA audio connectors, then say hello to **Darla by ECHO™**—priced to fit just about anyone's budget at only $349. (No, that's not a misprint.)

All three systems are compatible with audio recording and editing software applications that "talk" to the Microsoft Windows 95 .WAV device driver—which means you don't have to give up your favorite software in order to take advantage of the fantastic sound quality that Layla, Gina, and Darla offer. You can, for example (with full apologies to all of the fine software programs we're unintentionally leaving out), run Cakewalk Software's Cakewalk Pro Audio™. Or Steinberg's Cubase Audio™ and WaveLab™. Or Emagic's Logic Audio™. Or Innovative Quality Software's SAW Plus™. Or Sonic Foundry's Sound Forge™. Or Syntrillium Software's Cool Edit Pro™. (In fact, a custom version of Cool Edit Pro comes with each Layla, Gina, and Darla system, so you can be up and running even if you don't already own multi-track recording software.)

Plug-ins? You bet. Including perennial favorites from Waves and Arboretum Systems.

And since getting up and running is half the battle (a battle we firmly believe you shouldn't have to fight) all three systems are true Plug-and-Play™ compliant. We even give you a utilities disk that examines your system before installation, so you know exactly what performance you'll be able to achieve.

Don't worry. We haven't forgotten our Mac-based friends. Our PowerPC-compatible systems (same hardware, new drivers) are coming this summer. Prepare to be stunned.

## Precision Monitoring Systems

Building on the technological innovations that arose from the 20/20*bas* development, our intrepid engineers, Frank Kelly and Walter Dick, set out to create an active monitoring system that would be a perfect complement to the digital audio workstation environment. Requirements: small footprint, reference-quality frequency response, non-fatiguing to the ears over long periods of use, magnetically shielded, and *way* cool looks (!). The result: the **Tria™ Triamplified Workstation Monitoring System.** This integrated three-piece system comprises a floor-mounted VLF (Very Low Frequency) driver housed in a station that is also home to five separate power amplifiers, active crossovers, and a full set of calibrated trim and level controls, plus

## RØDE™ NT1

### Large Diaphragm Condenser Microphone

Hot on the heels of the awesomely successful NT2 comes the **NT1**, a true large diaphragm condenser microphone. Like its predecessor, the NT1 boasts low-noise transformerless FET circuitry, and features the highest quality components. With a 1" gold-sputtered diaphragm inside a proprietary shock-mounting system, a unique head design that provides both durability and pop filtering (while remaining acoustically transparent), and a wide dynamic range that makes the mic ideal for use in a wide variety of applications, the NT1 is destined to become a fixture in the modern project and professional studio. And at only $499, it's just plain scary.

# waiting for.

two biamplified satellite speakers, each with a 5-1/4" polypropylene cone driver and 1" neodymium soft dome high frequency driver.

What's truly remarkable is that the biamplified satellite speakers reproduce frequencies down to an incredible 55Hz, so the listener experiences full-range sound when positioned in the direct field (that is, sitting in front of a computer screen). With the addition of the VLF station, the system response reaches down to 35Hz, resulting in full bandwidth audio reproduction that is as accurate, precise, and pleasing to the ear as our award-winning 20/20*bas* system. You simply must hear **Tria** to believe it. Even then, you may not believe the price: $849. (Yes, that's for the *entire* system.)

The **20/20*p***™ is a direct field monitor designed to provide an affordable pathway into the world of powered speakers. Utilizing the proven 20/20 design, the system comprises a 20/20 cabinet with two full-range 100 watt power amplifiers—one of the amps drives the powered cabinet, the other drives a passive 20/20 satellite. The resulting sonic clarity is exactly what you'd expect from a system bearing the 20/20 name: extended low frequency response, exceptionally clear midrange, and sparkling high end. What does this kind of audio quality cost? A low, low $599 per pair.

As with all of our active monitoring systems, the **Tria** and **20/20*p*** offer continuously variable high and low frequency trim controls, input gain controls, balanced inputs with gold combination 1/4"/XLR connectors, and full magnetic shielding.

## ESW-1 Speaker Switcher

Bet you were almost going to pass over this part. After all, a speaker switcher isn't exactly the most exciting product in the world. But the **ESW-1™ Speaker Switcher** delivers breakthrough performance and functionality, thanks to the clever engineering of Peter Madnick, who has long been a fixture in high-end audio equipment design. (He's actually pretty scary, possessing serious chops in both the analog and digital domains.)

What makes the ESW-1 unique among switchers is its ability to simultaneously handle both active and passive monitoring systems. Of the six pairs of speakers that can be connected, up to three sets can be active. Switching among them is as easy as pressing a front-panel button. Or use the included remote control so you never have to leave the sweet spot when switching. Naturally, the audio path is beautifully transparent and the switching noiseless. There is one thing about the ESW-1 that we haven't quite figured out: If you own a pair of Event monitors, why would you have any other speakers that you needed to switch to?

## EMP-1 Microphone Preamplifier

What better to complement a RØDE Classic, NT2, or NT1, than a custom microphone preamp that combines superior sonic performance with the features demanded by today's studio professionals? (Okay, we admit the thing sounds pretty amazing with other brands of mics as well.) First off, you should know that the **EMP-1™ Microphone Preamplifier** was designed by engineering wizard Peter Madnick. Why is that important? Because, in Peter's own inimitable words, it means that the unit features a transformerless design utilizing a common-mode choke input *[translation: RF interference is virtually eliminated]*, a superior differential input *amplifier [translation: EM interference is suppressed]*, and servo control to maintain zero DC offset *[translation: There are no distortion-inducing capacitors]*. Ahem. Thank you for those fascinating explanations, Peter.

Put in terms the rest of might have a chance relating to: The EMP-1 offers ultra low noise operation, selectable phase, low cut filtering, phantom power, a line output (for running directly into *Layla*, perhaps?), and an internal power supply—all in a downright sexy little box. Now, what does all that mean? It means that the EMP-1 is a mic pre worthy of your finest microphones. (Don't let its low $299 price tag fool you. This preamp is the real thing.)

EVENT ELECTRONICS

We're Event Electronics. Thanks for taking the time to see what we're about. We hope you like what we're doing; please let us know. We'd love to hear from you.

For more detailed information on any of our products—and for amusing photos of prominent members of our industry caught in embarrassing situations—visit our Web site, **www.event1.com.** Or e-mail us directly at **info@event1.com.** Literature on specific products may be obtained by calling **805-566-7777, ext. 555.**

*Specifications and features are subject to change.*

World Radio History

CIRCLE 16 ON FREE INFO CARD

## LETTERS ON LETTERS

I am surprised that *EQ* saw fit to print the letter from Brendan Harkin in the July issue criticizing your article on Ben Vaughn's "car project." I can not remember ever seeing such a vicious and unprofessional attack in any reputable publication, and wonder why you saw fit to publish the ravings of such an individual at all.

Mr. Harkin clearly feels the need to mark his territory by claiming that records can only be made in a "real" studio like his, and that Ben Vaughn recorded in his car simply as a gimmick. It would, of course, be interesting to learn what Harkin's real studio consists of, but the real point is that it doesn't appear that Harkin has ever heard the Vaughn record, and with all records, isn't it the music that counts (and wasn't that the point of the article)? I have to assume that with Harkin's logic we should also classify such things as the Alan Lomax field recordings as "gimmicks" as well, since they utilized marginal equipment under less-than-real studio conditions, not to mention all the great early Atlantic R&B records that were cut not in a studio but in the Atlantic offices after hours. The list of such "non-studio" recordings is endless, and the distinction pointless.

I don't recall Mr. Vaughn claiming that all records should be made in a car, or not made in a studio. In fact, I have engineered several successful and critically acclaimed projects produced by him in my "real" studio, and have always enjoyed the experience.

Perhaps Mr. Harkin will eventually extricate his head from his posterior so he can use his ears to evaluate a record and the music on it, but I suspect he doesn't know how something like that actually works.

*Mark Linett*
*Glendale, CA*

[*Thanks for the support Mark, but the reason we print negative letters is to show the full range of opinions that exist in the industry. Every opinion is valid, including both yours and Brendan Harkin's (of course, we like yours better). The world would be a boring place if everybody thought the same way, and we try to use this page to create a dialog and keep people thinking. We welcome all comments. —Ed.*]

## MORE ON MASSENBURG

I just read the extended opinion from George Massenburg in your April issue. I must say I'm a bit disappointed at his "more golden ears than thou" attitude. He hasn't heard a decent hihat in 15 years? *Sheesh.* Apart from the implication that he has much better ears than us mere mortals, it makes me reconsider my interest in purchasing his equalizer.

There is one point that analog evangelists will not touch, however: Hasn't anybody considered the fact that good old analog tape is composed of a finite quantity of iron oxide particles per inch? This means that on a quasi-molecular level, all analog recordings are quantized: those particles can be polarized one way or the other.

Yes, the particles are randomly distributed over the surface of the acetate (e.g., they aren't all pointing in one direction), and perhaps the particles can acquire a smoothly variable charge, but, ultimately, it's one particle, one vector — and that is a quantity, not a truly smoothly variable function. The different directions and varying charges of the particles do not create a smoothly variable waveform. They create the audio equivalent of an anti-aliased image.

The only recording media that have hope of capturing a smoothly variating waveform is the direct-to-disc LP or wax cylinder. Digital, at a very high sampling rate and bit depth, offers the next best thing. Some people, obviously inadequate to the task, are deluded into thinking that 44.1 kHz at 16-bit is enough. The very nerve! Why, such miscreants would (shudder) perhaps even suggest that project studios (mostly Massenburg-free zones) can make good sounding music. *Gawds!*

*Bob Vandiver, M.D.*
*Orin Du Chat Studios*
*Portland, OR*

## MIC PREAMBLE

The mic preamp shoot-out in the June issue of *EQ* was very enjoyable and informative. We may never achieve that straight wire with gain, but modern mic pres are extremely close. And low cost doesn't always mean poor quality. It's like the t-shirt this lovely girl was wearing on the beach that said, "Free Sex — You Get What You Pay For!" But do you always get what you pay for? Can a pre that costs $1800 per channel (Avalon Design M5) be that much better than one for $100 per channel (Peavey A/A-8P)? Your ears will have to decide.

Now I would like to take issue with one point in Mike Sokol's sidebar entitled "The Sound of Mic Preamps." Mike, you are right on the money as far as mic loading affecting performance. Way back in 1965, when I was chief engineer at United Sound Studios in Detroit, I designed one of the first solid-state recording consoles in the industry. One feature of this board was a six-position switch that selected input load resistors from 24.9 ohms to 1 kohm. The sixth position was open, so the mic would see the input impedance of the pre, about 1600 ohms. And, yes, you could really hear a difference at each switch position, especially with ribbon mics. And we recorded a lot of gold records on that board.

Now, about your circuit. The load resistor is fine, but you should not use the series build-out resistors for the following reasons: [1] Increasing the source resistance to a mic pre will increase the noise due to the Johnson noise of the resistors by the current noise of the input opamp. [2] The resistors will form a voltage divider (attenuator) with the input impedance of the amp, lowering the signal level. [3] If the pre input is transformer coupled, the higher source resistance may affect the low frequency response of the transformer. [4] Unless the two build-out resistors are matched to 0.10 percent or better, the input common-mode rejection will be degraded. [5] At last, if you are powering a mic with a phantom circuit, you may get a considerable drop in voltage to the mic.

So, yes, use the loading resistor across the mic input, but don't use build-out resistors. And Mike, I hope you get your 44-DX. I sold several of them in the early '70s for around $150 each. And then I sold a Fairchild 670 about ten years ago for $1500. Some people never learn.

*Les Cooley*
*Eltec Instruments, Inc.*
*Daytona Beach, FL*

## PUBLISHER'S CLARIFICATION

Last month's *EQ* editorial was not meant to slight the meritorious efforts of the TEC Awards. Rather, this satire was intended to encourage the TEC nominating committee to finally recognize the enormous creative contributions of the project recording community represented by the readers of *EQ* magazine. We apologize for any misunderstanding and continue our support for the goals of TEC and the charities it supports.

*—Paul Gallo, Publisher*

## CORRECTION

In our July issue, the captions to the figures in Eddie Ciletti's "Avoiding Road Kill Article" (page 98) were switched. We apologize for any confusion caused.


World Radio History

# Digital Mixers Hit Earth.

**Announcing 02R V2 and 03D mixing consoles.** The incredibly affordable Yamaha digital mixers make the world a much more productive place. From the start, the 02R has delivered spectacular sonic quality with 32-bit processing, 20-bit digital/analog conversion and direct digital interface to your digital recorder. It has also allowed you to save and instantly recall all of your mix settings and the movements of 02R's motorized faders, EQ, effects and limiter/compressor/gates. **Now, 02R V2** adds more stellar features including ► DIGITAL AUX SENDS ► 6-channel SURROUND SOUND ► REMOTE MIDI CONTROL of external devices (like multitrack and hard disk recorders) ► INPUT PATCHING so you can assign tracks from a recorder to alternate inputs ► 24-BIT RECORDING on your 16-bit multitrack ► and new automation features including TOUCH SENSITIVE FADER EMULATION. 02R V2 has 44 digital and analog inputs and lots of outputs. For the more down to earth but ambitious 8-track digital studio working with MIDI gear, the **Yamaha 03D** offers the same features in a smaller format, plus brand new 32-bit effects processors. Whether you choose 02R V2 or the new 03D digital mixer, your mixing power will take off and your mixes will sound incredible. To understand why Phil Ramone, Roger Nichols, Tom Jung and Hans Zimmer rave about Yamaha digital mixing, see these products today at a Yamaha Authorized Dealer or call **1-800-937-7171 x 644** now for literature.

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CIRCLE 60 ON FREE INFO CARD

World Radio History

## MASTERER OF THE HOUSE

**Q** *Since we are increasingly able to master our own CDs without taking out a second mortgage, could you point me in a direction for duplicating a finished product? I've noticed advertisements in the back of EQ mag, but who can be sure where to turn? Even a list of what to look for in a duplication company would be a start.*

*Stephen N. Toney*
*Akron, OH*

**A** One of the best ways to find out which CD duplication company best fits your needs is to get the phone numbers of several (at least three) that catch your eye and give them a call. Once you've gotten past the obvious question of price and basic service packages, you might want to ask how long they've been in business (this'll help weed out the fly-by-nights); can they do the graphic layouts you like and provide you with a finished, shrink-wrapped package; do they have full "in-house" services, or do they broker the services out to various other production houses (generally, it's best to go with a company that has its own in-house mastering, design artists, and duplication facilities, rather than those that farm their jobs out to different service companies — a condition that could lead to erratic quality control); what's the turn-around time (e.g., when can I have them in my hot-little hands?); and do they offer a money-back guarantee on an unacceptable finished product?

Once you've made the calls, you need to go on your gut reactions, as to who was the most knowledgeable and helpful of the bunch. Basically, who did you feel the most comfortable with. After you've narrowed your search to the "best" of the bunch, you'll want to ask for a promo package that includes samples of their CDs and artwork. Several full-service houses have guides that can help you with the various stages of CD production and distribution (for example, Disc Makers offers guides on such subjects as master tape preparation, publicizing your own CDs, and a guide to independent record distributors in the U.S.). It would also be wise to find out what kind of mastering and art preparations are required upon submitting your final material. Can the company accept your CD-R as a master? What format should the artwork or film output be in?

It may sound obvious, but make sure that you have a copy of all the material to be submitted. Murphy's Law applies to the postal service, mishandling, or mishap during production. Heck, I've even heard of entire projects being held hostage in probate court when a mastering house went bankrupt. Finally, always ask for a test pressing (also known as a reference disc) and artwork proofs *before* the final product is duplicated. It may cost a bit more, but having the final say over how a product sounds and looks before it has been mass-duplicated is well worth the lost time, anger, and frustration of receiving thousands of substandard CDs.

David Miles Huber
Contributing Editor
*EQ* Magazine

## THERE ARE NO STUPID QUESTIONS

**Q** *I hope this isn't a stupid question, but here goes: If I record eight simultaneous channel/tracks of digital audio through a PCI card with eight analog ins to a WAV file format, would I have eight individual files? I am trying to determine the size and what kind of storage medium I will need to store one 4-minute song containing 24 tracks.*

*Our band has 16 songs, 24 tracks each, and our goal is to perform editing and mix down on a DAW. I realize my Iomega 100 MB Zip drive does not even come close, so now I am determining if a 1 GB cartridge from an Iomega Jaz drive will provide the capacity to store one song, 24 tracks of unmixed digital audio. From what I read in your magazine, one minute of digital audio consumes about 10.5 MB of uncompressed space. I am not sure if that is 2-track stereo. If that is the case, when I extend out 24 tracks, assuming each track is a WAV file, I calculate about 1 GB per song! Are recordable DVD drives an option today? I understand that Ricoh has just released a portable DVD recorder for the PC that costs about $600. I also understand that a DVD can hold as much as 3 GB. Any other suggestions or recommendations would greatly be appreciated.*

*James Harrill*
*via the Internet*

**A** First, if you record eight tracks simultaneously to a typical hard-disk recording program, you will indeed end up with eight files (unless they are recorded as four interleaved stereo files). If the program does not use the WAV format as its native file format, you will probably need to "Save As" or "Export" each track as a WAV file.

As to storage, 44.1 kHz, 16-bit, uncompressed audio requires a little



CIRCLE 59 ON FREE INFO CARD
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## Want your mixes to deliver the punch and clarity of the industry heavyweights?

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*Bernie Grundman, Bernie Grundman Mastering*
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*Bob Ludwig, Gateway Mastering Studios*
*Seven Time TEC Award Winner*

**Editor's Pick 1996**

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over 5 MB per track-minute, so one minute of 24 tracks requires about 125 MB. Therefore, a typical 4-minute pop tune would take around 500 MB. Storing all this data is one of the Achilles' Heels of hard disk recording. A Jaz cartridge will do, but the cost of media is relatively expensive. A tape backup, such as Iomega's Ditto, is inexpensive (as is the cost of media) and can hold up to 2 MB of compressed data, but it takes far longer to save via tape than hard drive (several hours to backup and verify). Recordable DVD drives are not yet available to the public. [Ricoh promises to let *EQ* readers know when its DVD recordable system is ready to go.] Another option is to use CD-R; the media cost is cheap, but you can't re-use the CD. (Ricoh, however, has a rewritable CD drive, and this will become more common in the years ahead.)

Once you mix the song within the DAW, then you only have two tracks to archive. In this case, your 4-minute tune would require about 42 MB of storage. It would be easy to fit 15 mixed, 4-minute tunes on a Jaz drive, or recordable CD.

For my own purposes, I ended up choosing a tape backup system due to cost constraints. However, if you need to shuttle data to and from hard drives frequently, a Jaz or SyJet drive would probably be a better (albeit more expensive) choice.

Craig Anderton
Technology Editor
*EQ* Magazine

## A POWER LUNCH

**Q** *I have a chance to pick up a used nonpowered "API"-style lunch box that I would be loading with API 512 pres and 560 EQs. I need advice on a few details:*

*1. What type of power do the API modules take, is it 24 volts?*

*2. If it is 24 volts, could I use the same power supply that I use (or make a twin) to supply a pair of Neve 1272's?*

*3. If the API modules have a different operational voltage, is there a schematic available for such a supply that would handle this task?*

*I would rather build my own and save a bit because, as I'm sure you know, the modules are going to cost a bunch. If you could help, I would be grateful.*

*Pete Drivere*
*via the Internet*

**A** API modules require bipolar (+ *and* –) 16 volts, not including phantom power, for microphones. A real lunch box has its own built-in supply card and transformer. (There is a phantom power project in the July issue of *EQ*. You can also access that information from my Web site.)

I highly recommended that you first get the current requirements for each card. To reach API: http://www.apiaudio.com/ or call 703-455-8188. Then add up the total current for the number of modules you expect to power. To create bipolar 16 volts, you will need:

a. A 36 ~ 40 volt transformer with a center-tap rated for at least 1 amp, or two identical 18 ~ 20 volt transformers;

b. bridge rectifier(s);

c. filter caps (2200 uF ~ 4700 uF rated for 35 volts;

d. TO-220 style Regulator ICs. These can be 7815/7915 (positive/negative) if used with a single, center-tapped transformer. You can also use two 7815's if using two separate transformers. To get either up to 16 volts, place a diode in series with the "common" leg of the IC, which will raise the juice .6 volts. Be sure to heat sink the regulators.

The National Semiconductor Linear handbook has lots of power supply schematics that detail miscellaneous parts and construction recommendations.

** Do not plug in any modules until your power supply has proven stable after a 24-hour burn-in period.*

** Be sure to include both AC line fuse(s) and bipolar fuses.*

** As a load test, put 30-ohm ~ 40-ohm resistors (10 watts ~ 20 watts ) on the Supply output. You may have to cool the resistors with a fan, but don't cool the supply. Take note of how hot the ICs get and measure the output voltage under load* and *no-load conditions.*

Eddie Ciletti
Contributing Editor
*EQ* Magazine

**ASK US**

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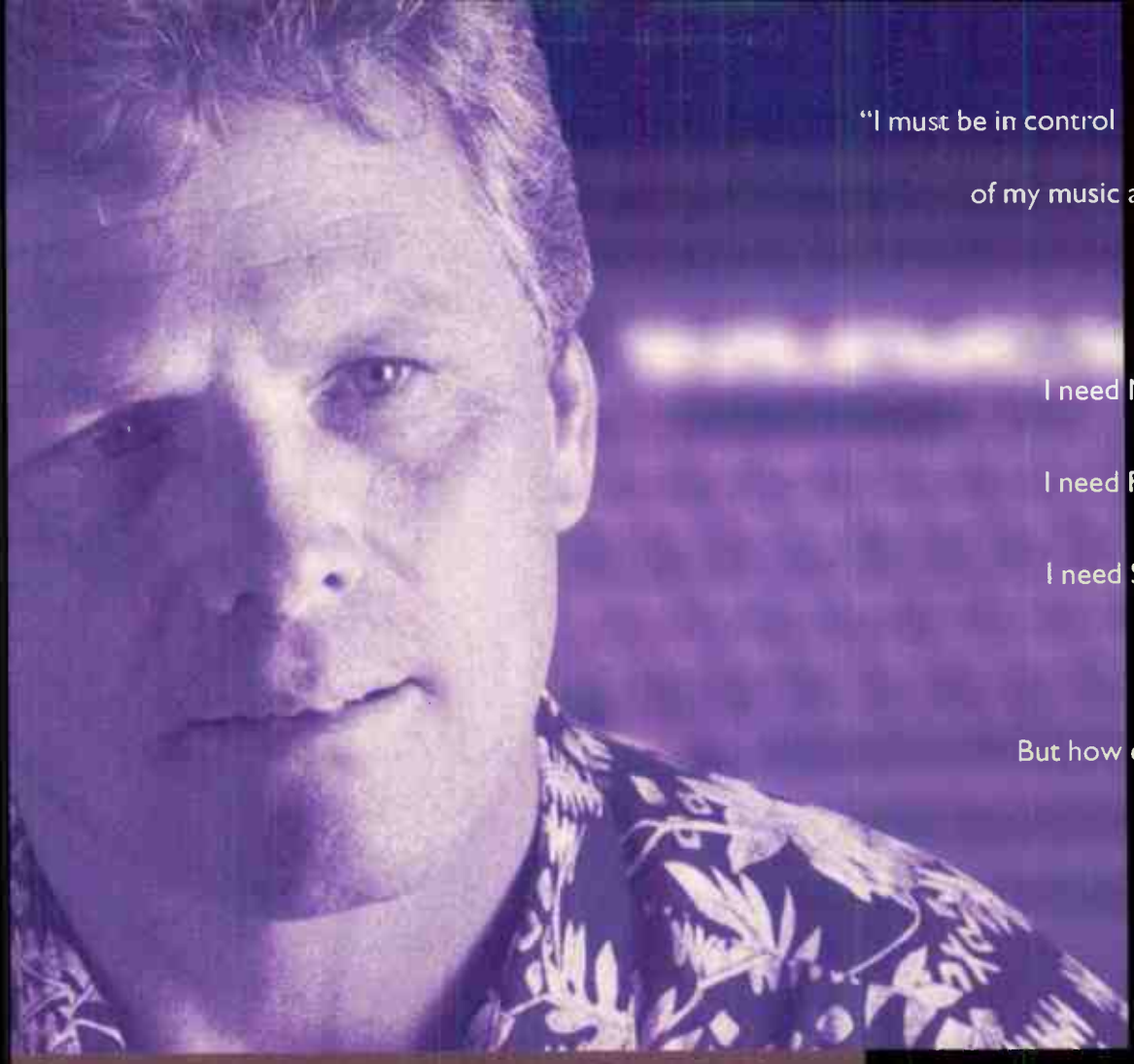

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**CIRCLE 39 ON FREE INFO CARD**

World Radio History

# EQ PRODUCT VIEWS

## MAKING PLANS FOR NIGEL

Originally designed for the Yamaha 02R, The Pro Audio Table with Speaker platforms from Nigel B. Furniture offers a 30-inch wide and 26-inch deep top laminated in Black Wilsonart — a workspace suitable for many other mixers. The Pro Audio Table features Total-Lock Wheels with Toe Brakes that simultaneously lock both the wheels and the swivel for enhanced stability. In addition to its heavy-gauge steel welded frame, the unit features a Height Adjustable Column that allows the user to either sit or stand. For more information, contact Nigel B. Furniture, 10655 W. Vanowen Street, Burbank, CA 91505-1136. Tel: 818-769-9824. Web: www.nigelb.com. Circle EQ free lit. #101.

## WHY STOP JOHN POPPER?

Middle Atlantic Products' Popper Stopper utilizes a four-layer screen to optimize its performance. The most recent incarnation of the Popper Stopper features gooseneck "memory," which helps to ensure that the screen maintains its mounting position until changed by the user. The gooseneck and mounting clamp are finished in a durable black powder-coat finish while the black layered screen is secured with an impact resistant, color coordinated plastic ring. The Popper Stopper carries a suggested retail price of $37. For more details, contact Middle Atlantic Products, Inc., North Corporate Drive, Riverdale, NJ 07457. Tel: 201-839-1011. Circle EQ free lit. #102.

## BREAKIN' ALL THE RULES

Applied Research and Technology's DST-825 Combo starts with a 12AX7A tube preamp with five gain settings including Clean Tube, Roar, Stack, Crystal, and Xtreme. The DST-825 then goes on to offer 25 digital effects chains, including delay, chorus, reverb, pitch transpose, flange, and tremolo parameters. Up to three effects can be used simultaneously. The amplifiers boast full MIDI implementation, which gives the user real-time control of gain, EQ, output, bypass, and digital signal processing and any combination of distortion, effects, and equalization can be stored in any of seventy-five presets. The 80 watts per side power amplifier was designed by Dan Pearce, and features a frequency dampening switch. The amplifier also offers a headphone jack and an XLR output. For further details, contact Applied Research and Technology, Inc., 215 Tremont Street, Rochester, NY 14608. Tel: 716-436-2720. Web: www.artroch.com. Circle EQ free lit. #103.


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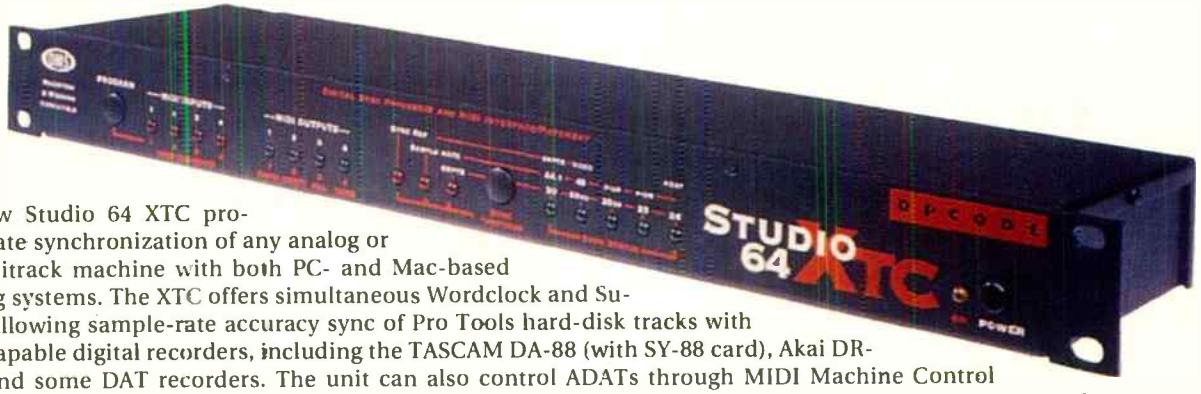


## PURE XTC

Opcode's new Studio 64 XTC provides accurate synchronization of any analog or digital multitrack machine with both PC- and Mac-based hard-disk recording systems. The XTC offers simultaneous Wordclock and Superclock outputs, allowing sample-rate accuracy sync of Pro Tools hard-disk tracks with many Wordclock-capable digital recorders, including the TASCAM DA-88 (with SY-88 card), Akai DR-4, E-mu Darwin, and some DAT recorders. The unit can also control ADATs through MIDI Machine Control (MMC) without requiring any external boxes or extra cards. The Studio 64 XTC's internal sync clock can write SMPTE as the master reference or it can generate Wordclock and Superclock from incoming SMPTE. Additionally, the XTC accepts video and blackburst signals as reference, routes MIDI timecode (MTC) and MMC, and can be used as a 4x6 MIDI interface with patchbay capabilities. The Studio 64 XTC has a suggested retail price of $495. For more details, contact Opcode Systems, 3950 Fabian Way, Suite 100, Palo Alto, CA 94303. Tel: 415-856-3333. Web: www.opcode.com. Circle EQ free lit #104.

## DAT'S AMORE

Building on the success of the original DA-20, TASCAM's new DA-20 mkII adds several new features, including: a sampling monitor function that allows signals to be monitored in either digital or analog; Auto ID detection level switching; an error-rate display function that monitors the error rate of the A and B heads; and self-diagnostic capability. The 3U rackmountable recorder is also equipped with multiple sampling rates, long play/record mode, S/PDIF digital I/O, and a wireless remote controller. Digital connections are available via the DA-20 mkII's S/PDIF digital ports, while analog connections are made using RCA pin jacks. The DA-20 mkII features a suggested retail price of $1099. For more information, contact TASCAM, 7733 Telegraph Road, Montebello, CA 90640. Tel: 213-726-0303. Circle EQ free lit. #105.

## PUTTING THE E'S IN "EFFICIENT"

Utilizing its new Energy Efficient Engine (EEEngine) technology, Yamaha Corporation of America's new "P" series amplifiers are available in three models — P1600, P3200, and P4500. EEEngine technology helps to deliver high output, cool running, and low power draw. The P1600 offers 150 watts per channel into 8 ohms (200 W into 4 ohms/400 W into 8 ohms bridged mono); the P3200 delivers 350 watts per channel into 8 ohms (480 W into 4 ohms/960 W into 8 ohms bridged mono); and the P4500 offers 500 watts per channel into 8 ohms (680 W into 4 ohms/1360 W into 8 ohms bridged). For more details, contact Yamaha Corporation of America, Professional Audio Products Dept., P.O. Box 6600, Buena Park, CA 90622. Tel: 714-522-9011. Web: www.yamaha.com. Circle EQ free lit. #106.

World Radio History

# EQ PRODUCT VIEWS

## GET MANLEY!

The Manley Labs VOX BOX is a vacuum tube-based combination of an optical compressor, tube microphone preamplifier, Pultec-style EQ, de-esser and limiter in a 3U design. The initial compressor stage offers attack, release, and threshold controls, as well as both instrument and line inputs. All of the outputs allow the user the choice of transformers or not. The second stage utilizes a Pultec-type mid EQ to adjust frequencies from 20 Hz–20 kHz. It offers three bands of passive EQ. The third, and final stage of the unit, offers a combination de-esser/limiter that's based on the Electro-Optical Limiter. The VOX BOX uses a 3 component passive approach for the EQ. The VOX BOX carries a suggested retail price of $4000. For more details, contact Manley Laboratories, 13880 Magnolia Ave, Chino, CA 91710. Tel: 909-627-4256. Web: www.manleylabs.com. Circle EQ free lit. #107.

## ROOM IN A BOX

DOD's SR400D is a two-input/two-output, full bandwidth, digital room delay that offers up to two seconds of delay on each channel. The unit is also designed to be used as a single-input/two-output delay unit for mono applications. Each channel features separate input level controls, signal indicators, and clip LEDs. Delay can be entered as feet, meters, or milliseconds, while temperature and humidity parameters can be input for precise settings. The SR400D also provides a backlit LCD display with double-high characters for easy readability. For further details, contact DOD, 8760 S. Sandy Parkway, Sandy, UT 84070. Tel: 801-566-8800. Circle EQ free lit. #108.

*In the words of the reviewers:*

*"...All you really need to know is that it is a Lexicon, it sounds as good as the name implies and it is affordable. Now go buy one."*

***Roger Nichols, EQ Magazine***

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

***Barry Cleveland, Mix Magazine***

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

***Jon Chappell, Guitar Magazine***

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

***Jim Aikin, Keyboard Magazine***

*The MPX 1 — get your hands on one today.*

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## SHURE IS A VALUE

Shure has introduced four new models of mics — three cardioid models (14A, 12A, and 10A) that are equipped with neodymium magnets and locking on/off switches, as well as the battery-powered 16A condenser. Both the 14A and 12A are designed for vocal usage and offer a frequency range of 80–14,000 Hz. The 10A has been designed for a range of applications and features an operable range extending from 80 to 12,000 Hz. The 10A also features a rubber isolation mount to reduce handling noise. The 16A is a battery-powered condenser model that features a frequency response of 50–15,000 Hz. Prices for the dynamic models range from $37.80 to $66, while the 16A lists for $101.20. For more information, contact Shure, 222 Hartrey Ave., Evanston, IL 60202. Tel: 1-800-25-SHURE. Web: www.shure.com. Circle EQ free lit. #109.

## HELD AT BAY

MIDIMAN's automated digital audio patchbay, the DigiPatch 12x6 offers six coaxial and six optical inputs for twelve independent sources routed to six paired coaxial and optical outputs, or six targets with one coaxial out and one optical out per target. The DigiPatch 12x6 routes digital audio connections between gear equipped with S/PDIF and ADAT Lite Pipe compatible digital audio connectors. The single space, full rack-mount enclosure can be programmed from the front panel or controlled remotely from a computer using the included DigiPatch Panel software for both Mac and PC. The DigiPatch 12x6 has a suggested price of $699.95. For more details, contact MIDIMAN, 45 East St. Joseph Street, Arcadia, CA 91006. Tel: 818-445-2842. Circle EQ free lit. #110.

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*Peter Freeman, Electronic Musician*

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# EQ STUDIO WARE

## AXÉ AND RECEIVE

Designed to be accessible to a wide range of users including professional musicians, non musicians, DJs, live performers, multimedia performers, and recording and postproduction studios, AXÉ from IK Multimedia is a multimedia interactive sampling CD-ROM that features Brazilian percussion grooves. The disc features 80 percussive grooves that can be combined in 20 million different ways. The disc also offers an 8-track digital percussion machine with high-quality, 44 kHz 16-bit phrases. The disc includes a multimedia guide to the instruments played in the CD with live movies of how they're played. For more information, contact ILIO Entertainments, P.O. Box 6211, Malibu, CA 90265. Tel: 818-707-7222. Web: www.ilio.com. Circle EQ free lit. #111.

## DUPE 'EM IF YOU GOT 'EM

With a starting price of $3995, DiscQuick, MicroTech Conversion Systems' CD-R copy machine, is a stand-alone duplicator that features simple 4-button panel operation and the ability to make copies from any type of CD, including disc-at-once Red book audio. The copier is built around Yamaha 400T output drives and a Pentium computer to ensure maintainability. DiscQuick offers automatic verification when requested and the LCD panel indicates copy progress and counts down multiple copies. CDs are copied at 4X speed and verified at 6X speed. For more information, contact MicroTech Conversion Systems, 2 Davis Drive, Belmont, CA 94002-3002. Tel: 800-223-3693. Web: www.microtech.com. Circle EQ free lit. #113.

## MOUNT AN OLYMPUS

Based on Olympus's new CDS630E CD-recorder mechanism, the CD-R2x6 is the lowest priced 2x6 CD-recorder with prices of $499 internal and $649 external. The CD-R2x6 is the quickest CD-R in its class, with less than a 200 msec seek time. The CD-R2x6 is designed as an internal model for Windows users with an available 5-1/4-inch removeable storage bay in its tower PC. The CD-R2x6/WIM is an external Windows unit and is designed for easy connection to most any desktop PC workstation. It features stereo audio out, headphone jacks, volume control, a SCSI diagnostic LED, and audio ground connector. Both Windows models include the newly release version 2.0 of Adaptec's Easy-CD Pro software for Windows. There is also an external MacOS model, the CD-R2x6/Mac, available for $649 with Astarte's award-winning Toast software. For further information, contact Olympus America Inc., Two Corporate Center Drive, Melville, NY 11747-3157. Tel: 800-347-4027. Web: www.olympus.com. Circle EQ free lit. #112.

## DVD, A GOLIATH

The DVD471TIII from DynaTek Automation is a complete IDE PC upgrade kit that features: a DVD drive, driver software, MPEG-2 video decoding hardware, IDE cable, and six DVD titles. The included software includes multilanguage support and a pop-up navigator control panel that allows interaction with the DVD video material. The system also comes with a plug-n-play card that's fully compatible with Windows 95. Key features include: fast 200 ms random access time; a sustained data transfer rate of 1.35 MB/s; and the ability to read all CD-ROM titles and audio CDs. List price for the DVD package is $649. For more details, contact DynaTek, 200 Bluewater Road, Bedford, Nova Scotia B4B 1G9. Tel: 902-832-3000. Web: www.dynatek.ca. Circle EQ free lit. #114.

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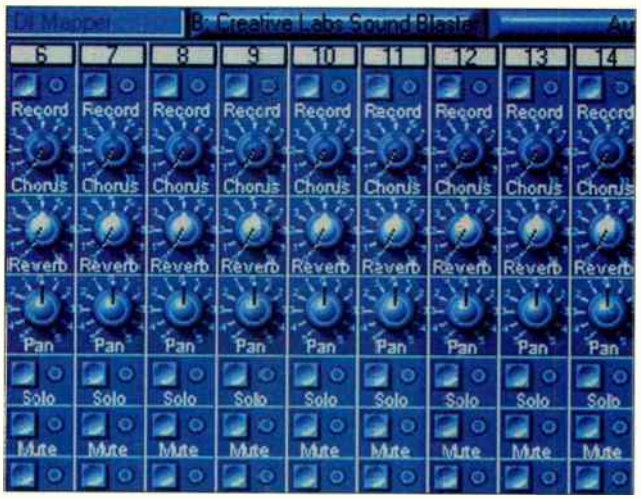
## THIS MAGIX MOMENT

MAGIX music studio 3.0, from MAGIX Entertainment, is an all-in-one hard-disk recording program and MIDI sequencer. The audio studio features eight tracks, a professional WAV editor, and supports real time video soundtrack editing, while the MIDI studio includes 128 MIDI tracks and allows you to record, edit, and play back eight audio tracks. The mixer section has all the features of a professional mixing console without the associated confusion thanks to MAGIX music studio 3.0's user-friendly interface. MAGIX music studio 3.0 also features a notation editor that prints out your compositions as sheet music with lyrics, guitar chord grids, and dynamic markings. The suggested retail price of the MAGIX music studio is $49.99. For more details, contact MAGIX Entertainment Corp., 429 Santa Monica Boulevard #120, Santa Monica, CA 90035. Tel: 310-656-0644. Circle EQ free lit. #115.

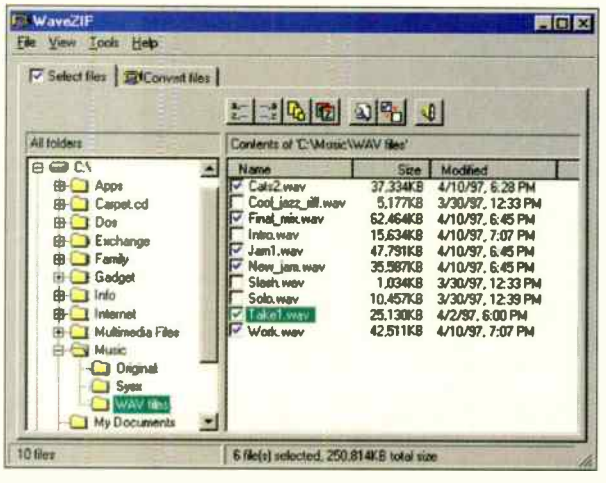



## THE DEFINITION OF "COOL"

Based on Cool Edit 96, Cool Edit Pro is a digital audio recorder, editor, and mixer for Windows. Users can mix up to 64 tracks together using just about any sound card. Features include: the ability to record, play, convert, and edit files up to 2 GB in size and in any of more than 25 formats; an array of Audio Effects modules, including reverb, multi-tap delay, 3D echo, equalizers (graphic, parametric, scientific, and "Quick"), compression, flanger, distortion, convolution, pitch change, tempo change, and more — many with real-time preview; noise and hiss reduction, as well as a click and pop eliminator. Cool Edit Pro carries a suggested retail price of $399. For more information, contact Syntrillium Software, P.O. Box 60255, Phoenix, AZ 85082-2255. Tel: 888-941-7100. Web: www.syntrillium.com. Circle EQ free lit. #116.

## ZIP IT!

WaveZIP, a new software application from Gadget Labs, has been designed to reduce the size of large digital audio WAV files. With data compression ratios of 30–60 percent depending on content, WaveZIP is completely loss-free with no degradation of audio quality. WaveZIP utilizes a Windows Explorer-type engine to allow users to find, select, and convert digital audio files. The program supports multiple PC audio file types including stereo and mono, 8- or 16-bit WAV files, raw PCM audio files and Cakewalk BUN files. The price is $49.95. A fully functional, free trial version of WaveZIP is available at www.gadgetlabs.com. For more details, contact Gadget Labs, 333 SW 5th Ave., Suite 202, Portland, OR 97204. Tel: 503-827-7371. Circle EQ free lit. #117.





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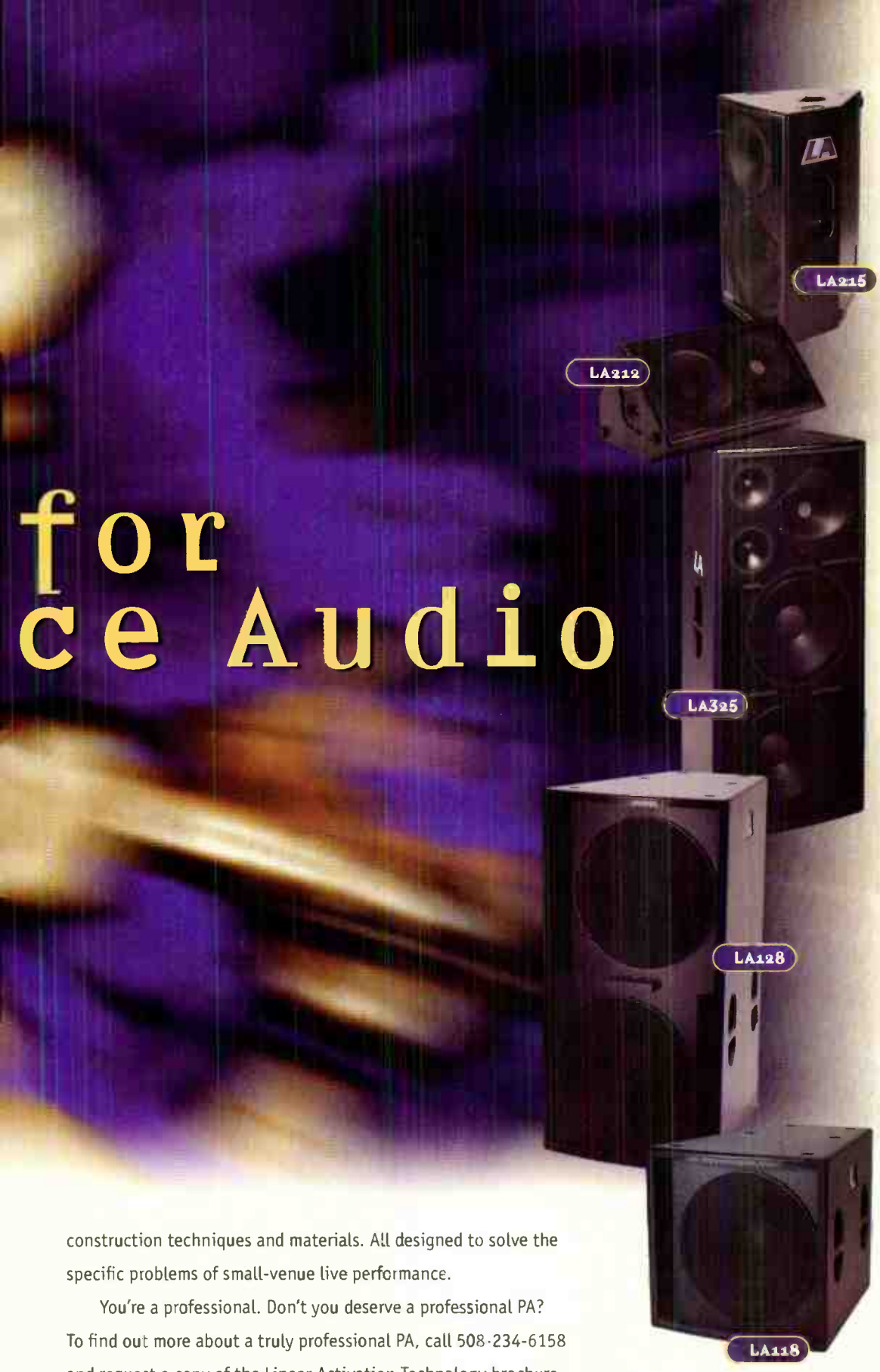


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# *Exercising Their* **Writes**

**STUDIO NAME:** Sony/ATV Music Publishing Studio
**LOCATION:** New York City
**KEY CREW:** Richard Rowe (president of Sony/ATV Music Publishing); William Garrett (producer/engineer and studio designer); Marvin Scott (studio manager)
**ARTISTS RECORDED:** Everything But the Girl, The Fugees, Shudder to Think, John Waite, Amel Larrieux, Total Commitment, Trey Lorenz
**CREDITS:** Garrett has worked on everything from New Kids On The Block to Slayer.
**CONSOLE:** Yamaha 02R
**KEYBOARDS:** Korg M1
**MIDI SOUND MODULES:** Kurzweil K2000R V3; AKAI S1000HD; Roland JV880 and R8 drum machine; E-mu Proteus/1 XR
**MONITORS:** Genelec 1031A; Yamaha NS10M; JBL 4412; Sony MDR-7506 headphones
**AMPLIFIERS:** Hafler Pro 2400 and *trans*•ana P1000
**COMPUTERS & SOFTWARE:** Apple Power Macintosh 7200; Sony Multiscan 17SF2 monitor; Opcode Vision and Studio 4 MIDI interface
**RECORDERS:** Sony PCM-800 digital recorder with SMPTE interface (two) and RM-D800 remote
**DATS:** Panasonic SV-3800; Sony PCM-2300
**OUTBOARD GEAR:** Summit Audio TPA-200B (2-channel tube mic pre); Neve 33609 stereo compressor; dbx 160A and 160XT compressors; Yamaha SPX1000 digital effects; Sony MU-R201 digital effects and DPS-D7 digital delay
**MICROPHONES:** AKG C414; Sony C48
**STUDIO NOTES:** Richard Rowe states: We are very excited about this studio. It is located in the hub of our east coast offices and it enables our writers to capture their ideas easily, quickly, and with digital fidelity. We know it's a resource our writers appreciate.

Engineer William Garrett explains the evolution of the studio: We started the studio in the fall of 1990 in a file room at our 5th Avenue location. In 1993 we moved from our 5th Avenue location to the main Sony building at 550 Madison Avenue. We had only one room, which was not acoustically designed to be a studio. We'd do all our recording and mixing in that one room. Then we moved from the 27th floor to our current location on the 18th floor. Engineer/studio designer Brad Leigh had done drawings for a redesign of the room on 27, so those drawings became the basis for the design on 18. To avoid interference from outside noise, we employed proper sound isolation plus zero seals on the doors. With solid acoustic design and a separate recording area, it's evolved from being a bunch of gear in one room to a real studio. It's a great in-house service we can

*continued on page 152*

Sony offers their artists the creative freedom of an in-house project studio



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# Sennheiser MKH 105

## A look back at one of the first RF-type condenser microphones

**MICROPHONE NAME:** Sennheiser MKH 105
**FROM THE COLLECTION OF:** Klay Anderson/ Klay Anderson Audio
**YEAR INTRODUCED:** 1963
**TYPE OF MIC:** Solid-state RF condenser
**POLAR PATTERN:** Omnidirectional
**FREQUENCY RANGE:** 20 Hz to 20,000 Hz
**OUTPUT LEVEL:** –27 dBm (ref: 1 mW/10 dynes/square cm)
**IMPEDANCE:** Approximately 10 ohms
**EQUIVALENT NOISE LEVEL:** 19 dB (DIN 45045 A-Weighted)
**TOTAL HARMONIC DISTORTION:** ≤5% at 100 µbar
**POWER SUPPLY VOLTAGE:** 10 volts, ±1 volt (from external power supply)
**OPERATING CURRENT:** Approximately 5 milliamps
**TEMPERATURE RANGE:** 14 to 158 degrees F
**DIMENSIONS:** 5" long x .75" diameter
**WEIGHT:** 3.2 ounces
**MIC NOTES:** As one of the earliest RF-type condenser microphones, the Sennheiser MKH 105 holds an important place in the history of the condenser mic, as well as in the Sennheiser line. Unlike typical condenser designs, its element is not DC-biased. Instead, the element functions as part of an RF circuit, operating in a manner similar to an FM detector. It is inherently a low-impedance design, making the capsule quite insensitive to EM interference. The MKH 105 uses an outboard "AB" power supply for balanced operation. Sennheiser also produced a version with unbalanced output (the MKH 104) and a phantom-powered version (the MKH 106). Its RF operating principle, combined with the true-pressure transducer element, can extend low-frequency response down to the near 0 Hz area. Sennheiser produced instrumentation versions based on this principle — the MKH 110 and MKH 110-1 — which were actually capable of capturing frequencies down to 0.1 Hz.
**USER TIPS:** Due to its design, the MKH 105 is relatively insensitive to temperature and humidity conditions. There is a slight rise of 3–4 dB in the high-frequency response up to about 12 kHz. Low-frequency response is rolled off electronically to prevent ground-transmitted noise (such as from an air conditioner or subway train) from appearing in the audio output. EQ

PHOTO BY EDWARD COLVER



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# 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 analog 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.

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# What's the deal?

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# Otari PicMix

## Otari lets you add surround sound capabilities to your existing console

**BY STEVE LA CERRA**

There's no question that use of surround sound formats is on the increase. Feature films, videos, and (more recently) music-only DVDs are being released in surround formats such as Dolby Stereo, Dolby Digital, DTS (Digital Theater Systems) Stereo, and Sony's SDDS. Mixing for these formats can be a scary proposition for the average studio because, in the past, a dedicated (and usually expensive) postproduction-style desk was necessary to accommodate the requisite bussing. This leaves music production studios with two basic choices: (1) toss your current console and buy a new surround-capable console, or (2) find a way to "upgrade" the existing console to surround-capability. Otari's PicMix is the tool by which you can effectively use your current console for making surround sound mixes in a variety of formats.

To digress for a very brief moment, let's take a look at a "5.1" format such as DTS. The five main channels are left, center, right, left surround, and right surround. The ".1" refers to the (sixth) subwoofer channel. In order to do a mix in a 5.1 format, your console must have at least six busses. Various effects, music, and dialogue would be mixed through the console to these six busses and the resultant audio groups would be recorded to (for example) an 8-track digital multitrack that acts as a multitrack mixdown deck. Fine. Now how are you going to monitor this stuff in your control room? That's where PicMix comes in.

A PicMix system is comprised of several different hardware modules. Essential to the system is the Monitor Master Rack, which furnishes the basic audio interfacing. Eight dual-input channels are provided, each allowing for audio switching between "Direct" and "Playback" sources. Direct refers to the signal being sent *to* your multitrack mixdown deck while Playback refers to the signal being played back *from* your mixdown deck.

You might be wondering why this switching is provided. Think about doing a surround mix: at some point in the mix process, you might need to either play the mix back or punch in a section. In the case of a punch, you'll need to monitor playback from the mixdown deck until the punch-in point. At the instant you punch in, you'll need to monitor the input to the mixdown deck (just like any "normal" overdub situation). Monitor Master silently handles this switching and also includes a hard-wired stereo bypass for traditional stereo mix situations.

The Monitor Master also provides eight monitor bus outputs that are intended to feed your power amplifiers for the various surround channels. Any audio channel can be assigned to any monitor bus, and a front-panel LED matrix indicates which busses are assigned to what loudspeaker channels. Since there are 36 monitor presets, you could instantly reconfigure your mix rig from Dolby Stereo to DTS. Monitor output level can be set in 1 dB steps from 20 to 105 dB SPL, allowing overall speaker level adjustment. Calibrated insert points are also provided in case you need to patch in a codec.

If you find that you need more audio inputs, you can add a Monitor Slave — a 2-rack-space unit that provides eight more dual-input channels and has its own LED assignment matrix. Up to three Monitor Slaves may be added to a PicMix system for a total of 32 dual inputs. Audio inputs and outputs to the Monitor Slave and Monitor Master are electronically balanced at +4 on DB25 connectors and the units are compatible with just about any multi-bus audio console.

One of the options available in the PicMix system is the Monitor Controller, an 8.8- x 10.5-inch control panel that can live ei-

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ther in or on top of your console. A single Controller has eight physical control strips assignable to any of the tape machine tracks, allowing remote solo and mute functions. Solo and mute functions can also be executed on the eight output busses from the Controller. Any control strip can be assigned as a "virtual machine master." This would allow you to, for example, take ten or twelve tracks of sound effects and define them as a "virtual machine." You could then mute or solo this entire machine with the push of a single button. PicMix supports the use of multiple Monitor Controllers. To add machine control and track arming to the system, Otari offers the Machine Control Interface (MCI).

To facilitate panning of an input across all of these busses, Otari offers the PicMix Panning System, consisting of the Panner Audio Rack and the Panner Controller. The Panner Audio Rack is the audio interface part of the panning system. A Panner Audio Rack may be loaded with one to six Panning Modules. Each module accepts two audio inputs (+4 dB, balanced) from any console and allows them to be independently panned across three to eight busses. Possible configurations for the two modules include two 3-channel panners, two 4-channel panners, one 5- and one 3-channel panner (or vice-versa), one 7-channel panner, or one 8-channel panner. This flexible bus capability allows the Panner Audio Rack to operate in just about any surround format including Dolby Stereo, Dolby Digital, DTS, and SDDS. Since it's software-updateable, the Panning Audio Rack will also be able to accommodate future surround formats.

Acting as a remote controller for the Panner Audio Rack is Otari's Panner Controller. Like the Monitor Controller, the Panner Controller can either live in a desktop box or fit into a blank panel in the console. Each Panner Controller has four panner control sets: A and B are on knobs while C and D are on joysticks. Any of these four sets of controls may be assigned to any of the audio inputs that have been connected to the Audio Rack, thus giving you surround pan control over your audio channels. An 8 x 8 LED matrix shows the current format and signal position. Pan moves may be automated via MIDI sequencer. All components of the PicMix system interface to each other via PicMix Control Network (PCN), a duplex serial link that also delivers power to the remote controllers.

*A typical Panner or Monitor System begins at approximately $5000. For more information contact Otari at 800-877-0577 or by fax at 415-341-7200. Circle EQ free lit. #118.*

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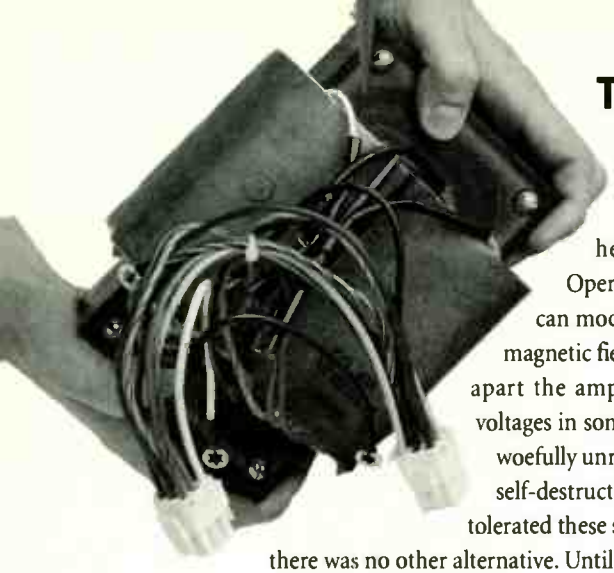

## THE PAST...

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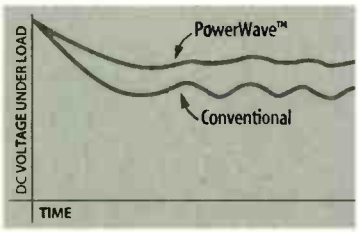


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| PowerLight 1.4 | 300 | 500 | 700 |
| PowerLight 1.8 | 400 | 650 | 900 |
| PowerLight 2.0HV | 650 | 1000 | N/A |
| PowerLight 3.4 | 725 | 1150 | 1700 |
| PowerLight 4.0 | 900 | 1400 | 2000 |

*20Hz-20kHz, 0.1%THD; **1kHz, 1% THD

*The new PL 2.0HV was designed for maximum power at 4ohms in a 2RU chassis, while the new PL 3.4 provides maximum power from a standard 120V, 15A line cord*

## IN THE END, IT'S THE PEOPLE

No matter how good the gear, it's people that make the difference. We know your performance depends upon our peformance. When you buy a product from QSC you buy more than just a piece of equipment, you get our support and involvement. New PowerLight models and features have come from working directly with people like you. If our standard models don't meet your needs, our Technical Services Group can provide you with custom modifications. Need a question answered or got a problem? Get on the phone or the Web. It's like having your own engineering consulting group.

Contact QSC for more infomation...better yet, come by for a visit!

**QSC's PowerLight Project Team** *(clockwise from left):* ***Darrell Austin,*** *Technical Services Manager;* ***Pat Quilter,*** *Chief Technical Officer;* ***Robert Becker,*** *Design Engineer;* ***Greg McLagan,*** *Market Manager (Live Sound);* ***Doug Teulie,*** *Industrial Designer*

**QSC AUDIO PRODUCTS, INC.**
1675 MacArthur Blvd., Costa Mesa, California, 92626 USA
***Ph*** 714/754-6175 ***Fax*** 714/754-6174
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*"...the pure, high-quality, rich sound this amp provides is unmistakable."*
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*"Zero defects, 450 shows"*
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*"I bought one ton of PowerLights and replaced 3 tons of conventional amps...you do the trucking math!"*
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BASF

# Studio Observer

*Published by JR Pro Sales, Inc. – Your North American Distributor for BASF Products*

VOLUME ONE • NUMBER TWO

Joe Ryan

Tremendous changes have taken place in the magnetic tape industry over the past year, both in technology and business. Here at JR Pro Sales we are very excited about these changes and the remarkable opportunities they will create for users of BASF audio and video tape products.

As you probably have already heard, effective January 1st of this year, the company formerly known as BASF Magnetics GmbH, a subsidiary of BASF AG of Ludwigshafen, Germany, assumed the new name **EMTEC Magnetics GmbH**, the result of its purchase by the Korean chemical consortium KOHAP. A formidable giant in the chemical industries, KOHAP's strength in plastics offers important opportunities for EMTEC in the continuing development of polyester film based products like audio and video tape. EMTEC, the same people, labs and factories who make BASF tape, will continue to refine and manufacture the BASF brand products you have been using, as well as develop new, improved products to address your magnetic storage needs, under the EMTEC banner.

### OUR COMPANY

Exclusive sales and distribution of all BASF audio tape, video tape and duplicator products in North America is handled by JR Pro Sales, Inc., of Valencia, CA. JR Pro Sales was created specifically to provide superior sales support and technical service for all North American users of BASF recording media.

### OUR TEAM

The sales force for JR Pro Sales is a team of knowledgeable professionals with years of experience in the pro audio and video industry. In addition, we now have Technical Support Engineers for both the Eastern and Western regions.

### OUR PRODUCTS

The BASF product line, the manufacturing processes, the quality controls and the place of manufacture, along with our commitment to produce the highest quality media anywhere in the world, all remain unchanged. EMTEC Magnetics GmbH has committed tremendous resources to the continued support and growth of its recording media business. The same technical and research prowess that has made BASF a worldwide leader in so many recording technologies is fully behind you. New product development will continue to anticipate and meet your future needs.

JR Pro is ready to continue as your recording media partner. With new warehousing and distribution systems in place, an extraordinary sales force eager to work with you, and our own staff of technical support engineers, we look forward to being able to provide you with the finest media products and outstanding service and support. Our dealers across North America share our commitment to providing you with top quality products and service.

Our future success is directly tied to the health and well-being of our business relationship with you, our customers. I'm confident that we have the people, the products and the resources to help you make great recordings. We look forward to being an integral part of your future success!

Sincerely,

Joe Ryan – *President, JR Pro Sales, Inc.*

## The Plant Receives BASF Master Award

***Legendary Sausalito Studio Continues Long Tradition of Recording Hits***

*Arne Frager, owner of The Plant Studios, receives BASF Master Award from Jean Tardibuono, JR Pro Sales National Sales Manager*

Located at the edge of San Francisco Bay, just a few blocks from Sausalito's famed boathouse community, The Plant Recording Studios continues a tradition of hit recording begun some 25 years ago. Birthplace of countless chart-toppers since the early 70's, The Plant has hosted a stellar array of artists including **Fleetwood Mac, Sly Stone, Huey Lewis, Stevie Wonder** and **Carlos Santana**. Being careful to maintain its heritage, owner/engineer Arne Frager has also systematically remodeled and upgraded The Plant's facilities and services to keep this legendary studio at the forefront of the recording scene.

Consequently, stars continue to flock to The Plant, where recent sessions have included artists like **Verve Pipe, Jerry Harrison, Chris Isaak, Machine Head, John Lee Hooker** and **Blueland**.

Last year The Plant was host to engineer Bob Rock and **Metallica**, while they recorded their mega-hit album, ***Load***, using BASF tape. As a result of the album's stunning success (well over six million copies have been sold to date!), The Plant and engineer Bob Rock have been awarded the BASF Master Award

*Continued on page three...*

World Radio History

# IF YOU HAVE ONE OF THESE:

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PREMIUM BACK-COATED S-VHS TAPE

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SLIDING SECURITY TAB TO PREVENT ACCIDENTAL ERASURE

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60 AND 40 MINUTE LENGTHS

*Consult the back of this issue for the name and number of your nearest BASF dealer and stock up on DM 938 today.*


# ON THE ROAD WITH BASF STUDIO MASTER TAPES

On December 8, 1996, **Aretha Franklin** went home to Detroit to perform and produce what she called one of the most important concerts of her career. She chose Randy Ezratty's Effanel Music to handle the remote recording of this three-hour, holiday gospel celebration, and Randy chose BASF SM 900 as the tape to capture this historic event. Barely a week later, at the Cow Palace in San Francisco, veteran engineer Greg Goldman was tucked behind the mixing console in the Le Mobile remote truck, recording superstar **Melissa Etheridge** as she rocked into the night to a sold out crowd. Greg's tape of choice? BASF Studio Master 911! Studio Observer talked with both these renowned engineers about recording on the road with BASF Studio Master tapes.

*From behind the doors of Le Mobile remote truck, veteran engineer Greg Goldman recorded superstar Melissa Etheridge's Cow Palace concert to his tape of choice – BASF's Studio Master 911.*

"I need consistency not only from reel to reel but I need to know that if I use tape from a different batch, no variations will occur," noted Goldman during a break at the Etheridge event. "That is why tape quality control is vital to an engineer, whether working from a remote truck or in a studio. I record with BASF's SM 911 because the consistency is superb."

Goldman, whose session credits read like Billboard's Hot 100 chart (Rolling Stones, U2, Bruce Springsteen, Eric Clapton, etc.) was first introduced to BASF tape by veteran producer Don Smith, while Goldman was a staff engineer at A&M Records. Shortly thereafter, BASF's SM 911 master tape became Goldman's tape of choice for multi-track recording: "I'm confident that what I'm recording is exactly what I'm going to hear when I play the tape back. Every nuance is captured. This is why I use BASF."

*Randy Ezratty, of Effanel Music.*

Back in Detroit, Ezratty spoke to *Studio Observer* about working with Aretha Franklin: "With choirs, orchestra and an array of soloists led by Aretha herself, the production and technical challenges were enormous. Ms. Franklin is a very demanding producer and artist, and when it came time for her to go on stage and sing, everyone had to make their own decisions and perform to Ms. Franklin's high professional standards."

Because post-production for the concert was to be done at Vanguard Studios in Detroit, Ezratty spoke to Vanguard owner Mike Powell and they decided to record the concert on 24-track analog tape at 30 ips with no noise reduction, and at highly elevated levels (+9). Their tape of choice was BASF SM 900 on 5000 ft. reels. "Often in an event like this," says Ezratty, "with all its complexities and the number of inputs required, we are inclined to go 48-track digital. But we decided to do this along the lines of a more traditional style live concert, making some decisions on the fly and working within the context of 24 tracks. We did do a backup to DA-88 which probably will never see the light of day, because the analog multi-tracks sound great!"

"This was my first experience with SM 900 without noise reduction and at such high levels, and it really worked well," Randy continued. "BASF has long been our first call tape. Whenever our clients ask us to recommend the tape (and they usually do), we pick BASF!"

In the truck or in the booth, on the road or in the studio, JR Pro Sales has the right BASF tape for the job.

World Radio History

*MASTER AWARD, continued from page one...*

by EMTEC Magnetics GmbH, manufacturers of BASF brand recording products.

Accepting the award, the first ever presented to a recording studio, owner Arne Frager commented, "We're proud of our role in working with Metallica and Bob Rock on this project. It's very exciting to see the album's success and to have our work acknowledged by BASF with this wonderful Master Award."

Frager also noted, "We use BASF SM 900 as our house tape at The Plant, because it sounds better than any tape we've used. We recommend it to all our clients."

The BASF Master Award honors recordings made on BASF media that reach a Number One position in charts anywhere in the world. The unique crystal and chromium Award recognizes artistic achievement and chart success, but also draws attention to the importance of preserving artistic works for the future by encouraging engineers, producers and recording artists to consider the long-term safekeeping of their recordings. To that end, a donation of $1,000 (US) is made in the recipient's name to UNESCO to use for the restoration and preservation of culturally significant sites around the world which UNESCO is working to safeguard.

Recordings that reach a Number One position on any recognized chart and are recorded, mixed or mastered on BASF tape are eligible for the Master Award. For more information or an application call JR Pro Sales at (888) 295-5551.

## NEW APPOINTMENTS AT JR PRO SALES

*Jean Tardibuono and Phil Paske*

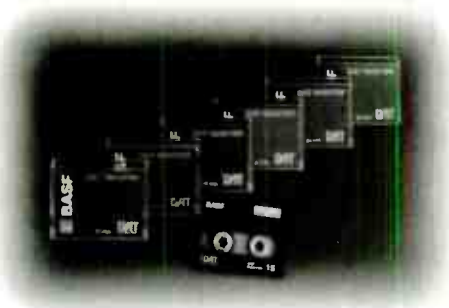
JR Pro Sales President Joe Ryan recently announced several new staff appointments designed to assure the highest possible level of service for JR Pro Sales customers. Leading off the new appointments is the promotion of Jean Tardibuono to the position of National Sales Manager. A Purdue graduate in marketing with a distinguished career in the magnetic tape business, Jean is well known to tape customers from her previous position as Western Regional Sales Manager for JR Pro Sales and for the former BASF Magnetics. Working out of the Los Angeles area, Jean will guide the marketing and sales efforts of the entire North American JR Pro Sales team.

Enhancing the engineering and technical support side of operations, Ryan also announced the appointment of Phil Paske as Technical Support Engineer for the Western States. Phil, who comes to JR Pro Sales from long experience on the customer side of the tape business, was previously Director of Engineering for Custom Duplication, Inc. of Inglewood, California, where he served for 18 years. Prior to joining CDI he brought his engineering talents to bear as Mastering and Quality Control Manager for Motown Records. Phil is based out of the Los Angeles area.

Paske reports to Michael Ryan, who heads up North American Technical Support for JR Pro Sales. Ryan also handles Tech Support for all states east of the Mississippi, while Paske covers the states west of the Mississippi. Both engineers are active assisting customers with applications and providing engineering know-how whenever needed.

In other news, Darren Chamblee has also been appointed Southern Sales Manager based in the Nashville region. Janet Miller has been appointed Product Manager. Tom Burrows moved from LA and now serves as Southwest Sales Manager, and Doug Bernhardt and Kim McKenzie are new additions to Sales in the Western region.


# BASF DAT MASTER



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World Radio History

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Westlake Audio
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Polyline Corporation
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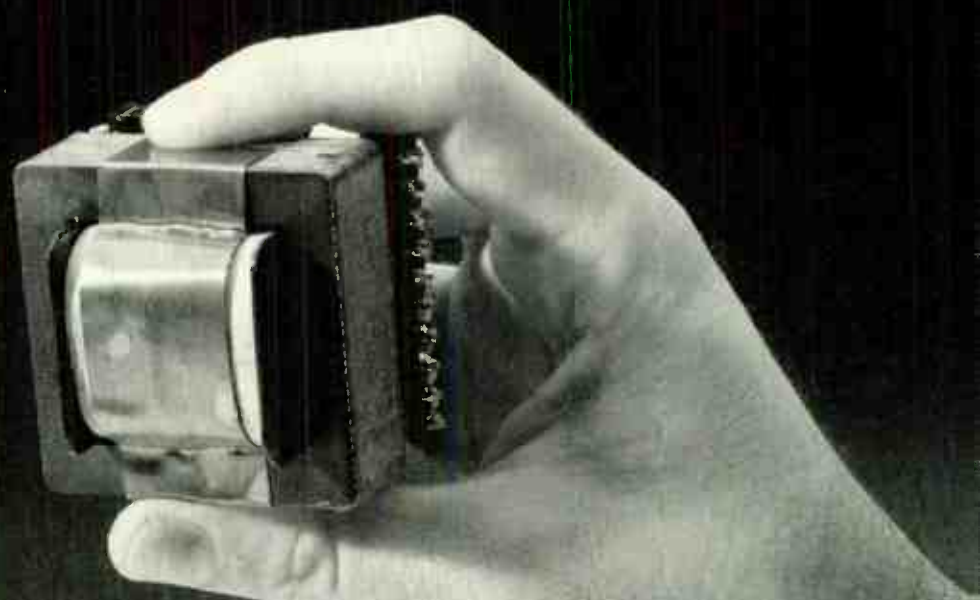

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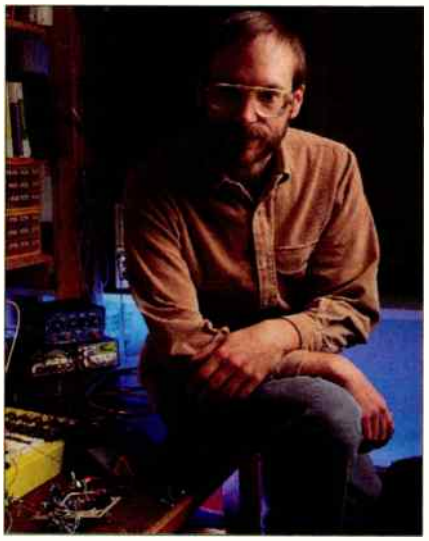

**BY CRAIG ANDERTON**

You want the highest average level possible on your CD. Why? Because everyone else does. In fact, there are a whole class of tools — compressors, normalizers, level maximizers, you name it — designed to do just that. After all, loud is good, right? Given two identical sound sources, people invariably identify the one that's slightly louder as better. (*Consumer Alert:* When buying speakers in a store, check whether the brand the store wants to push is slightly louder than the other speakers.)

Frankly, I'm tired of recordings that use only the upper 6 dB of a CD's dynamic range. Dynamics should be a part of music, and I always thought part of the beauty of digital recording was its wide dynamic range. Silly me! Apparently, the point of digital recording is to be as loud as possible.

However, there is a way to put some serious average level on a CD without totally destroying the dynamics. It takes a little more work, but try this technique and see if it doesn't produce a result that's ultimately more satisfying than alternative methods.

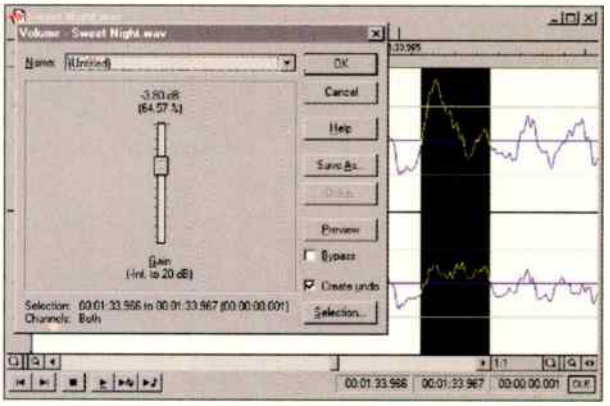


FIGURE 2: Zoom in on the transient, define it as a region for editing, then use the volume or scaling option to cut it down to size. In this example, reducing the indicated waveform's level a little under 4 dB will bring the peak in line with the rest of the signal peaks.

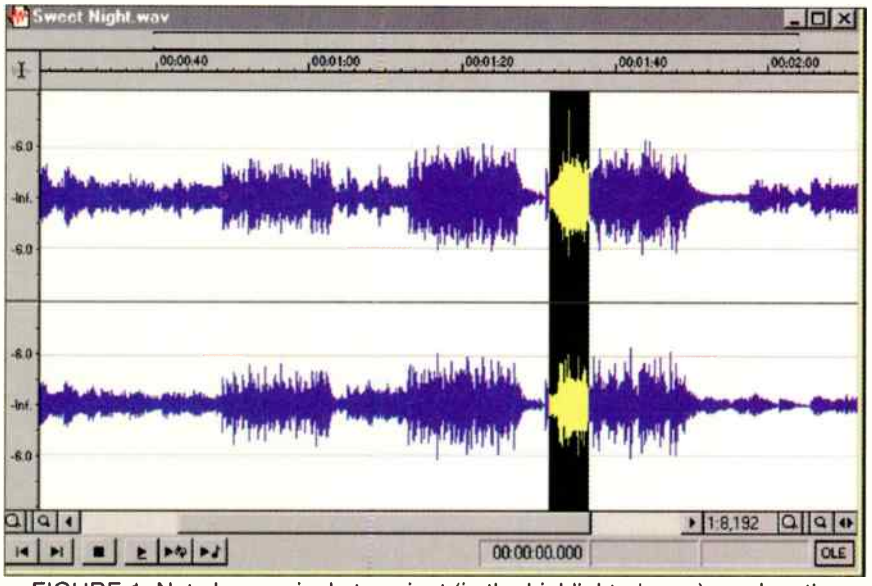


FIGURE 1: Note how a single transient (in the highlighted area) reaches the maximum available dynamic range. As a result, normalization cannot bring up the overall level any further.

### WHAT'S WRONG WITH COMPRESSION?

Electronic compression is useful, but comes with a price: breathing, pumping, possible increased noise, and transient mutilation. Add compression to a languid lead guitar track, and it can sound very cool. But while a subtle amount of limiting can definitely help during the mastering process, overcompression can drain the life out of the song.

Multiband compression is much better because it separates the signal into multiple frequency bands and individually compresses each one. This just about eliminates pumping and breathing because, for example, a heavy-duty kick drum isn't going to affect the high frequencies. When compressing program material, this is my technique of choice. Still, there's always a slight squashing that's hard to avoid, and is inappropriate for many types of material.

One reason people like analog tape so much is because it provides several benefits of compression without the negative side effects. Still, tape has hiss, modulation noise, distortion, and all the other drawbacks that made people want digital in the first place. There must be a better way.

### NORMALIZATION

Normalization is a digital signal processing function that's available in most digital audio editing software (e.g., Sound Tools, Sound Forge, Alchemy,


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# How to lose the low-down, baby left me, mangy dog, sun never shines, salty gravy, underpowered, overpriced, hard-to-use software blues.

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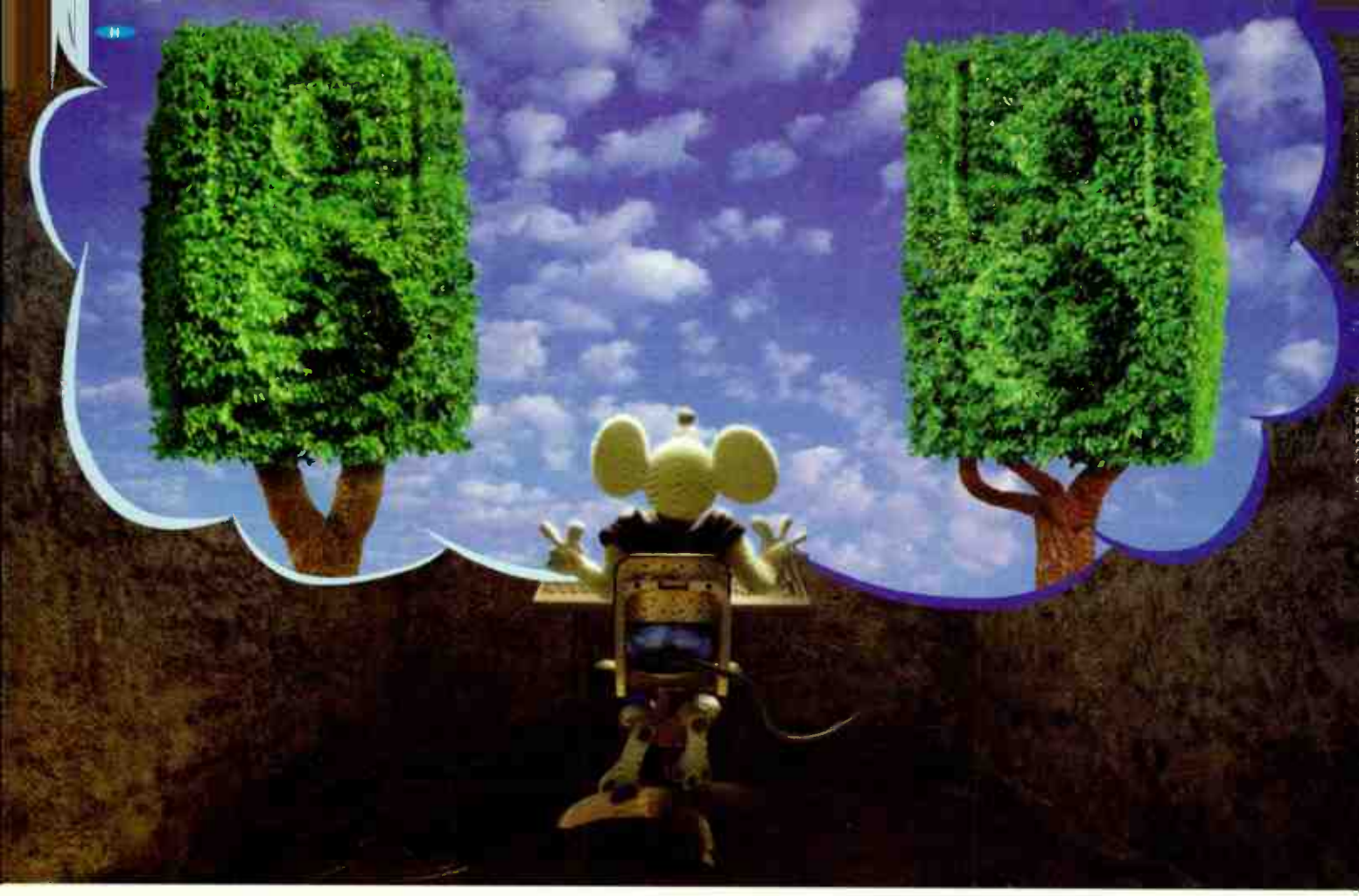

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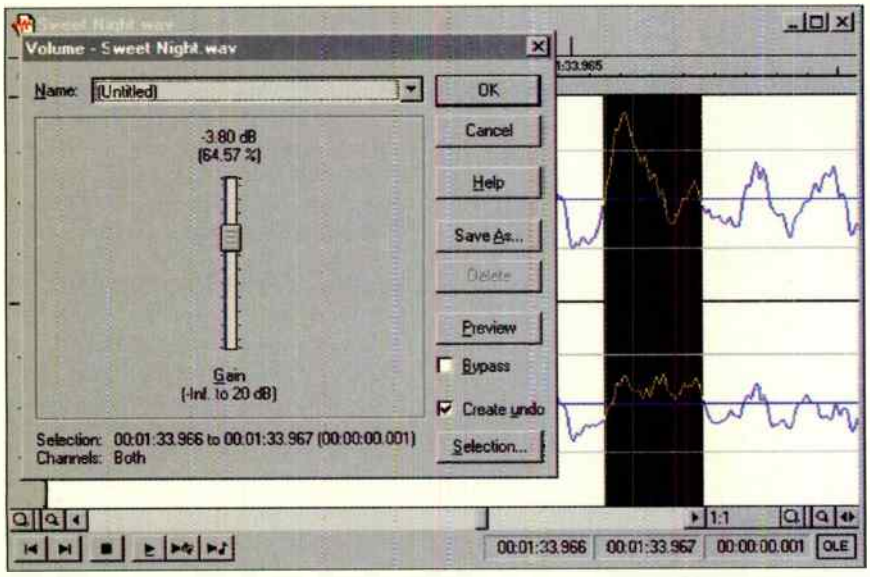



FIGURE 3: After normalizing the track, the average level is significantly higher compared to fig. 1 — with no compression, distortion, or other gimmicks.

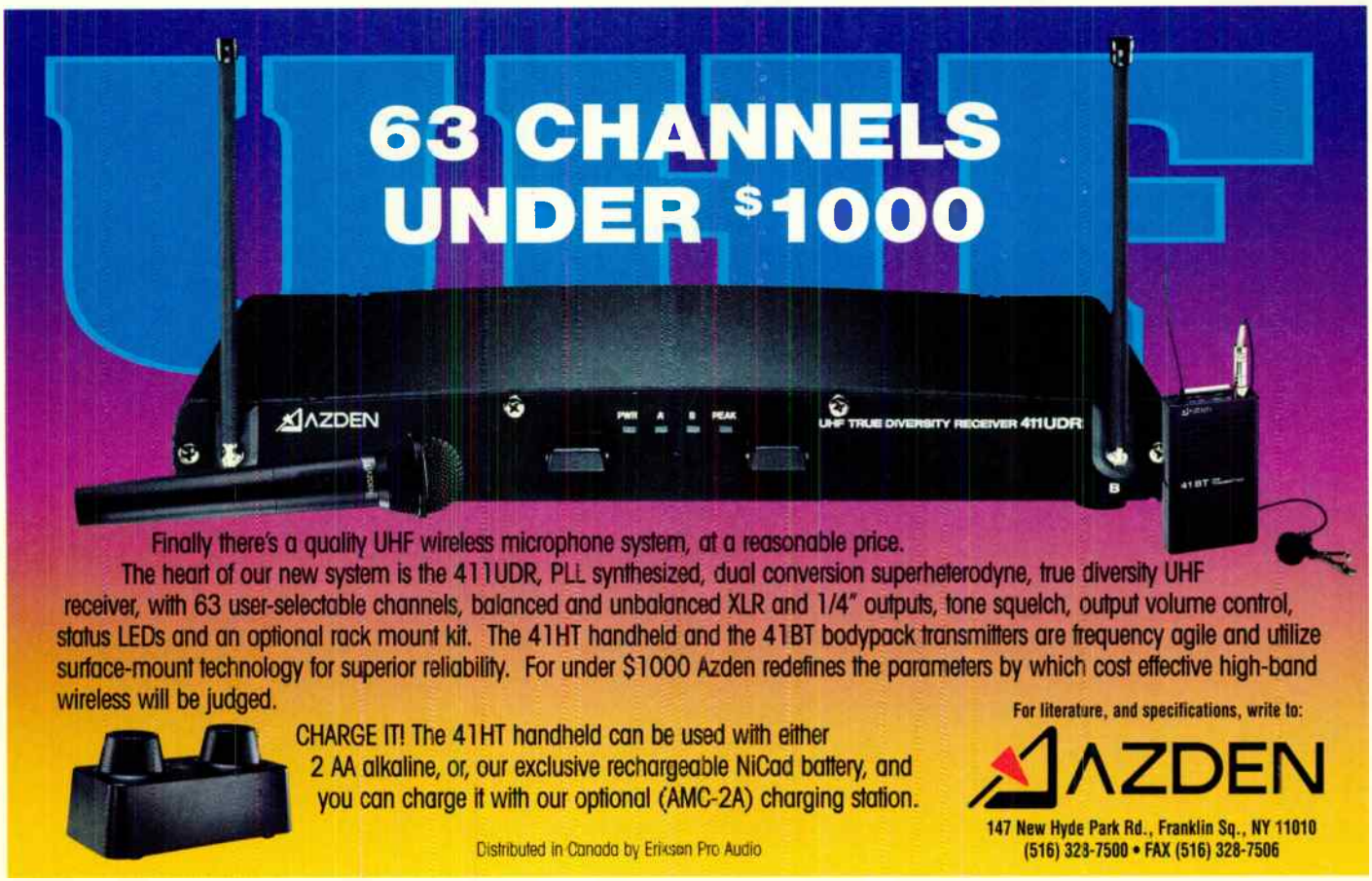
etc.). It scans through the program material for the highest level, and if that level doesn't reach the maximum available dynamic range, the program boosts the overall signal so that the peak hits the highest level possible. For example, suppose you record a track of music and the highest peak registers at 6 dB below the maximum available headroom. Normalization brings the entire track up by 6 dB. (Incidentally, most normalization functions allow normalizing to some percentage of the maximum available level; it needn't always be 100 percent.)

There are some problems, though:

• Because normalization boosts the entire signal, the noise floor comes up as well.

• Normalization has nothing to do with a song's average level, only the peak level. Yet when balancing levels between tracks in the process of assembling a master tape, it is the average level that is usually most important. This is one reason why most mastering engineers recommend that you not normalize each individual song.

• Excessive use of amplitude changes with linear, nonfloating-point digital systems can cause roundoff errors that, if allowed to accumulate, impart a sort of "fuzzy" quality to the sound. If you're going to normalize, it should be the very last process — don't normalize, then add EQ, then change the overall level, then re-normalize, etc.



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Despite these cautions, in many cases normalization can indeed help put the highest possible *peak* level on tape. But this won't help very much if the average level of a track is relatively low, yet there are one or two major peaks that hit the maximum available dynamic range. Here's a solution.

**THE LEVEL/NORMALIZATION CONNECTION**

If you look at a typical 2-channel mix, you'll often see a few peaks that are considerably higher than the average signal level (fig. 1). When you normalize, these bump up against the maximum available headroom and essentially set a limit on how high the rest of the signal can be.

Bringing down the level of those few peaks prior to normalization can increase the overall signal level a lot more. Here's how.

1. Identify the areas with the individual peaks (such as shown in fig. 1) and work on one area at a time.

2. Click-drag across the peak that you want to cut down to size (fig. 2). The region boundaries should be on zero crossings (i.e., the amplitude at each boundary is 0).

3. Use the program's volume or scaling function to reduce the excessively loud peak so that it's more in line with the other peaks. If the peak is only a half-cycle wide, just process that peak. If it is a full cycle, scale both halves of the cycle simultaneously.

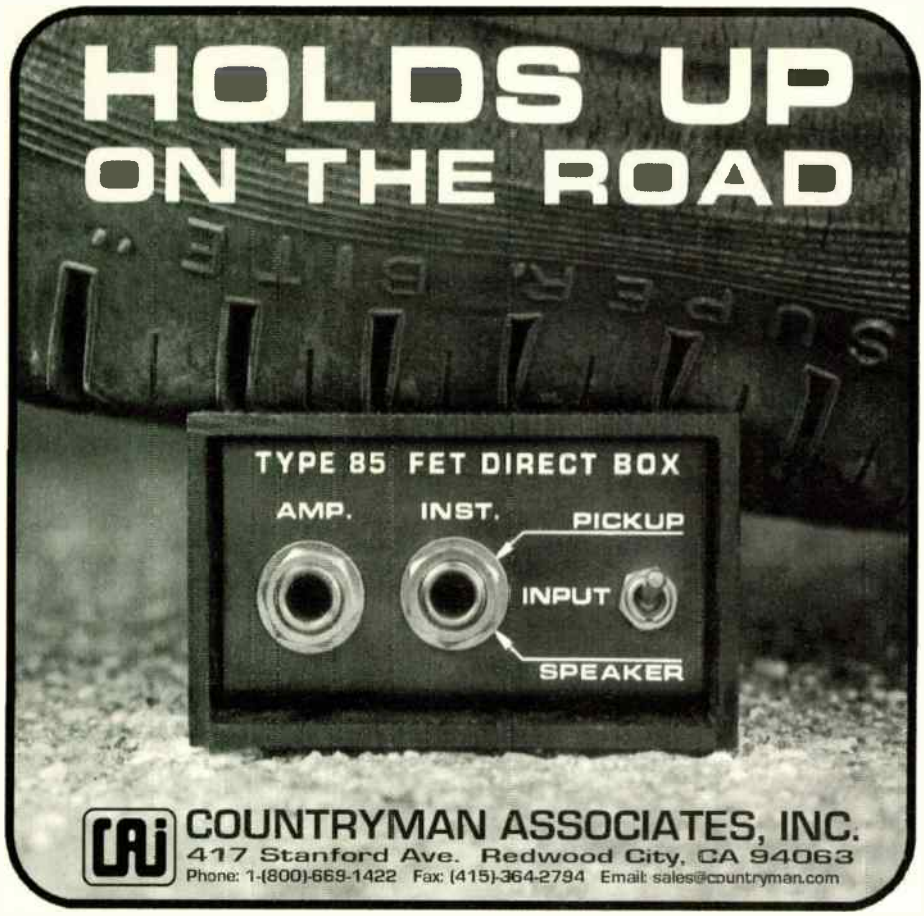
4. Perform the same process on other excessively loud peaks in the song.

5. Finally, normalize the entire song.

Fig. 3 shows the final result. Note how the second version has a much higher average level, but most of the signal remains completely untouched — only the "rogue" peaks are affected. This preserves the transient response, increases the level, and avoids the undesirable side effects of compression.

Granted, it takes more work to seek out and tame individual cycles than it does to just set a compressor's In/Out switch to "In," but the results are worth it. Try it, and I think you'll agree.

*Craig Anderton, the author of* Home Recording for Musicians and Multieffects for Musicians, *just got back from doing seminars in Mexico City and is heading off to Austin, TX to teach for a week prior to taking his act to Germany. He thinks frequent flyer programs are great.*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# Will a wet woolen blanket placed over my PA system enhance or degrade sound quality?

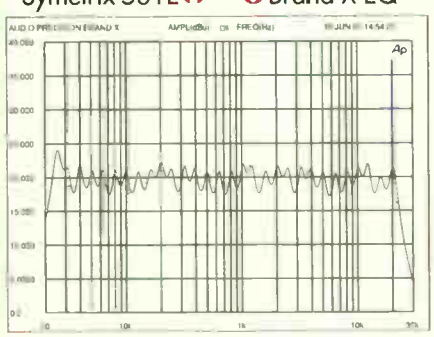
The answer is: The blanket will degrade sound quality. The so called ***BOSS*** effect (Blanket Over Sound System) can also be achieved without the blanket, but is nevertheless an *undesirable* effect. Often, when the blanket isn't present and the PA still sounds bad, the culprit is none other than the system's graphic EQ!

Symetrix is making a couple of new concert sound quality graphics that will blow the blanket off your PA! The details:

➲ **Constant Q equalizers** exhibit superior feedback control characteristics, but don't all sound the same. Filters must combine with minimum ripple to achieve predictable frequency response. Q must be optimized to limit interaction between adjacent bands. Our filters exhibit the very best combination of minimum ripple and maximum selectivity.

The graphs to the right were made with all faders at maximum boost, not a typical setting, but a test that can immediately pinpoint an equalizer's problems. The ripple from the well known brand X is not hard to hear! The Symetrix graphics not only look better on paper, they sound significantly better!

Symetrix 531E ⓘ ⓤ Brand X EQ



➲ **THD+Noise (1kHz at +4dBu, eq in, all bands flat) is <0.002%.** A very important spec in any EQ, it can only be acheived with meticulous design and exacting craftsmanship.

➲ **Precision grounded center detent metal shaft faders.** Two important concepts: 1) The center detent means that when a fader is in the center (grounded) position its filter contributes zero noise. 2) Metal shaft faders operate more smoothly and reliably over time. They cost a lot more than plastic ones found in competing units, but we believe that without them you don't have a professional EQ.

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➲ The two position **range control** switches the 31 graphic faders between a standard +/-12dB range and a high resolution +/-6dB range.

➲ **Large high contrast knobs and crisp graphics.** A feature we know you'll appreciate late at night when you're really tired. (Many EQ's don't even have fader knobs!)

➲ **Servo controlled output stages** eliminate large electrolytic caps from the output. The result is zero DC output offset, a low -3db rolloff point (6Hz), and the elimination of output loading effects.

➲ **LED input level ladder.** An EQ's dynamic range spec can only be achieved when the incoming signal is properly adjusted. With the 531E and 532E input signals are set precisely where they need to be. Dynamic range of over 112dB is assured.

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# *Killin' Me By* **Degrees**

PHOTO BY JIM HERRINGTON

## How I finally got my sheepskin — 38 years in the making

**BY AL KOOPER**

*"Oh the benches were stained with tears & perspiration*
*The birdies were flying from tree to tree*
*There was little to say — there was no conversation*
*As I stepped to the stage to pick up my degree....."*
*—Bob Dylan, "Day Of The Locusts"*
*© 1970, 1976 Big Sky Music*

Little did I know on that June afternoon in 1970, as I piloted my B-3 across the above song for one of Dylan's *New Morning* sessions, that 27 years later I would live the words he was singing that day.

Recently, Five Towns College, a music school on Long Island, called me to tell me that I had been selected to receive an honorary doctorate of music at their forthcoming commencement exercises. I was extremely flattered and it meant a great deal to me.

I struggled in my collegiate years and virtually begged for a musical education that no school had the curriculum to deliver. I folded after a year at the University of Bridgeport, frustrated beyond belief. How lucky these graduates were to be able to nestle into a rock 'n' roll higher education. I wish I had that advantage back in '61 when I direly needed it. Instead, I hit the pavement running and worked in Tin Pan Alley until by the virtue of hundreds of failed starts, my star began to rise.

And my parents, who wore the Scarlet Letter in their neighborhood when I left college prematurely with no degree, lived only 45 minutes from this institution that wished to vindicate them 36 years later. Alas, at 88 and 83, respectively, they were too infirm to attend. No matter — they could hang the degree in their living room and enjoy it for the rest of their lives. But first I had to go sit on a stage with Senator Alfonse D'Amato, dressed in a cap and gown, and make an acceptance speech.

I arrived at the appointed time in a pretty good mood on a glorious spring morning. I was taken to a classroom where the Dean, faculty, and other honorees were dressing for the ceremony. I was ceremoniously handed my cap and gown. I put the gown on and I looked rather regal; almost like a judge in his robes. I reached for the cap and fiddled with it for a good five minutes.

*There is no way to look cool with a mortarboard on your head.*

In a serious bind, I decided to revert to a House Of Blues baseball cap I had worn that morning on the trip out there. After all, it was a *cap*. I attached the tassel to the button on top with some tape, and, checking myself out in the mirror, felt confident enough to now join the procession. Instead, I was taken aside by the Dean who coaxed me outside for some some photos. I know he was upset by my change of attire, but I got the feeling that somewhere in his attic was a dog-eared Blues Project album and that intimidated him enough to let me fly my freak flag.

Senator D'Amato thought so much of this ceremony that he sent his *mother* in his place to accept his degree and speak. I was now in a photograph, wearing my baseball cap and gown, with Alfonse D'Amato's mother. I remember thinking to myself at that moment, *"I'll have to clear a space next to that photo of John Belushi, Steve Martin, and myself for this one here."*

I had to follow Mrs. D'Amato's speech, and, surprisingly, hers was a good one. I was not prepared to follow a great speech and it threw me. I babbled something about how lucky the graduates were to have attended such a school and that they would surely meet up with a lot of dishonest and untalented people soon, and that, hopefully, now properly educated, they would know how to deal with each and every one of them. I sat back down and clutched my doctorate for dear life.

POWER TRIO: The author, Mrs. D'Amato, and Michael Kovins, president of Korg USA, doing his best Bob Keeshan imitation....

At the buffet for the faculty and honorees afterward, the Dean approached me again as I was exiting to leave.

"Are you on your way out, Al?," he inquired.

"Some would say so, Dean, some would say so," I replied over my shoulder as I exited the proceedings.

Before I sent the degree to my parents, I scanned it into my computer. One twisted evening about 3 AM last week, I used a graphics program on the computer to replace "Doctor Of Music" with "Doctor Of Ob/Gyn." As the phony diploma eased out of the printer, causing me to actually laugh out loud, I thought how marvelous this parody would look framed next to the picture of me and Al D'Amato's mom next to the picture of John Belushi, Steve Martin, and me.

Is this a beautiful country or what? EQ


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# We made the console,

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"I replaced a console that was more than 3 times the price, and got a quieter, more transparent, and sweeter sounding console! Big console feel, with an amazing price!" - Kurt Bevers, Brownell Sound, Oregon.

"An incredibly musical console, ultra flexible with a real usable EQ. It is absolutely the best sounding project studio board that I've heard". - Howard Givens, Spotted Peccary Studios."

"I love the desk, the EQ is just marvellous. Ghost is the best 8 bus recording desk on the market." - Lee Hamblyn, Engineer.

"Intuitive handling, flexible routing, great Soundcraft sound." - Melvin Fernandes, Recording Engineer, CMM Studios, India.

"I use the Ghost for several radio shows doing live performances. The EQ is amazing, I'm on air in 5 minutes! Doing dance stuff is one, doing live stuff is another. But I use only one board for both of them, The Soundcraft Ghost." - Barney Broomer, Sonic One Rotterdam.

"Ease of operation and the numerous in-line inputs for my synthesizers and samplers is why I purchased the Soundcraft Ghost console." - says President of Saban Entertainment and producer of Mighty Morphin Power Rangers Shuki Levy.

"I didn't know how useful mute groups could be and how good the EQ had to be until we used the Soundcraft Ghost." - Stefaan Windey, La Linea Musicproductions b.v.b.a., Belgium.

"It sounds great and the EQ is very precise which makes it very easy to pin-point the frequencies I need to work on. Ghost enables me to finish mixes on the console at home, without having to use any other studio." - Phil Kelsey (Remix Engineer)

"The console is very user-friendly and is constructed so well that it can easily withstand the rigors of even the most hectic of production schedules." - Corey Dissin, Producer at Paul Turner Productions.

"Both myself and our Production Director Jeff Thomas used the console for PowerStation and were equally very, very impressed. For the money, the console is fantastically versatile, has good headroom and a very impressive EQ." - Alex Lakey (Engineer for PowerStation)

Ghost

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# *The Mysteries Of* **Modeling**

## Making the most of Yamaha's amazingly expressive but intricately programmed VL70-m

**BY TIM TULLY**

Yamaha's VL70-m just may be the most expressive electronic instrument I've ever played.

*I have no doubt, however, that it's the most mystifying I've ever programmed.*

The VL70-m, like Yamaha's other VL instruments — the VL1, VL1-m, and VL-7 — employs "virtual acoustic" synthesis that generates sound using not oscillators or samples, but software models of the basic elements of acoustic instruments. These models comprise an ungodly mass of math that describes the many ways acoustic instruments respond to a player's gestures. Although VL instruments are more responsive (given the right controller) and potentially expressive than any other kind of synth, trying to program them beyond a certain level is a brain buster of mammoth proportions.

Furthermore, playing the half-rack VL70-m with just a keyboard provides only a small taste of what it can do. At the very least, you also need a Yamaha BC3 breath controller. The BC3 supplements a keyboard by sending MIDI Breath Control (Controller 02) data in response to a player blowing into it. Better yet, forget the keyboard and use a MIDI wind controller like the Yamaha WX11 or WX7, or the Akai EWI. These devices play similarly to a sax or clarinet, and respond to breath and embouchure by generating — in addition to the Note on/Note off and Velocity values commonly sent by keyboards — MIDI Breath Control, Channel Aftertouch, and Pitch Bend data for significantly greater expressiveness. (Yamaha's MFC10 foot controller has a WX11/WX7 input that sends additional continuous controller data for even greater control.)

There aren't a lot of MIDI wind controllers, largely because few synthesizers take advantage of their expressive potential. But the VL70-m was designed with wind controllers in mind: one of its two 128-patch preset banks was programmed specifically to change volume, pitch, and timbre in response to wind-controller data. What's new is that timbral changes in modeled patches are much more profound and varied than just sweeping a low-pass filter. Some of these patches come astoundingly close to sounding like acoustic wind and string instruments, not only as just static timbres, but actually through time, as they're played. Other sounds don't just imitate, but cut new sonic ground with remarkably flexible timbres.

Let's look at some of the ins and outs of using this instrument.

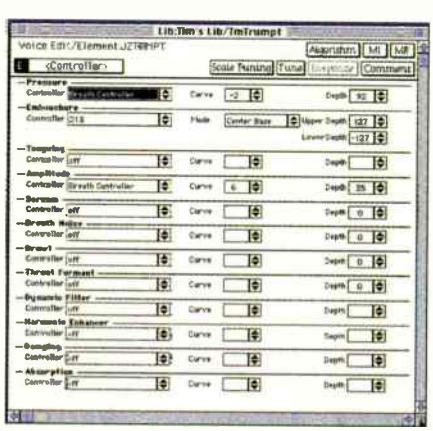

FIGURE 1: The Element/Controller page of the Expert Editor gives you basic access to the VL70-m's Control Edit Parameters.

### CONNECTIONS

In addition to MIDI In, Out, and Thru jacks, the VL70-m has a front-panel jack that connects to a WX7 or WX11, and a rear-panel "To Host" connector that can go directly to a Macintosh or PC without a MIDI interface. While these are nice conveniences, their role is not made clear.

In fact, the WX connector is fine for live performance or recording MIDI sequences using a VL70-m and no other instruments, in which case the To Host connector is also useful. Not made explicit though, is the best setup for the very common working scenario: sequencing with other instruments. Here, the standard connections are, in order: connect a wind controller and VL70-m to the input and output, respectively, of a MIDI interface, and connect the interface to your computer.

### PROGRAMMING

I interviewed Manny Fernandez, who programmed the VL70-m's factory patches for Yamaha. Manny explained that the VL can respond to dynamic input to generate expressive sounds far beyond the potential of any controller(s) available today. He also confirmed that programming the unit will yield at least a low-grade headache, and often some incredible timbres.

"This thing will respond to every gesture you can throw at it and more," he said. "But after three days of tweaking a voice, it might still sound like a bug fart, and you'll



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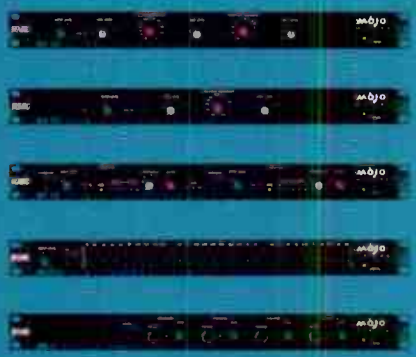
# Single & loving it.

## MQ302 mojo filter



[ WE RACKED OUR BRAINS ]

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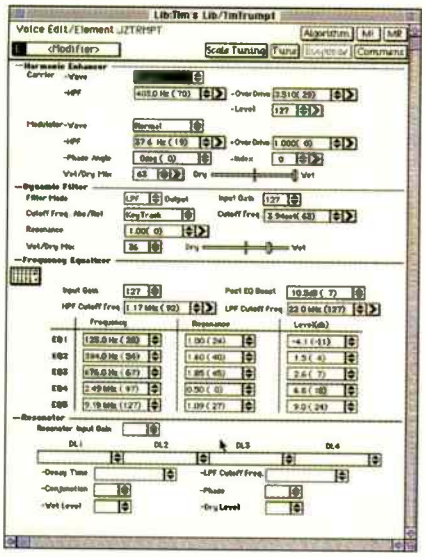


MOD SQUAD: Modifying the EQ

never know you're ten clicks away from exactly the sound you wanted."

This wisdom in mind, let me add that going the extra mile, within a few constraints, is well worth it for most people.

### NONTECHNICAL ARCHITECTURE

In terms of a personal pain/gain kind of perspective, you can think of a VL70-m patch (Yamaha calls it a "voice") as having four levels of parameters:

1. Those accessible from the front panel. Many are familiar — envelope generators, EQ, and so forth — but they quickly get into unique VL components like Scream and Throat Formant.

2. Controllers and modifiers accessible from the Expert Editor software, specifically the Miscellaneous, Modifier, and Instrument Controller windows. Tweaky, but effective, these are where you can really create your own sound.

3. Mathematical alterations of the way the models themselves respond. These parameters are why it's called the Expert Editor. You can edit such things as Graham Function Argument and Lip Collision (no kidding), but wouldn't you much rather be playing music?

4. The models themselves. You can easily mix and match reed mouthpieces with violin bodies, but you can't change how either works. Beyond here lie dragons.

### GET THE SOFTWARE

If you're interested in doing any programming, do yourself a big favor and download the Expert Editor software from Yamaha. Not only does it make the editing the front-panel parameters much easier, but it gives you access to the deeper mysteries of the machine, just in case your life isn't complicated enough.

Download the software from Yamaha's U.S. Web site: **http://yamahaxg.ysba.com/xg_software_index.html**

or its Japanese site: **http://www.yamaha.co.jp/english/xg/html/vleditor.html.**

There are three Macintosh programs: the Expert Editor, the Visual Editor, and the Analog Editor, and a Windows version of the Visual Editor. If at all possible, go for the Expert Editor. It not only offers access to all the instrument's editable features, but it gives you a good overall visual picture of how the machine operates.

Unfortunately, the Mac programs require the obsolete MIDI manager. You won't find it in the current Mac OS (7.6) or a few earlier versions, however, Yamaha is working on versions that will work with OMS. More immediately, you can download MIDI Manager (actually Apple's MIDI Management Tools 2.0.2), from **http://swupdates.info.apple.com/usalpha.html.** MIDI manager seemed to work without apparent conflicts on systems configured with QuickTime, OMS, and other current media software.

Another useful Web site is the online VL programming guide at **http://www.midifarm.com/yamaha/vlguide.htm.**

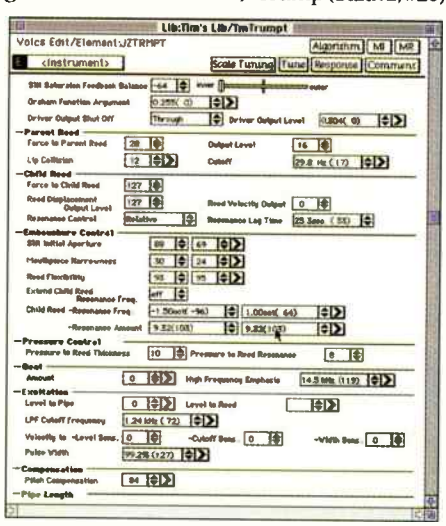
### CONTROL EDIT PARAMETERS

Of all the unique VL70-m parameters, I found a group of its Control Edit Parameters the most intriguing, effective, and accessible — specifically, Embouchure, Tonguing, Scream, Growl, and Throat Formant. Each of these creates a different effect, depending on which instrument model you're editing. Don't let that throw you though, you can edit them on the Element/Controller page of the Expert Editor (fig. 1) with coherent alpha/numeric settings for Controller, Curve, and Depth. The Controller setting determines which MIDI controller drives the Control Edit Parameter. Depth sets how much of the effect is invoked, and Curve determines the linearity of its response. A zero curve is a linear, one-to-one response. A higher number means more breath, for example, is needed to generate the effect.

The patch Airsax (bank 2, # 10) provides a good example of how the Scream Parameter can work. In the Controller page, set the Scream depth to –32 and play the patch. You'll hear a constant gurgle. Now set Scream to be controlled by Breath Control and make the depth +44 with a curve of seven. You now have to blow harder to get the effect. Set the curve to 16, and you have to blow much harder to get it.

The Throat Formant parameter adds harmonic coloration to a patch, emulating changes in a wind player's throat and air passage. Set it to a fixed pitch to mimic acoustic instruments whose physical structure gives them a natural resonance at a certain pitch. As you play, that resonance will sound louder on notes more harmonically related to the formant's pitch. Experiment with this in the Element/Miscellaneous page with the Airsax or LyricOff (bank 1, # 106) patches. You'll see how it gives the patch a live, acoustic character. Set the formant to Key Track to create a distinctly synthetic sound.

Brass instruments have unique harmonic responses to embouchure. Set the JzTrump (bank 2, #20) so its Embouchure responds to Pitch Bend, and set the lower depth to –127. Biting harder on a WX7 reed (sending Pitch Bend) now has the effect of a brass player tightening his embouchure, putting the instrument into different harmonic "modes" in relation to the harmonic fundamental. You can hear a characteristic "cracking" of the sound, and if you have good chops, can learn to play bugle on a WX7.



SOUND SHAPER: Instrument control

This just scratches the surface of this deep instrument, but it ought to get you going. Remember Manny Fernandez's programming advice: "Change Pitch Bend and Breath to get more dynamics, and don't just imitate sounds. Find what works with your playing style and play with it. You'll have your own personal axe on which you can develop a sound that responds to the emotion you're trying to put into your music." EQ



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- **10 channel expander**
- **Main channel direct outputs**
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- **100Hz channel high pass filter**
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## INPUTS & EXPANSION

Both TRILOGY models afford a tremendous amount of usable inputs - 24 on the TR166 12 channel and 28 on the TR206 16 channel. The TR140ex 10 channel expander can be added for a total of 14 more available inputs.

## MON:STER CHANNELS

Each of the last 2 channels of the TRILOGY and the 10 channel expander feature an XLR balanced microphone input and 1/4" left and right stereo line inputs, and both can be used simultaneously - great for effects returns, keyboards, and any other stereo line or mono microphone source. A clever EQ assign switch routes the channel equalization to either the stereo line input or the microphone input.

## STAGE MODE SWITCHING

A unique switching circuit turns the TRILOGY into a stand alone 6 bus stereo out stage monitor console. When stage mode is engaged, auxiliaries 1-4 are routed to the sub-group outputs, providing fader control of auxiliary 1-4 master outputs. Combined with auxiliaries 5 and 6, the TRILOGY offers 6 discreet monitor sends. The L/R outputs also remain active and can be utilized for a stereo in-ear monitor or side fill system.

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# *The Home-Brew* **Pop Filter**

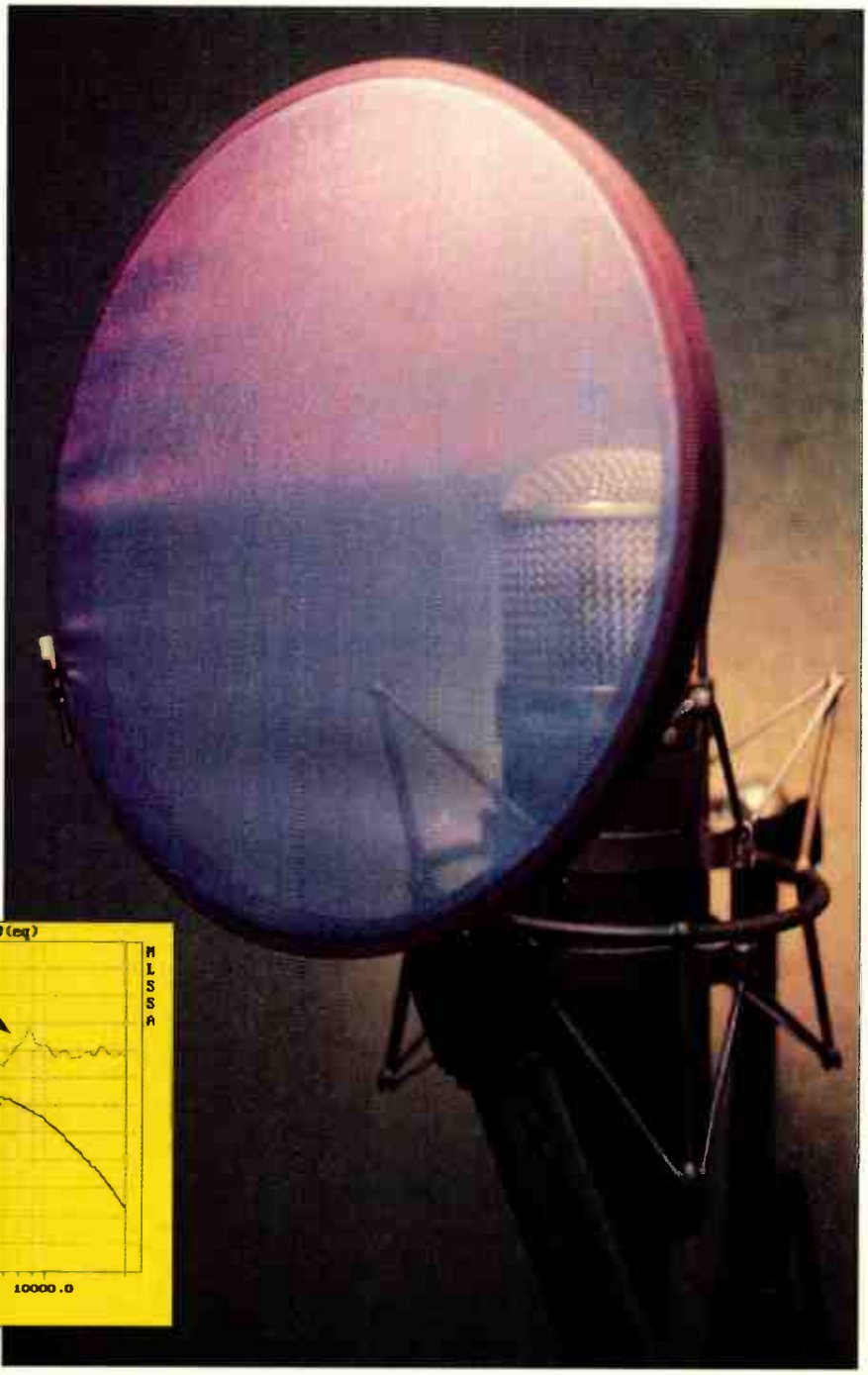
## Sock it to those popping problems with this do-it-yourself project

**BY JOHN MONFORTE**

It's no news to *EQ* readers that owning a project recording studio can be an excellent alternative to renting out a full-scale commerical facility. Recordings made in these modestly equipped rooms can sound every bit as professional as one made in a full-service room, assuming you can wear the hats of producer, engineer, and maintenance tech, as well as musician.

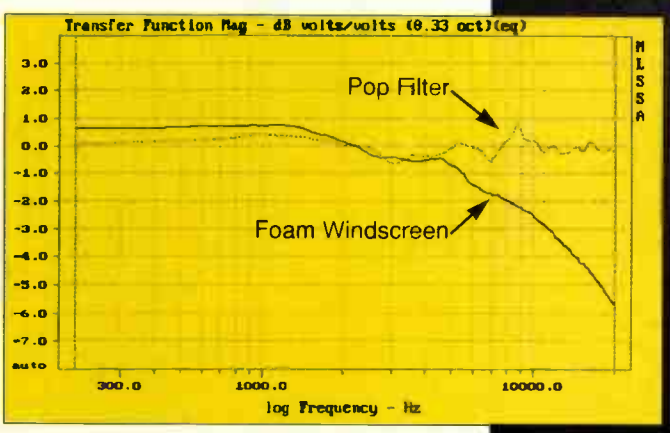
Many people who make their own recordings also find themselves in the roles of acoustician and/or construction contractor. For all the same reasons, they can cut their costs and still get the job done well. It doesn't need to stop there. With a little ingenuity and a skilled pair of hands, it is possible to actually build some of the equipment needed in a project studio. As usual, it can be done at a fraction of the cost without sacrificing quality one bit.

A good place to start is with a windscreen or, more correctly, a pop filter. Long before the fancy commercial jobs hit the market, pop filters were being used by the people who identified the solution and built their own. The first one I made consisted of panty hose stretched on a wok strainer. It certainly got some weird looks, but no one doubted it did the job. In fact, it worked so well that I should have built a more attractive one long ago, but the only improvement I could have made was in appearance. Well, here is my new improved version that you can make yourself. You can use the money you



POP TO IT: A pop filter is easy to make and can make a noticeable difference in your sound.

FIGURE 1 (below): Comparison of windscreen and pop filter.



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save to buy a decent pair of sealed headphones for those close-miked vocal tracks you will soon be recording.

### TALK ABOUT POP FILTER

I call this a pop filter because it really is no good outdoors in the wind. In the recording studio, the blasts of air that bombard the mic are caused by the musician, so we know more about the nature of the problem and can use a bit more finesse in reaching a solution that does less to alter the sound.

While not essential to the construction process, we should take a moment to see just why we need a filter and what properties it needs to give us the best recordings.

Microphones measure either the pressure or the velocity of a sound wave. Pressure-sensing mics are inherently omnidirectional, and all mics that sense only velocity are bidirectional. Cardioid microphones measure equal portions velocity and pressure. Wind and breath noise are pure air velocity, so any directional mic will be sensitive to these disturbances.

One solution would be to use an omni microphone. Pure omni mics are hard to find in recording studios. Their extreme accuracy in terms of both frequency response and distortion makes them almost ubiquitous in audio measurement equipment. One would think that since there are no stage monitors in a studio and, when overdubbing, there are no other instruments to reject, omnis would be our first choice. Unfortunately, our tastes prefer the hefty sound of proximity effect that only directional mics can impart to an instrument. Our choices of microphones and sounds in general, are just as much due to cultural precedents as they are to science. If a recorded voice sounded exactly like the people in real life, it would be rather boring. We want that bigger than life, better than real sound.

There are a few commonly encountered sources of velocity noise in recording situations. First and foremost is voice, either speaking or singing.

PARTS LIST: These simple materials can be used to build your home-brew pop filter.

As the performer moves in closely, popping occurs on consonant sounds such as the "p's" and "b's." This is because the human is expelling relatively large quantities of air in short bursts to make the sound. Flute and sax recordings also reveal some artifacts depending on how the mic is oriented, but that is truly a minority of the total applications for a pop filter.

The job of any pop filter is to prevent these puffs of air from arriving at the mic while, at the same time, letting clean unfiltered music pass through unimpeded. At first this appears to be a challenging task, but actually it is not difficult at all if you know a bit of theory.

We all know music is a wave motion of the air molecules, but the noise is due to a comparatively large current of air moving in a manner that aerodynamicists refer to as a laminar flow. When you turn on a faucet slightly, you see a smooth, glasslike column of water. All of the molecules of water are traveling in the same speed and direction like a school of fish traveling across a reef. Once the flow is increased, individual molecules tend to start colliding with their neighbors, which causes further collisions until the water column is distorted by turbulence. Describing the minutiae that cause these cascading interactions is best left to supercomputers. Aircraft designers use these computers to design planes that cover themselves with a thick blanket of laminar air. Fortunately for us, we are after the turbulence, which is very easy to obtain. All we have to do is trip up a small fraction of the air molecules and they will stumble over each other until their net motion is virtually zero. After all, it only takes a handful of tacks to bring rush-hour traffic to a halt.

A true windscreen needs to be prepared for a wind coming from any direction and, for aesthetic reasons, must be as small and dainty looking as possible. This calls for drastic measures. Sound-reinforcement vocal mics come equipped with internal windscreens made of sintered metal or open-cell foam. Either material is porous, but the


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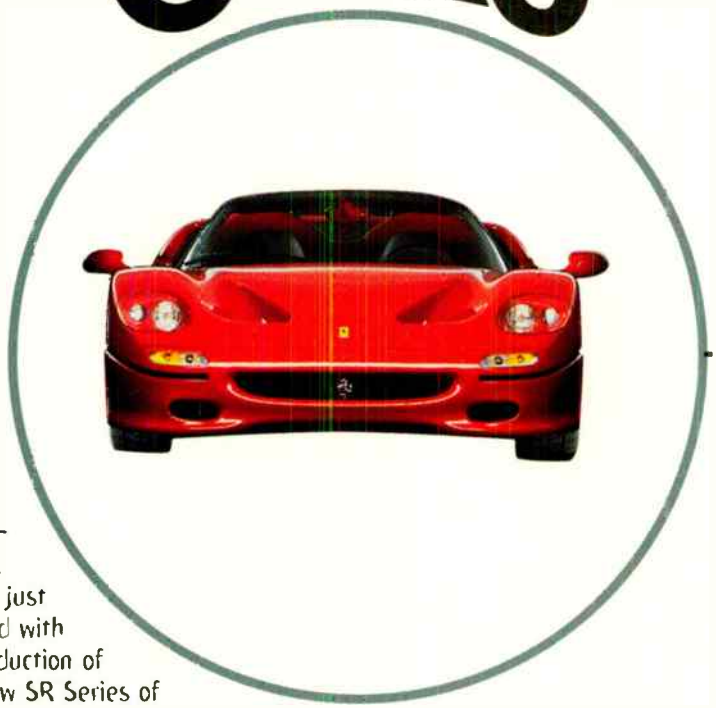

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|---|---|---|---|---|
| Congfiguration | Dual 31 Band | Stereo 31 Band | Dual 31 Band | Dual 31 Band |
| Balanced In/Out | In only | Yes | Yes | Yes |
| Low Cut Filter | Yes | No | Yes | Yes |
| FET Switching | No | No | No | Yes |
| Response | 20Hz - 20kHz | 20Hz - 23kHz | 25Hz - 20kHz | 20Hz - 20kHz |
| Signal to Noise | 95 dB | 96 dB | 112 dB | 106 dB |
| THD | .003% | .009% | .008% | .004% |
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path air molecules must follow to pass through is tortured and sinuous. By the time the molecules encounter its neighbors on the other side they find themselves aimed in radically different directions, so they end up colliding with each other more than the diaphragm of the mic.

As effective as this is, there is a sonic detriment that occurs as well. This type of windscreen tends to warp the frequency response to some extent because sound needs to pass through relatively thick blankets of windscreen material that reflect and absorb sound. We need something that is more sheer. The answer, as the appliance salesman would say, is volume, volume, volume. By increasing the size of the windscreen, we allow more time for the air molecules to completely scatter each other. If we know where the blast is coming from, we don't need to surround the whole mic, we just put a section of windscreen in its path. There it is, the humble pop filter.

### IF YOU BUILD IT...

The parts you will need are easily obtained. I use a 7-inch embroidery hoop that can be obtained at any fabric store for a buck or two. While you are there, you can pick a fabric, too. Panty hose does work, but it stretches out and runs eventually. I have found even better materials searching in fabric stores.

What you are looking for is a light fabric that breathes. Don't concern yourself with how well you can see through a fabric. You should be able to cover your mouth with it and breathe easily through it. This will take care of the frequency-response issues. In order to test its aerodynamics, blow on your hand with and without the fabric in between. A good fabric should stop the draft completely in less than a foot. Sooner or later you should come across one that even looks nice, too. For this article I selected a violet taffeta that no modern, active, vocal microphone should be without this season. If you take a moment to look around the store, you may notice that you are the only person in there blowing on the fabric. You can be sure everyone else finds you to be considerably more peculiar than that.

Since I got one of the cheaper wooden hoops, I painted it in a color that matches the fabric. The only other thing you would need is a way to attach it to a mic stand. An old broken mic clip can be cut so only the threaded part remains. Just drill a hole in it and the outer ring of the hoop so a number 6 screw can pass through them. Use a flathead screw and countersink the inside of the outer ring by turning a large drill bit by hand in the hole. This will make an indentation that will let the screw head fit flush. Inside the clip, use a lockwasher and nut to secure the screw. This joint does not need to rotate.

Fit the fabric between the hoops and tighten it in so that it is lightly tensioned. It is not important to stretch the fabric as tight as a drum head. As long as it is not flapping in the breeze it should work just fine. If your fabric does not stretch, there may even be some waviness in the final product. This has no effect on the sound quality. Depending on the material, you may want to secure it with some glue when you assemble the rings so it doesn't slip out. Barge cement or rubber cement should work fine, but at these prices there is no reason not to use wood glue and make it permanent,


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if you prefer. Once assembled, trim the fabric with a razor blade or x-acto knife.

Now you are ready to roll tape. A side benefit of a pop screen is to help you position your performer. You know how it is. You place the mic and it seems that by the time the session is over, the vocalist is crowding the mic. Performers like to rest their lips on something, and the pop filter, at the very least, fixes their distance to the microphones and keeps them aimed at the right spot and from the right angle. Remember, in close miking, little distance changes result in large changes in level and tonal balance. Both your microphone and your limiter will thank you.

Another reason to use a filter is to protect the diaphragm. Condenser capsules are easily damaged by the moisture and don't-ask-what-else that comes from the breath. First, bass goes, and eventually the very expensive capsule needs replacement. This is even more depressing if the capsule was an antique original. They don't make them the same way nowadays. Your repaired mic will lack some authenticity and lose value. So always practice safe recording and use some form of a windscreen on all vocals.

I like to put my filter on its own stand. In case the filter gets touched or moved, it won't be picked up as handling noise by the mic. Most of those large diaphragm vocal mics are very sensitive about this. If you don't want to do this, the filter can share the other half of a stereo bar or a drum clamp could be used to attach it to the stand.

Some of you may doubt that something you whip up with ordinary household materials can compete sonically with manufactured gear designed by guys wearing lab coats. Fear not, intrepid reader! I measured the change in frequency response caused by adding the pop screen to one of my favorite Bavarian vacuum tube condensers. The curves shown in fig. 1 demonstrate how little the sound changes compared to the official foam ball sold by the mic's manufacturer for $90. It might come from the Black Forest and be tattooed with a prestigious logo, but that doesn't necessarily mean that it is the best that science has to offer. Even in the case of the pop filter, those little perturbations in the high frequencies are more due to reflections off of the hoop than any loss through the fabric.

A pop screen is just one of many different items that can be built at a cost far less than its commercial counterpart. There are also many other useful time- or money-saving tools that you can make for your studio. So keep reading *EQ*. There is more to come.

*After sixteen years at the University of Miami's Music Engineering Technology program, John Monforte has moved to the University of Michigan's Media Union. This new multimedia research center will soon be the home of many collaborative projects in the arts and technology, and will serve as a focal point for multidisciplinary degrees.*

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# Q: What's the difference between a PCI soundcard and the

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## A: Oh, about a gazillion things.

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Hook up directly to each of your console's eight busses. Transfer tracks from a tape-based digital recorder for editing. Record your band live without premixing. Layla gives you eight independent balanced analog inputs—all simultaneously accessible, all outfitted with exceptionally low-noise 20-bit A/D converters. (We even put two extra inputs on the front panel to help you capture those moments of inspiration without needing to fire up your whole rig.) And in case you were wondering: Input levels are adjustable in software from –10dBV to +4dBu.

These days it seems like everyone and their brother is making PCI audio interface cards for the PC and Mac. To say the marketplace is a bit confused is like saying Times Square on New Year's Eve is kinda crowded. So how do you separate the good from the bad and the ugly? Easy. Look hard at the features, determine what's important to you, then balance that against what's going on in your pocketbook.

We'll help. Study these pages carefully. We think you'll soon see that Layla delivers the features and performance you want—at a price that's remarkably easy on your budget.

Okay. Got the picture? Obviously Layla isn't just another card, but a complete system. A system designed to help you make great-sounding music. Designed to grow as your needs grow. Designed to change the way you think about hard disk recording.

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**PLAY IT** Forget about having to premix output tracks—forever. Layla features ten independent balanced analog outputs, each one boasting a superior quality DAC, for true 20-bit audio performance. And our exclusive OmniBus™ audio assignment architecture lets you easily configure the outputs as aux sends, monitor mixes, discrete track outs—you decide. Plus you can play back on all ten output channels while you're recording on all eight input channels . . . that's not just full duplex—that's octadecaplex!

**EXPAND IT** Now for the really big news: You can synchronize multiple Layla systems—expansion is as simple as plugging in another card and connecting the word clock output of the master unit into the word clock input of the slave. (Daisy-chain as many Layla units as you have PCI slots in your computer.) When you build a larger system you not only get more hardware ins and outs (how does 24 inputs x 30 outputs grab ya?), you get more (lots more!) DSP horsepower.

**MIDI IT(!)** All right. We admit that MIDI in/out/thru probably isn't the most earth-shattering feature you've ever seen (even if it is opto-isolated). But we know you'll appreciate the convenience of being able to create a simple, yet powerful audio/MIDI multitrack recording system without having to hook up a ton of additional gear (or worrying about your MIDI interface card conflicting with the IRQ on your digital I/O card, which conflicts with your SCSI card which conflicts—you get the picture). Did we mention that Layla is a true Plug-and-Play™ system? That's right, no jumpers to set, no IRQs to configure (in fact, only one IRQ is used for both audio and MIDI functions and no DMA channels at all are used). Setup is as simple as plugging in the card and connecting the included multipin cable from the card to the audio I/O unit.

**SYNC IT** Layla offers synchronization capabilities that make it perfectly at home in a variety of professional environments. Synchronize to picture via SMPTE/MTC. Lock to external word clock. Generate sample-accurate sync from the master clock out. (Our word clock provides continuous single-sample resolution from 5kHz to 50kHz.)

**DIG IT** Create a 24-bit stereo master mix to send to the digital output. (Yes, Virginia, there's stereo 24-bit digital input as well.) Or maybe an all-digital effects loop is more to your liking? Whatever the application, your precious audio tracks are handled with 24-bit precision throughout Layla's internal audio path.

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**ECHO IT** Why does it say ECHO on the card? Simple. Our strategic partners, ECHO Corporation, are the engineering team behind Layla. ECHO has been providing audio ASICs and DSP system software and drivers to the computer industry for the last 17 years, and their designs have been sold and licensed to such industry leaders as Analog Devices™, Motorola™, Rockwell™, Sony™, S3™, and VLSI™. Why should you care? Because it's your way of knowing that the Layla hardware and software driver (the key to making Layla compatible with so many of the great Windows 95 audio applications) were designed by people who really—we mean *really*—know computer-based digital audio.

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World Radio History

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# *Audio Au* Natural

## Using ambient room miking to create reverb

**BY RICH TOZZOLI**

Producer/composer Peter Vitalone and I have always been really conscious of the vibe associated with the recordings we make — especially the ambient environment. Everywhere we go, we'll clap in the room or say, "Hey!" just to get an idea of how the room itself sounds. Sometimes the people around us get a bit annoyed because we're always saying things like, "Oh did you hear that room?" It evolved from our obsession with sound as it exists in different rooms.

Doing recordings with no EQ isn't so uncommon these days. But our attitude was that, by taking the time to mic the instrument properly, taking the time to mic the room just as carefully, and using a good signal path, we could make great recordings both sonically and musically. We played with mic position on every instrument and that is what takes the most time. Generally, we first go into the room, play the instrument, and move our ears around until we find where the mics should go. In the case of the piano, we had to nudge the mic in or out to tweak the bass response a bit.

In addition to writing all of the songs for this project, Peter Vitalone also played piano, Hammond B3 organ, and accordion. Musicians playing on the first song, "Golden Light," included Paul Nowinski (Les Paul Trio) on upright bass, Tony Mason (Holly Palmer) on drums, Hernan Romero (Al DiMeola) on classical guitar, Paul Frazier (The Funky Poets, *Free Willy* Soundtrack) on lead vocals, and Ray Frazier (also Funky Poets) on background vocals. Every one of these guys is an all-star, so we could easily have set them up in our studio at R. Austin Productions (Westwood, NJ) and had them play the songs live. But we wanted more than that: we wanted each musician to be totally comfortable with the unique ambient environment in which they were playing. There's a distinct difference in the headspace that a musician is at when they are playing in a studio, as opposed to, let's say, a church. Our goal was to capture that difference.

"Golden Light" started with the drums, which went down onto a TASCAM DA-88 along with a guide keyboard track from a Korg 01/W. Drums

NATURAL WONDERS: From left to right: Rich Tozzoli, Paul Frazier, and Peter Vitalone. For more information, visit Tozzoli's Web site at www.r-austin.com.

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were recorded at our studio. The 01/W was recorded in stereo, while the drums were recorded onto four tracks. There was an AKG D112 on kick, Shure SM57 on snare/hihat, and a pair of AKG [C414B] TLII's. Set to cardioid, the TLII's were placed six feet apart and three feet away from the cymbals. Tony was playing a really old Slingerland kit that sounded amazing.

CHURCH MUSIC: Ray Frazier lays down the background vocal track.

It took a while to place the kick mic right because it's hard to do a kick without EQ. Sometimes it sounded a bit weird by itself, but when you put it into the mix it works. Our signal path was real simple: The TLII microphones were plugged into a Demeter VTMP-2b tube mic pre, then straight into the DA-88. The kick mic and snare/hat mic were plugged into our Mackie 32•8 and the direct out was patched into the DA-88. We also used the 32•8 for monitoring purposes, fed through to a Samson Q5 headphone amp, and AKG K240 phones (I was using Sony CD999 phones).

Once Tony had cut the drums, it was time for Paul to play the bass part. After a bit of ambient listening, we decide to track Paul in the stairwell at our studio. An Audio-Technica 4033 was placed right near one of the f-holes of the bass, and then up at the top of the stairwell we placed an A-T 4050/CM5 in omnidirectional pattern. The A-Ts were connected to the Demeter pre and routed straight to tape. This gave us a track of the bass close-miked and another ambient track of the bass sound; this ambient track would later become our reverb send.

This DA-88 tape (now with a total of


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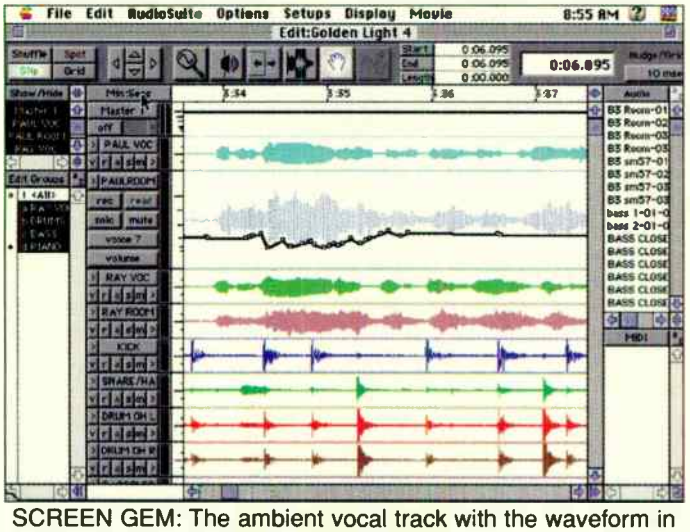
eight tracks) was bounced digitally into Pro Tools IV, which we run on a Apple PowerMac 8500 with 64 MB of RAM. Using a Digidesign 888 interface, each track from the DA-88 was routed to an individual track in the Pro Tools session. Visually, we could see downbeat #1 in Pro Tools — which is very important to the subsequent overdubs. These eight tracks of Pro Tools audio were submixed to stereo via the 32•8, back onto a fresh piece of DA-88 tape.

Now it was time for Pete to play his piano part. Paul N. has a 1947 "L" Steinway in his living room, so we couldn't resist. We took the DA-88, a Mackie CR1604, the Demeter pre, Samson headphone amp, phones, an eight-channel harness (to run the DA-88 into the '1604 for monitoring), a couple of mic cables, and a couple of cables to connect the Demeter output to the DA-88 input. Headphone lines came from the '1604's headphone jack into the Samson phones amp with a stereo cable. We packed up our rig and headed for Paul's place.



SCREEN GEM: The ambient vocal track with the waveform in the background in light blue and Rich's volume automation of the reverb in dark.

Paul's living room is a rather eclectic room with some odd furnishings, so the sound of this room — and, just as importantly, the vibe — was very cool. Unpacking the rig and setting it up in the living room took about 15 minutes. Everyone was in the living room monitoring with cans on. I could move the ambient mic around the room and, with my phones on, could instantly hear the varying sonic nuances of different placements. With the lid open, we placed one A-T 4050 close in on the piano and placed another 4050 cranked towards the ceiling, recording each mic to its own track. Both mics were set to omni. Once again the signal path was mic-Demeter-DA-88 and we obtained a similar effect of having a direct-sound track and a reverb track.

Back to the studio. We digitally dumped the piano back into Pro Tools and visually lined up downbeat #1. There was no timecode and no click tracks — every time we bounced ODs from DA-88 to Pro Tools it was an unsync'd fly in. There were no problems with drifting because it's only a three-minute song. The nudge-ability in Pro Tools is visually very easy. In fact, two kick hits were late, so I cut the waveform and moved them to lock in with the bass. For a second time, we submixed out of Pro Tools IV through the 888 into the 32•8 and onto a fresh piece of DA-88 tape.

To complete the rhythm section we needed to record Pete playing a Hammond B3. Paul and Ray Frazier's father is a minister at a church where there's a beautiful old FAT B3 with flown stereo Leslie's. We had to track it there. We put a Shure SM57 in tight on one of the Leslie horns (for grit) and used a 4033 way up in the room pointing towards the ceiling for reverb. When you solo the 4033 track you can hear this weird eerie sound when the Leslie winds up. It's *sooooo* cool. We brought the tape back to the studio, bounced the B3 into Pro Tools, lined up the downbeat to put it in time, and then made a stereo mix of the now-complete rhythm section onto a fresh piece of DA-88 tape.

Having finished the rhythm section, we were ready to record the vocals and decided to go back to the church. Paul Frazier sang through an A-T 4033 close-up. About 40 feet away from where Paul was standing we placed an Earthworks TC30K (way in the back of the church). We stretched the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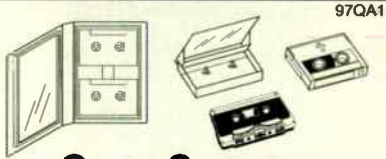
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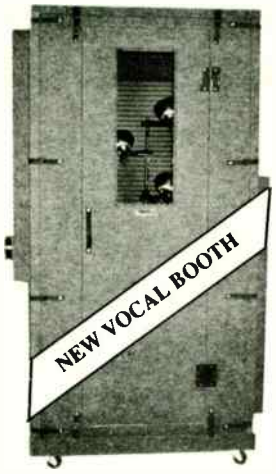


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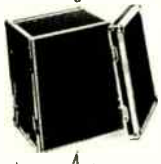

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headphone extension as far as we could and had the portable recording rig right up in the pulpit area (no blasphemy intended). Each mic went to its own track, and then Ray sang his background parts through the same setup. We now had a rhythm section on tracks 1 and 2, Paul's dry vocal on 3, Paul's vocal reverb on 4, Ray's dry vocal on 5, and Ray's reverb on 6. We also tracked Pete's accordion part in that church with two TC30K's: one up close and one out in the room. We would listen in the headphones, put the mic out in the church, and Peter would move with the accordion until we found the spot. Then we'd tell him to stop and do the track.

Last in the tracking process was Hernan Romero's classical guitar part, which we overdubbed in a wooden loft in Patterson, NJ. His guitar was miked using two TC30K's, one close up and the other about three feet away. The close mic was placed right where the neck meets the soundboard. This time we chose to place the ambient mic closer because we didn't want too much room sound and there was a lot of outside noise.

The fun part (some of which you can hear online) is listening to all of the different rooms. It's strikingly different from anything you could hope to simulate with a digital reverb. And it's also the headspace that all of the musicians were in, allowing them the creative freedom of being in a comfortable environment. Musicians will play differently behind a closed glass studio than they will in a church or a room or a loft, or some situation where it's just friends hangin' out.

As you read this, we're in the process of recording (and mixing) the rest of the record in a similar manner. On another song, "So Long," we recorded Paul Frazier's vocals in the same stairwell that we had done the bass in. As Paul angled his head up into the stairwell you could hear a clear difference in the reverberant characteristics — he actually would change the reverb in real time, dependent upon how he moved his head. On the chorus, Paul would angle his head up into the ceiling and you can clearly hear the reverb change. In fact, on almost all of the sessions, the musicians could do this just by angling their instrument. That's part of the coolness of this vibe. That's what we meant by setting an atmosphere. The musicians were allowed to practically create their own space by using their headphones, listening to where they were. As they'd moved around they could hear it, getting real-time feedback in their headphones on their position. They have a determination in their own reverbs, which is something that you could never get from a digital box.

We've also just recorded guitarist Jack Petruzzelli (Joan Osbourne) playing acoustic guitar and mandolin in that same church. The acoustic guitar was miked close-up with a BPM Studio Technik TB-95 and the direct output from the guitar was plugged into a Carvin Vintage amplifier. We placed the amp in the back of the church facing up towards the ceiling and used a TC30K a few feet off the floor, pointing down towards the corner of a wooden pew for the ambient sound — which gave us a really reflective, bassy sound. For the mandolin we decided to use just the BPM mic up-close.

In the mixes, we're playing around with panning the direct track to one side and the reverb track to the other — not necessarily a hard pan, but enough to give the illusion of space. Some of the reverb tracks may sound muddy or funny by themselves (such as the B3), but they work together with the close mic in context of a mix. The depth of the two tracks combined is beautiful, and that's what this method creates. You can hear that stairwell and Paul Nowinski's breathing as well. For Ray's vocal we mixed the close mic to one side and the church panned to the other side to open up the depth so you could really hear that church. Pro Tool's powerful automation really became an integral part of making these mixes special, as did the excellent imaging of our Event 20/20 bas monitors. In addition, the record is being mixed using QSound Labs' newly introduced QSYS TDM 2.0, to even further enhance the dimensional aspect of the recording.

Even in big studios, you can have one or two rooms, but it's still [just] two rooms. We have five or ten rooms or whatever we can imagine that are sonically unique. You can't record in Grand Central Station, and we did constantly have problems with outside noise. Sometimes these outside sounds added personality to the track. I'm almost surprised you can't hear it. When we isolated Ray's room vocal track, there's a train horn in the beginning (lucky for us it's in the same key as the tune!). There's birds, lawnmowers, dogs, all kinds of things. But who cares? It's ambient, it's fun, and it's real. We're going for a whole vibe — every single

*continued on page 136*


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# dweezil

dweezil zappa finds inspiration not in his father's neve-equipped utility muffin research kitchen, but in his small mackie-based project studio

by mr. bonzai

photos also by mr. bonzai



World Radio History

# engine

**Mr. Bonzai: Where are we?**
Dweezil Zappa: I call this room "Bitch Stevenson Sound." He's my joke sportscaster. "Hello, Bitch Stevenson here for Fox Sports."

**What have you got here at Bitch Stevenson Sound?**
I have so many ongoing projects that I needed to learn how to operate on my own, so I could work whatever hours I wanted and do much more experimenting with ideas and recording. To do that, I had to get a simple but functional board, and Mackie was the one for me. I set myself up in this room inside the bigger studio here at the Zappa house.

It seems ridiculous because we have a Neve console in the other room and great equipment, but it requires having a second engineer. Also, there are Neve projects that need to be worked on at the same time that I am working, so that room needs to be available. It made sense for me to have my own little space inside the bigger space. I can expand if I want to and take it into the other room and mix with full automation. I have the best of all possibilities now. This is *low* maintenance.

**What else do we have here?**
I've got these Yamaha NS10's, 24 tracks of DA-88. We already had a lot of good mics here, so I've been lucky with that. Next, I'll get some other items to improve my room — extra mic pres, maybe some special EQ. This started as a project studio, but it's more functional than any other studio I've worked in — for me, anyway. I want to carry it all the way through in here, so I am starting to expand. What I like is that anybody can get this kind of equipment. It's simple and easy to use. I don't like reading manuals — they hurt my feelings.

**And you can bounce this up to master level?**
Yeah, and it's fast to work in here. You can do edits and all kinds of stuff with these machines. I like 'em and I like this board a lot. Even the EQ. Some people say, "Well, you only want to use EQ for *special* occasions." But you know, everything is a *special* occasion for me. I want to plug in and tweak the knobs until it sounds right. I don't care if I'm using EQ if it sounds like what I'm interested in.

Being confined to this space, I try not to go in and out of the room. That's why I'm mainly doing direct guitar recording. Sometimes, if I really need that kind of sound, I'll leave one mic set up on a cabinet. I have it set up in the big room and I just run a cord in here and plug in.

I've done 90 percent of my new work in here with this DigiTech stuff, the Zoom, and direct into the board. This is this new DigiTech guitar thing — Studio Guitar System 2112. It's got some "tubes" in it, as

**Suspect:** Dweezil Zappa

**Residence:** Los Angeles

**Age:** 26

**Occupation:** Guitar player, sportscaster, and self-described "studio dog."

**Albums:** *Havin' A Bad Day* (1986), *My Guitar Wants To Kill Your Mama*, (1988), *Confessions* (1991), *Shampoo Horn* (1994), and *Music For Pets* (1996) with brother Ahmet in the group "Z."

**Diet:** Italian. "Any kind of pasta."

**Vehicle:** Aston Martin aficionado.

**Peculiar Habits:** Cannot tap his foot in time to music. "I tell musicians, don't look at my foot to figure out where I'm putting the '1' in this piece of music because it'll screw you up. I have a spastic sense of rhythm."

**Ancestry:** "Mostly Italian, but we're mutts — a little Danish, Portuguese, Hawaiian."

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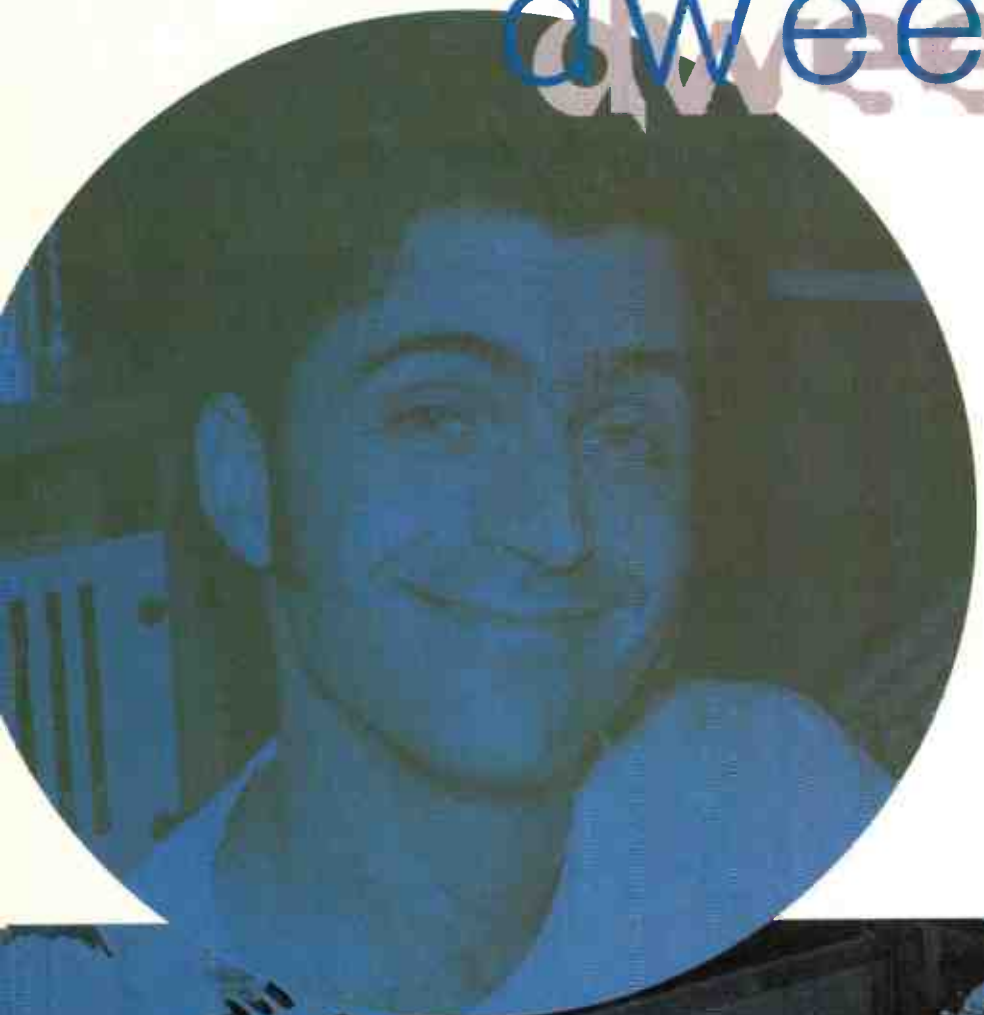

well as the solid state. It's like a pre-amp, and it's recommended use is with an amp — then it sounds the best. But for the kind of guitar sounds that I've been looking for, I didn't want them to necessarily sound like amp sound. I wanted them to almost sound fake. Sometimes when you record direct, say with just a distortion pedal right into your board, you get this sound that's in your face, really weird, only fuzz. It was interesting to me that I never did this before. I thought I had to always play through an amp.

Not only was it convenient to just plug it in because I didn't have to go anywhere, it ended up being a texture that was more interesting for the songs that I'm currently writing. I'm moving away from what I used to do, and the sounds that I'm playing with are not necessarily like the "old school" rock sound. They're in between everything.

**You call it "pop music with weird guitars?"**

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# dweezil

That's what I am looking for now, because I like melody. I can appreciate some of the progressive music that has no real melody, but if I am going to sit down and listen to something — I prefer to enjoy the melody. Call me crazy, but I am one of those people.

**What's this Zoom thingie?**
They make all sorts of products and this one is about five years old. I made some patches for it. They had all kinds of guitar players design sounds, and I made some for this one. This is the 9050. And I have tons of interchangeable pedals. What you see here is just a third of what is usually on the floor.

**What's this plaid one?**
It's the Monkey Dance, the Glow Vibe, and it's got a real warbly sound. It's hard to use. You can't use it a lot, because it has a real specific texture.

**Are these your two main guitars?**
This weird-looking guitar was made by a friend of mine. I forgot that I owned it and just found it the other day. It turns out that, of all my guitars, this one sounds the best for direct recording. The company who made it is called Moser, but it's in the shape of a Duosonic Fender. It almost reminds me of Adrian Belew. And I have this old acoustic Gibson, but there are many guitars nearby. I've been playing the Jimi Hendrix Stratocaster a lot in here.

**When we spoke a few years ago you had about a hundred guitars but you were shooting for 300.**
I was getting closer, and then I started thinking that there were some that I never played. If they haven't come out of the case in five or six years, there's not a strong possibility that I am going to be using them real soon. So I just sold a bunch of them to the Hard Rock, and a bunch to friends who were looking for new guitars. I wanted people who play guitar to have some of the really good ones, and I wanted people to see some of the really cool looking ones. I liked 'em, but I knew they were just sitting in my locker in cases. It's just good for people to see them.

**What are you working on now?**
I'm trying to finish something I started six years ago, back when people were still into guitar. Today, guitar playing, and certainly virtuoso guitar


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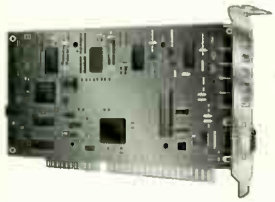

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World Radio History

playing, is completely buried. There are only a few communities in the world who still appreciate guitar, maybe a small town in Sweden or way off in Japan. Anyway, when I started this project the idea was to have as many of my favorite guitar players as possible. I would write music with specific players in mind and have them all play, and have one continuous piece of music that lasted the entire length of a CD. So it's 75 minutes, with about 45 guitar players playing randomly throughout, with every style of music I could put into it, playing every guitar that I owned, and using every guitar sound that I could come up with.

**Some of the guests?**
Edward Van Halen, Eric Johnson, Brian May, Steve Morse, Albert Lee, Angus and Malcolm Young, Yngwie Malmsteen, Blues Saraceno, Warren DeMartini, Brian Setzer, Joe Walsh. And some friends of mine: Tim Pierce, Steve McKnight. There's a lot of different styles of players. I'm going to cue the CD so that people can go to certain solos. And I hope to include Sonic Solutions pictures of what it actually looks like when they are playing. Maybe a book should go along with it. There's even ethnic music. I did the music of the Bulgarian Women's Choir on guitar.

**Is it almost done?**
It's like a giant "connect the dots," and I've just about connected all the dots. Now I have to color it — a few more overdubs and then mix. It's 95 percent done as far as recording, and I hope to finish it this year. I'm waiting to get Jimmy Page, Jeff Beck, and a couple others. I want them to be on it. I wanted to have everyone that was inspirational to me in wanting to play guitar. Unfortunately, some of my favorite players have passed away since the project started — my father, of course, and Stevie Ray Vaughn.

I just wanted to see if it could be done. It's not like others records that have had a lot of guest guitarists — it's randomly connected musical tidbits that propel it forward. It's like an audio movie and you think about all sorts of things as you listen. It's a crazy thing to try to do. That's why it's called *What The Hell Was I Thinking?*

**What about this new material you played for me today?**
I've been working on my own solo record since I put this room together about a year ago. I've recorded

TL Audio VP 2051

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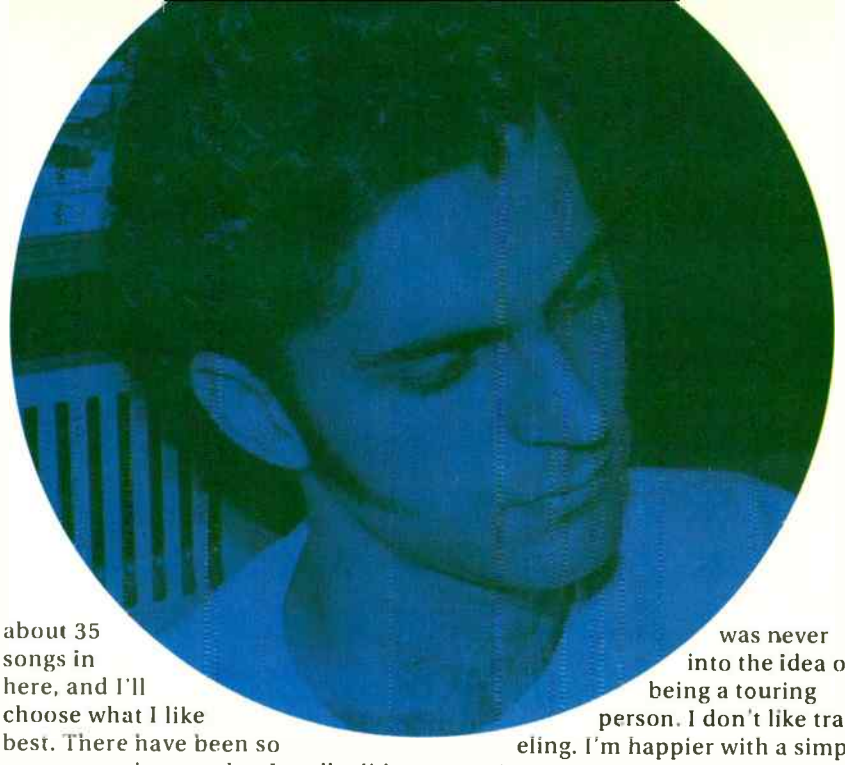

about 35 songs in here, and I'll choose what I like best. There have been so many experiments that I really didn't know which direction the record would go. I have some of the most serious songs I've written and I also have some of the most ridiculous songs I've ever written. I don't know if they all fit together, so I might have two records. But I enjoy a certain levity throughout a serious album. I have a short attention span, so I like things to change. And, in some bizarre way, there is continuity with this material.

**What about the Beatles influence here?**
I got obsessed with the Beatles's "Polythene Pam," and couldn't get it out of my head. I decided to do my own version and be done with it. I tried to record a version where the front half sounds identical to the original and halfway through it turns into a techno-version, but without any keyboards. Just guitars. On this one I played all the instruments except the drums. I'm trying to do everything I can by myself just to see what it will sound like. Also, I work late at night, and it's not easy to get somebody to come over and play bass at four in the morning. Well, I might get my friend Blues Saraceno to do it.

**Doing any touring?**
I haven't been doing any touring. I've lost interest for the time being. Ahmet and I haven't been doing any projects lately — we're on totally different wavelengths. But we want to do some TV stuff together. As much as music is the main thing for me, I was never into the idea of being a touring person. I don't like traveling. I'm happier with a simple routine.

Ultimately, I'd like to get into scoring. That's another reason why I put this studio together. So I would have confidence in knowing how quickly I could deliver something. I did the music for these ESPN commercials that we did for baseball — they're kinda funny. We're the baseball detectives. We use excessive force whenever possible. We even beat the shit out of Gary Coleman, which was a lifelong dream come true.

**Do any of the Zappa kids have kids?**
Nope. People often wonder what we would name our children. I have no idea.

**Did you once change your name?**
I never did. I had the fortunate experience of being in a shoe store when I was four years old and this big kid came over and was threatening me. He said, "What's your name?" I told him "Dweezil" and he said it was a stupid name. I said, "What's your name?" He said "Buns." At that point I never questioned the validity of my name. I thought my name was cool — compared with Buns. I thought, "I don't have a problem."

Both Ahmet and Moon wanted to change their names. When Moon was little she wanted to change her name to one she considered to be normal, which was "Beautyheart."

Ahmet was tired of being called "Ahmet Vomit" at school. There was a construction worker at our house who Ahmet thought was cool. He had a motorcycle and his name was Rick.


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So, Ahmet wanted to be "Rick Zappa." The next day he went to school and told everybody he'd changed his name. "I'm now Rick Zappa." Everybody goes, "Rick the Dick." He went right back to Ahmet Vomit.

**Why are you a guitarist?**
I enjoy the guitar, I gotta say, just because it's the most versatile instrument. You can make it sound almost any way you want. You can torture it, you can bend the strings. There's just so much that can be done with it.

**Are you an E-mail guy?**
I receive so much E-mail that I've almost decided I never want to look at it. I just get random stuff, and I've got a backup of 3000 messages that I'll never get to.

**What's wrong with the music industry?**
There's so much wrong with the music industry, that it is impossible to fit it all into this article. Currently, what bothers me the most is that there's a lack of bands being signed that will have any longevity. It's all about the "one-hit wonder." There's no concentration on excellent musicianship. It's about the right hat, the right hairdo. That's frustrating for anyone who actually enjoys music and people playing real instruments.

There's all these popular bands who sample everything, no guitar, and they're just rhyming stuff over other people's recorded work. Then they are touted as genius musicians. I have a difficulty with them being called musicians, because manipulating other people's music doesn't make you a musician. A technician, maybe.

**Is there anything good?**
I think there is. Even out of the stuff I complain about there are good things. I used to be much more judgmental, but I can't be bothered to be in that headspace anymore. If I don't like something, maybe it's just not for me. Other people clearly enjoy it.

Ultimately, the thing that is really annoying is that anything can become popular if it gets exposure. People are so ridiculous — MTV, all the radio stuff. It's so political and there's no space for new music. There could be. There are so many bands that could be successful if they had exposure. It seems wrong to me that only certain bands, based on the kind of deal that they make, get the big push.

You can't get airplay if your video isn't being played, and maybe they don't play your video because you're not getting radio airplay. It's a Catch-22 that's beyond insane. You


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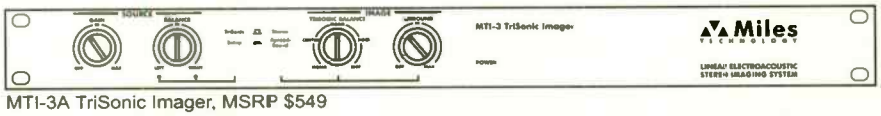


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## ANATOMY OF A SONG: "WHAT IF?"

**Dweezil Zappa and Mr. Bonzai investigate the creative process**

**Mr. Bonzai: What inspired this song?**
**Dweezil Zappa:** Well, I was really frustrated and a bit depressed because of a girl. Everything seemed like we were headed into a relationship, and then suddenly we had to slam on the brakes. I guess it was a timing issue. She was too soon out of another relationship to be involved in another one. To get my mind off the whole thing I had to write a song about it.

**Could you give me some key lyrics?**
*Whatever doesn't kill you*
*Makes you stronger than before*
*When you least expect to fall*
*You fall even more*
*It's easier to break up*
*And go back and take a look*
*It feels worse to wonder*
*About the chance you never took...*

**When did the melody arrive in your brain?**
I wrote both at the same time on this one because I was in an obsessive/compulsive-type mood. I had to find a distraction, anything to keep my mind off phone calls to this girl. I pretty much wrote the whole thing in one sitting, which I tend to do anyway.

**Next we go into your little studio. What comes first?**
I put a Boss drum machine part down.

**Does that go the whole length of the song?**
Yes, and I try to make sure that songs aren't longer than five minutes so I timed this out to about four and a half. I don't know how to program my drum machine in terms of bars and measures, and I don't really care to investigate it. I just choose one pattern and let it play all the way. Then I play a guitar part to it.

**All the way through?**
If I can make it all the way through without mistakes, but usually I do a few punches. After the guitar part, I sing along to make sure that I played the proper arrangement.

**Do you record that vocal?**
No — next I figure out what kind of textures the song will need to come alive. This song has a lot of chord changes and a lot of lyrics, so I needed to break up all of the vocal stuff with little guitar melodies throughout the song. I wanted a guitar sound that still sounded like a guitar, but not necessarily the same as a lead guitar. I wanted it to sound like weird melody stuff, and you wouldn't be sure if it was guitar or not.

**What guitar did you use?**
The one that's in these photos you took.

**Are you processing the guitar?**
Yes, through the Zoom. I got really lazy, and decided that it was easier to record direct, or straight into the board through certain types of effects boxes. I just got to the point where it was just too much for me to walk out of my little cubicle to put a mic on a cabinet. [*Laughs.*] That's too far to walk, man. I gotta plug direct. I used the Zoom and got a nice ring modulator sound — it ends up sounding like a keyboard, but with the personality of a guitar.

**What's our next track?**
After that, I decided that I had enough little things breaking up the vocals, so I might as well start singing, here in my little room.

**What mic do you prefer?**
I had a Neumann U87 set up, so I used that. But I've been meaning to experiment with other mics.

**One track of vocals?**
For the lead and the verses, yes, but in the chorus it becomes three-part harmony, so I did those next. Once the vocals were done, the song was coming together and I was thinking, yeah, now it pretty much needs only bass and real drums. I called my drummer, Joe Travers, and had him come down. He played some drums throughout the song, in the big room. I engineered from my little room, but I did have to leave the cubicle to set up for the drums.

**How many tracks do you use for drums?**
From four to seven, and sometimes I end up mulling them down to two. In this case, I had four tracks for his main kit, and then we did an overdub track. I kept the drum machine, which he plays to, and the machine is part of the song at this point.

On top of that, he plays a "loop" kind of feel. These days, people are using computers and putting loops to everything, but I don't know how to do any of that stuff. My way of getting a loop is getting a really crappy drum sound that sounds like a loop, and then having my drummer play it where I want it, instead of trying to find a place to lock it up in the computer. This works out rather well. I use this mic that is like a principle's microphone for the school PA. I put that about ten feet away from the drum kit and compress the hell out of it, distort it — and there's my loop sound. Just one track, and I put that off on the far right in the mix, which comes in during the choruses.

**What about the bass?**
I added bass after the drums. I like to do the bass later on, in many cases, because I like to feature it and I have to make sure that it has the right frequencies to cut through everything else. I like to have the drums, guitar, and vocals done before I put the bass on, because I want it to fit in nicely and not get lost. I like bass lines that can be heard and enjoyed as a melody part of the song. I've had trouble on other records where the bass just gets lost.

**Who played bass?**
I called my friend Christopher Maloney to play bass on this one. He has many basses, but I tend to make him use this one bass sitting in my cubicle. It's one of the original basses that was played on a lot of the Mothers of Invention records — an old Hofner bass, semi-hollow body, with a sound that works for the material I am doing these days. I keep experimenting to find the best way to get a decent bass sound. This time I put it through the Zoom, but I bypassed everything, so it's like a direct box. And then I used a compressor and a little EQ.

After that, I decided there were still spots in the song that needed more tension to make the song move along. I didn't want it to stand out too much, but just give it a feel that something else was going on.

I had to find another weird guitar sound,

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something that almost sounded backward. I put this "Monkey Dance" effect on it, so it's got this real shaky, tremolo with a backward sound, and I played this counter melody that goes in the verses, like a leading voice that moves along with the chords. That's off to one side in the mix — just kinda sits there. It's interesting, because your ear goes from listening to the lyrics to this melody thing and you don't really know what it is. It almost sounds like a Theremin.

Then I thought I was done, except for the fact that I wanted to accent a couple of chords that happen here and there. I used a different guitar, one that I designed with the Japanese guys at Performance Guitar. It's got a special parametric EQ built in, and when you turn the knobs, you can get different frequency responses. For this song, I used what sounds like a really extreme wah-wah peddle. You can go from the lowest low midrange to the highest midrange and it will make these massive sweeps — it sounds like a chord explosion.

**Is this guitar commercially available?**
They made a few. If people tried to convince the guys at Performance, they might be able to get them to make one. It has a weird shape and weird electronics. I have one, and I think they might have made a few more and sent them to Japan. It's shaped somewhere between a Fender Music Master and a Charvel Surfcaster, but then squashed. It's comfortable, sits on your lap like a Stratocaster, well-balanced — it just looks odd. I put some chords on with that guitar and at this point I'm pretty much done, unless I decide that it needs a little "plinky" sound that would keep time a little bit in the verses, almost like what a tambourine would do, but on guitar. That's the only thing left.

**So, we'll call this an almost complete song.**
Yes, and then we mix. Right now, I am choosing the best four or five songs and then I'm going to talk to some record companies — some major record companies — which I haven't done for about eight years.

struggle to break through in small clubs and you ruin yourself.

**What music would you like played at your funeral?**
I don't know that I would care. The stuff I've always liked listening to is not necessarily appropriate for a funeral. How about Van Halen's "One" or "Eruption."

**If you could go back before recording gear was invented, what would you like to hear?**
I like the Baroque period, full of melody. The Renaissance period would be a fascinating thing to witness. The best ideas were just being made up back then.

**How would you sum up your experience as a TV sitcom star?**
Oh, it was absolutely brutal. The TV show that we did bore no resemblance to the concept that was the original idea for the show. We were put through the TV wringer. Frank told us, "You really don't want to be involved in this industry." He was talking to me and Moon. "I know that you guys want to be excellent at what you do, and you're not allowed to be excellent at anything on TV."

**Any business insights for musicians?**
I'm still trying to find them myself. It's hard enough to make a living doing anything, and doing something you enjoy doing may be the hardest. For a musician, it depends on the instrument. For guitar players, there are very few opportunities because the instrument is not looked at in the same way it used to be. There used to be an interest in playing rock guitar, but now it's all about learning a few chords. Guitar is almost the kiss of death right now. It's all keyboards, sampled guitar, loops, and manipulation. They don't need guitar players. Bass players may have an easier time finding jobs.

**What about drummers?**
Yes, but you have to be good at programming these days.

**What's the biggest mistake of your life?**
I don't think I've made it yet. [*Laughs.*]

**What would you like Santa to bring you this year?**
Hmmm...Y'know, I'm thinking maybe some old Neve EQs, maybe some nice compressors... EQ

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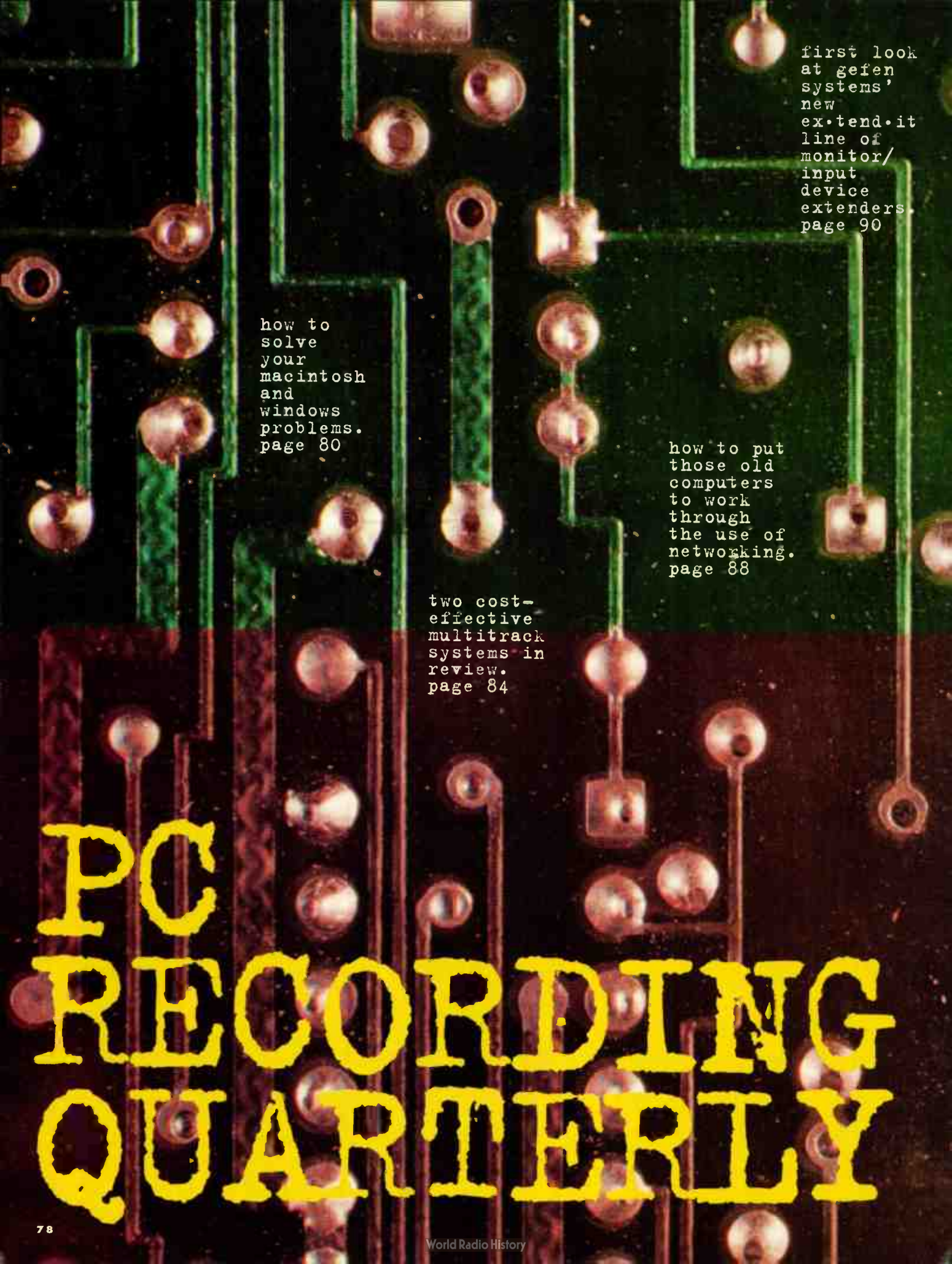




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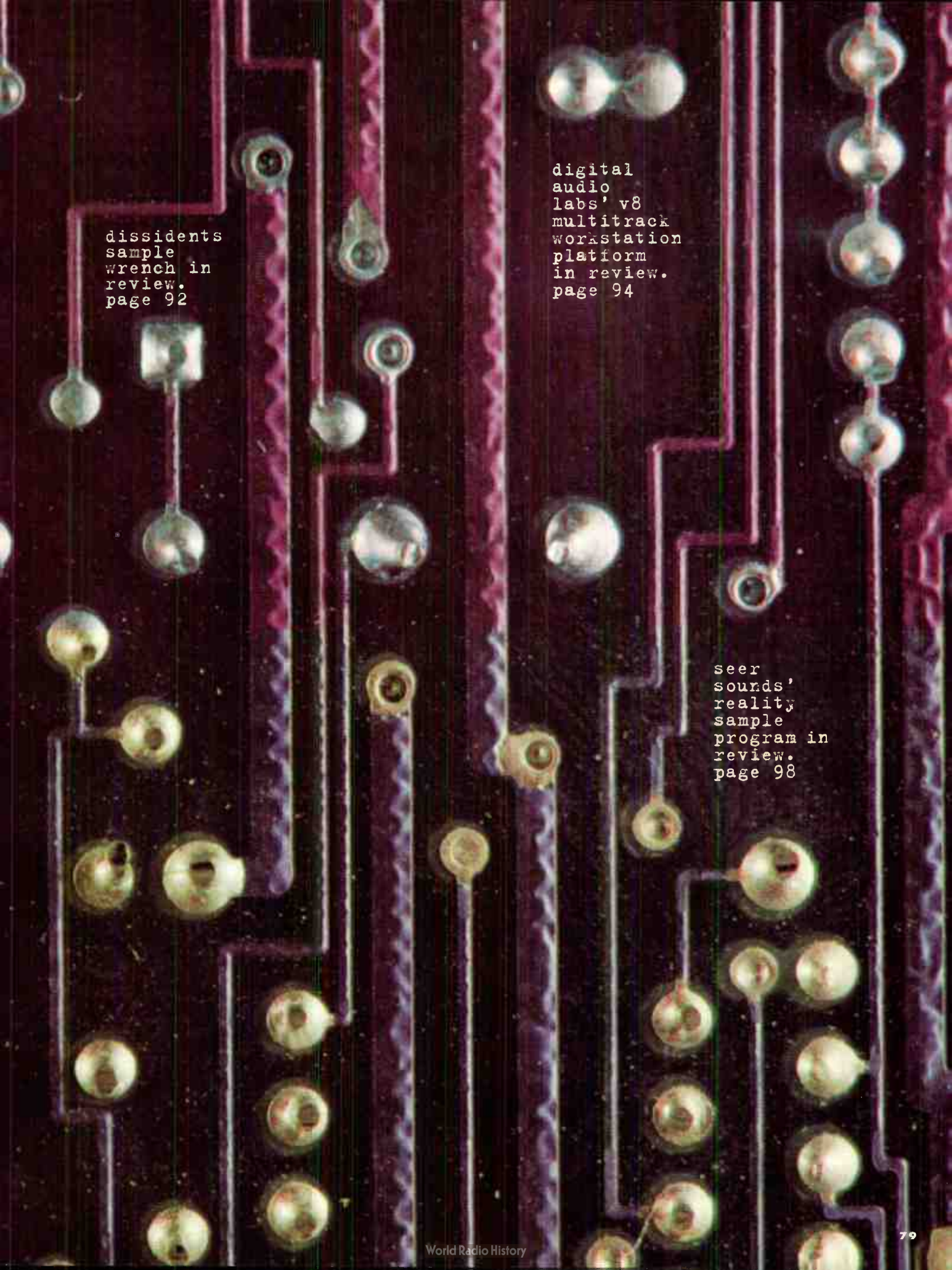

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PC RECORDING QUARTERLY

BY CRAIG ANDERTON

# Solving Mac/Windows System Problems Once And For All

**WHICHEVER PLATFORM YOU HAVE DEDICATED YOURSELF TO, HERE ARE SOME TIPS ON MAKING IT RUN FASTER AND BETTER**

Catchy title, eh? Well, it's a bit of an overstatement, because some problems are caused by hardware. But if errant software is screwing up your life, then read on.

### SOFTWARE IS SCREWING UP MY LIFE!

There you are, enjoying a relatively stable existence, when temptation appears in the form of a wonderful new piece of software. You install it, and watch helplessly as various drivers and extensions take over your hard disk. You cross your fingers and reboot...

When it works, you breathe a sigh of relief and move on. But sometimes — disaster. The skxjirvg.dll attacks the duhburp.dll with a vengeance, causing your computer to pout until you fix whatever obscure problem ails it. Even the Mac isn't immune from this kind of foolishness: next time you try to do something simple (like send a fax from your word processing program) and it crashes the computer, you'll discover the dark world of extension conflicts.

While there are several "solutions" to these problems, they're not foolproof. Apple's Extension Manager selects which extensions will be present at bootup; more advanced options, like Casady & Green's Conflict Catcher, help identify the problem — an improvement over the trial-and-error method of simply removing extensions one at a time until things work.

For Windows, programs like CleanSweep monitor program installation (when the most mischief occurs). In theory, it keeps track of the additions made to your system, so uninstalling a program removes all the bits the program installed in the first place. Then again, it might also remove some files that other programs happen to share, and when you boot up those programs...*ooops*.

One foolproof option is to reinstall a "clean" system. Crushed under the weight of all those orphan files, invisible copy-protection doodads, derelict extensions, and so on, your computer might not crash, but just become inconsistent. In this case, starting over with a clean system and reinstalling your programs can remove the data cholesterol from your computer's arteries.

### SOLUTION #1: REMOVABLE DRIVES

The Mac lets you choose any drive as a start-up disk. This is a beautiful thing, since you can store different systems and collections of programs on different start-up disks. If you have two or three drives, each can have its own system (this also guarantees the computer will boot, even if your primary drive fails).

Better yet, store your system and related applications on a removable cartridge. A Zip, SyQuest, or Jaz drive is a good choice, as there's enough storage for a decent-sized system and some applications. For Windows 95, though, a Zip won't cut it — the system itself is usually close to 100 MB. Mac system 7.6 isn't much better: a full install requires about 70 MB.

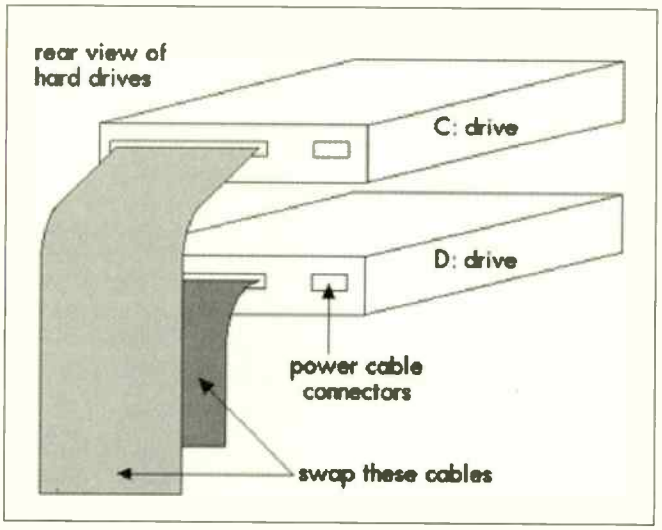



FIGURE 1: This shows two hard drives from the rear. Swap the two gray ribbon connectors to change your boot drive.

With copy-protected programs, dedicate one cartridge per program. If the disk goes down, you've lost only one program — keeping all your copy-protected programs on one drive begs for trouble. (Unfortunately, though, there are a few spoilsport manufacturers who make programs that won't install to removable drives.) Also, sometimes you hit a rogue program that just doesn't seem to get along with others. Isolate it, including a system, in its own cartridge, and your problems are over.

With cartridges, install a fresh, virgin, fairly minimal system on each cartridge, then install the appropriate set of programs. Optimize each system for the task at hand, and you're covered.

### SOLUTION #2: SWITCHABLE DRIVES

This solution is more Windows-oriented. Since I review a lot of PC software and hardware, my hard drive gets overloaded with all kinds of crap, some of which doesn't even

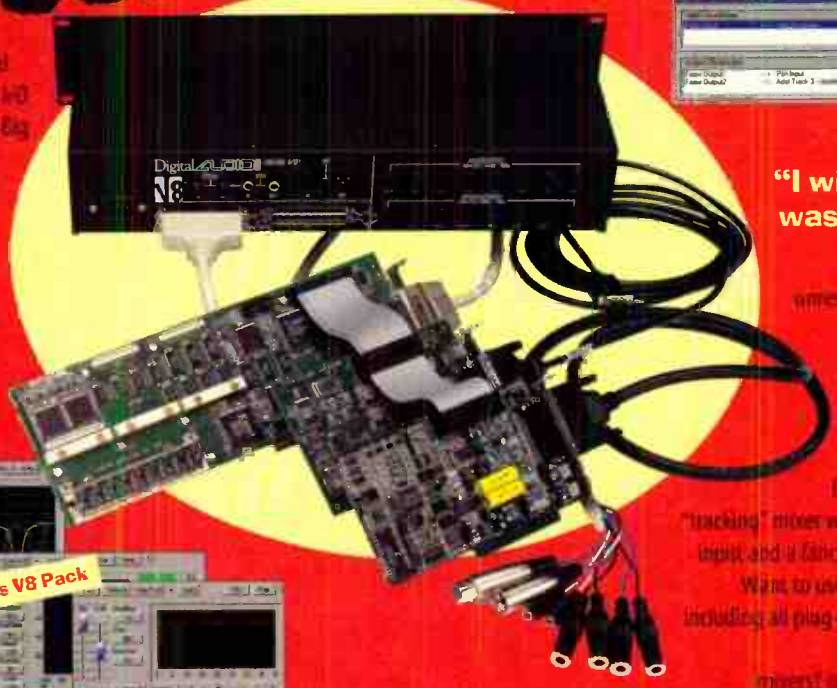

World Radio History

# 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/D/D/A sports S/N ratios in excess of 90dB and crosstalk better than -100dB! Add to that the ability to completely configure the Big Block from software, right down to the individual analog gain trims. We even isolate 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 Supercharger and RAM Inductor modules to the V8 and get hundreds upon hundreds 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 live 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, sample-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

World Radio History

work (ah, beta testing). After installing a program and rebooting my machine, I never quite know whether things are going to be okay or not, which can be pretty nerve-wracking. But there is an answer.

If you're buying a computer, get Windows installed and nothing else (none of those stupid demos). Make the system tweaks you want to make — where the icons go on the desktop, color scheme, etc., then copy the C: drive to a CD-ROM, and put it in a safe place. You now have a clean version of Windows suitable for future reinstalling.

In my machine, there are two 1 GB hard drives (C: and D:) and a Ditto tape backup system. When something scary comes in for review or testing, I take C: out of the boot process, turn D: into a clean boot drive, and install the software on D. Here's the deal:

1. Backup drive D: to tape — twice.
2. Erase drive D:.
3. Copy over the clean version of Windows from the CD-ROM to drive D:, or simply install Windows to drive D: from the original copy.
4. *Important: Shut down the computer and turn off the power.* Now swap the wide ribbon cables on the back of the C: and D: drives so that the computer thinks drive D: is actually C:, and vice-versa (fig. 1). You don't need to switch the narrower power connector cables, but if you're not sure which is which, swap both sets. (There must be *some* way to do this in software, but no one I've talked to has an answer. If you know of one, please write in!)
5. Turn the power back on. The computer will now reboot from the clean version of Windows.
6. Install your scary program, knowing it won't destroy anything on the Drive Formerly Known as C:.
7. Install a few other selected programs — just the minimum needed to function (for me that's Microsoft Office, Paint, and AOL).

This technique also works great for "spring cleaning" where your poor hard drive is so screwed up you want to start over. After switching to the drive with the clean install, reinstall the programs you use one by one. Particularly important preferences files can usually be copied over from the former C: drive. Once you're sure everything is working fine on your new drive, back up the former C: drive, reformat it, and use it for data (or whatever else tickles your fancy).

### IS THIS TRIP NECESSARY?

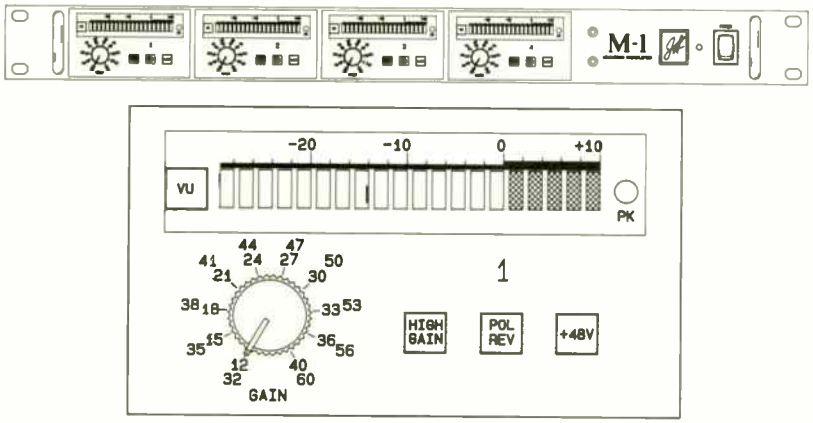
Admittedly, this is a power user tip — if you just run a sequencer, digital audio program, and word processor, you probably haven't experienced these kinds of problems. But if your computer is trying to be an office, recording studio, art gallery, Web link, and a place for your kids (or yourself, for that matter) to shoot alien life forms, it might be approaching the point of serious instability.

Someday, all programs will work together harmoniously, and all system drivers will be compatible chums. And someday, I may sprout wings and fly to the moon. Meanwhile, if your computer sags under the weight of its own programs, try one of these tricks. It just might save the day.

*Craig Anderton wishes Volvo and Maytag would team up to make computers. He figures they'd survive crashes well and never need repairing.*


# M-1

## MICROPHONE PREAMPLIFIER




(ACTUAL SIZE)

Gloria Estefan, Dolly Parton, Neil Young, Lou Reed, Laurie Anderson, Bob Dylan, Madonna, Eric Clapton, George Harrison, Paul McCartney, Paul Simon, Joe Henderson, James Carter, Ernie Watts, Bill Hollman, Saturday Night Live, The Muppets and many others have done great work with the M-1. The M-1 is clearly superior, *satisfaction guaranteed*. Here's why:

**The Jensen JT-16-B Input Transformer.** The world's best mic-input transformer. If you thought transformers were a compromise, you haven't heard the JT-16-B!

**The 990 Discrete Op-Amp.** The 990 discrete op-amp is superior to the monolithic op-amps found in other equipment.

**No Coupling Capacitors in the Signal Path.** DC servo circuitry and input bias current compensation circuitry eliminate all coupling capacitors and the degradation they cause.

**Standard features:** LED-illuminated push-buttons; phantom power switch; polarity reverse switch; conductive plastic gain pot and high-gain switch; shielded toroidal power transformer with 6-position voltage selector switch; gold plated XLRs; ground-lift switches.

**Options:** VU-1 meter (shown); PK-1 meter; Jensen JT-11-BM output transformer;

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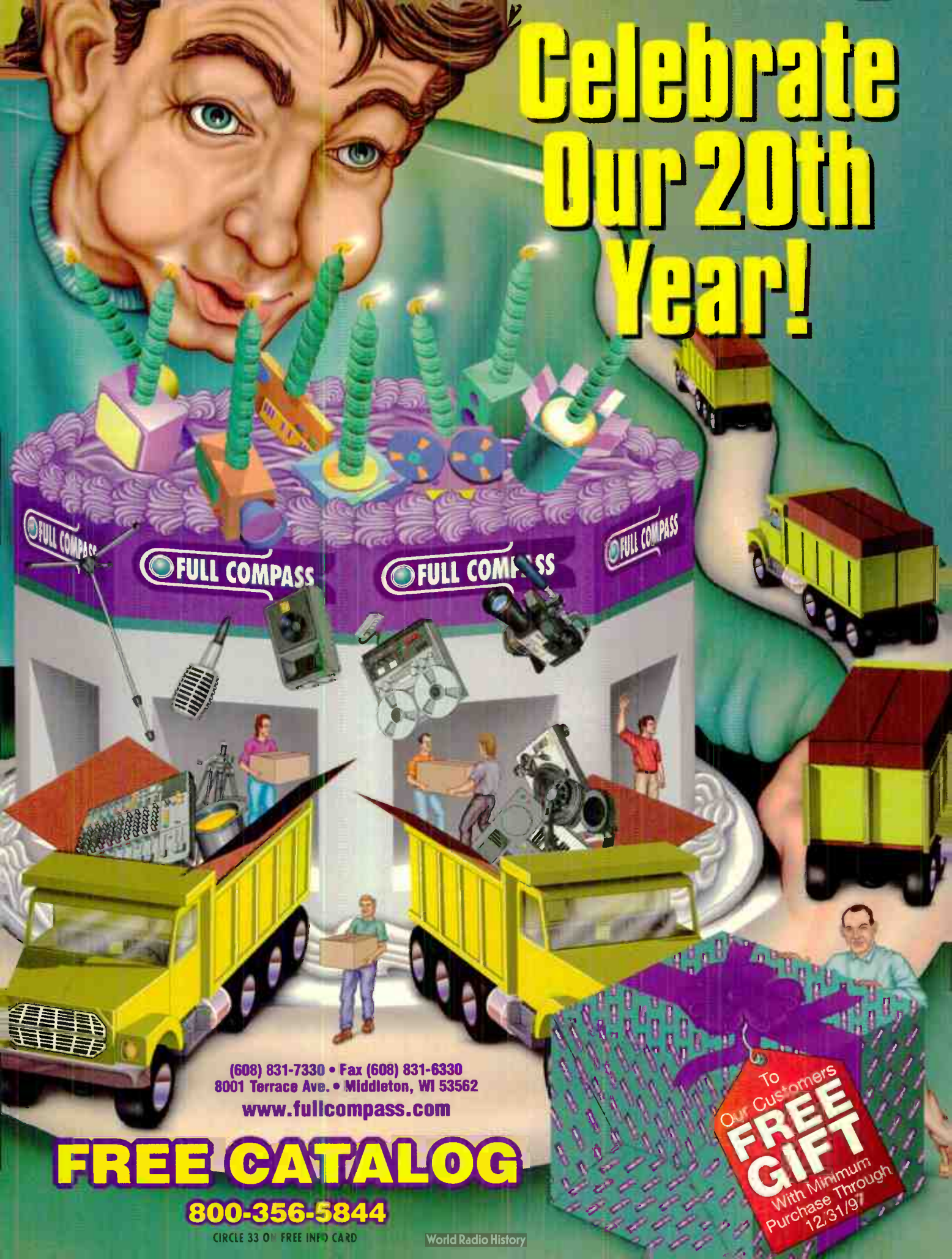


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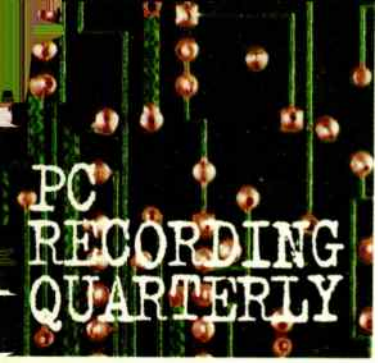


BY
CRAIG
ANDERTON

# Digital Multitracking for Cheap

## YOU DON'T HAVE TO SPEND A LOT TO GET A DECENT SOUND PROGRAM, AS THESE TWO BUDGET BUNDLES DEMONSTRATE

Looking for a studio-in-a-box? Times have certainly changed since you had to cough up tens of thousands of dollars for a Fairlight or Synclavier: now you just add a sound card to your PC. While these started off as consumer-oriented boards for making noises with games, many pro-oriented sound boards now exist. But what's more interesting is that consumer systems have become so capable, despite the low price, that the line between consumer and pro is blurring.

So let's compare the Turtle Beach MultiSound Pinnacle system and Guillemot Home Studio Pro 64. Both have similarities: a custom synth chip set, multitrack digital audio recording/playback with MIDI sequencing, a bunch of bundled software, and digital I/O. They even both use SPDIF daughterboards whose connectors take up a rear panel slot space, but don't actually plug into a slot. However, there are many differences too.

Does the Pinnacle justify its higher price tag? Is the Pro 64 a toy or a tool? One thing's for sure: the price of hard-disk recording for Windows just went down another notch.

A DAY AT THE BEACH: The Pinnacle sound card can handle 20-bit conversions.

## Turtle Beach Pinnacle Sound Card

Turtle Beach's latest card, the Pinnacle, combines synthesis, MIDI, digital recording/editing, and analog I/O (SPDIF digital I/O is optional). It bundles several applications but also works with MPC-compatible applications, as well as PC mainstays like Cakewalk Pro Audio.

**The Card.** The card (which is not Sound Blaster compatible for DOS applications) mounts in any 16-bit ISA slot that handles an 11.5" board. Plug and play didn't work the first time, so I got lazy, did a manual install, and all was fine.

I/O consists of mic in (doubles as digital I/O jack for SPDIF; a minijack-to-dual RCA adapter is included), line input for recording, aux input (goes to the mixer but can't be recorded), stereo output, DB-15 MIDI/joystick connector, and EIDE CD-ROM and audio CD connectors. A separate daughtercard has RCA SPDIF in and out that parallels the mic jack connector. If you're tight for space, use the mic jack and adapter; if you have an extra slot, add the daughtercard.

The digital audio is surprisingly good, thanks largely to 20-bit A/D converters (quoted signal-to-noise is -97 dB). If you don't install the board near noisy cards and your machine has decent grounding, the sound is more like an outboard converter. Using the accessory digital I/O avoids audio problems altogether.

For accessorizing, a WaveBlaster header allows adding a synth daughterboard, and SIMM sockets accommodate up to 48 MB of sample RAM for custom instruments. There's access to 48 MIDI channels total: 16 through the MIDI out port, 16 for the Kurzweil synth, and 16 for the daughterboard.

Users of version 2.0 who found the manual as frustrating as I did (although well-written and knowledgeable about

**MANUFACTURER:** Turtle Beach, 5 Odell Plaza, Yonkers, NY 10701-1406. Tel: 914-966-0600. Web: www.tbeach.com.

**APPLICATION:** Add MIDI synthesis and analog/digital audio recording/editing to Windows computers.

**SUMMARY:** The hardware's focus on quality, both in the digital audio conversions and synth engine, put it a cut above typical consumer sound cards.

**STRENGTHS:** 20-bit conversion; Kurzweil synth engine; excellent bundled software; S/PDIF I/O option can work without a second slot; up to 48 MB of sample RAM; supports up to four boards for multiple output channels.

**WEAKNESSES:** Only 1 GM drum kit; no XG compatibility.

**MINIMUM SYSTEM REQUIREMENTS:** Win 95 – 486/66 with 8 MB RAM, 16-bit ISA slot, two free IRQ channels (three if using the EIDE CD-ROM port), 32K upper memory block, CD-ROM drive. Win 3.1 – same except 486/33 and 4 MB RAM.

**PRICE:** $429, $499 with digital I/O daughterboard. **EQ FREE LIT. #:** 119


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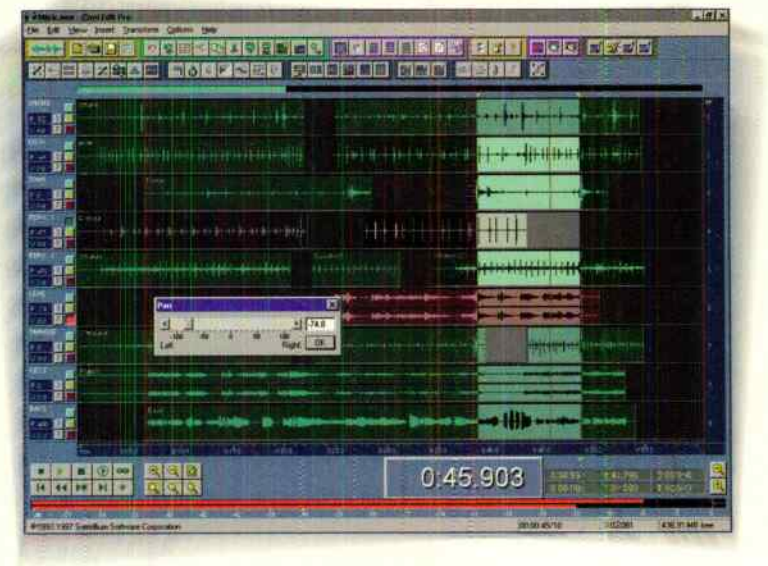


SIX-TY FOUR TRA-CKS

THIR-TY D-S-P E-FFECT-S

UN-DER FOUR HUN-DRED DOL-LAR-S

# Cool!

**Cool Edit™ Pro** is a digital audio recorder, editor, and mixer for Windows.™ It's based on Cool Edit 96, Syntrillium's groundbreaking and highly acclaimed shareware application, and it's the digital audio package you've been waiting for. Cool Edit Pro is a breeze to learn and use, packs enough top-quality digital effects modules to fill a room full of rack mounts, and can mix up to 64 tracks together, using just about any sound card. Call or e-mail Syntrillium to find out more, or ask for Cool Edit Pro at your favorite music or computer store.

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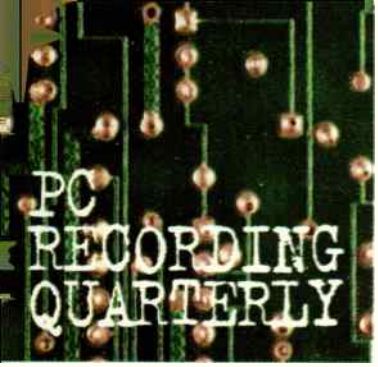



Windows, it was way out of date compared to the software) will be glad to hear that version 3.0, due for release a few weeks after writing this article, has a totally rewritten manual.

**The Synth.** The 32-voice Kurzweil synth engine features a clean, well-recorded, 4 MB (compressed to 2 MB) GM sound set. It's excellent (the reverb is 24-bit, effects are channelized, and all voices are sampled at 48 kHz), and indeed sounds like a downsized Kurzweil synth. I'd like some alternate drum kits, but that's life. Sample RAM is a nice addition, but uploading a sample covers the entire key range; multisampling isn't an option yet. Overall, the synth sound quality gets a major thumbs up, and version 3.0 is slated to have patch librarian/editing support.

**The Software.** A full version of Voyetra's Digital Orchestrator Plus, a very capable and cost-effective MIDI + digital audio program, is included. We won't go into detail here because the program had a full-length review in the Feb. '97 issue. While the klunky WAVE SE II software in version 2.0 has been dropped, its important features have now been folded into DOP.

Other programs include the MousePlayer, a virtual keyboard for triggering the synth, Audio Station II (provides a consumer-style, "hi-fi gear" interface for CD, WAV, and MIDI players) and Microwave, a tiny WAV file player. This is actually a great little utility, as it will open and play back a long WAV file almost instantly (no wait for loading times). The keyboard is handy and includes pitch bend, but velocity is fixed (too bad clicking higher or lower on the key doesn't change velocity).

**Is This the Way to Make WAVs?** Compared to other "budget" cards, Pinnacle's main strengths are multi-card capability for up to 8 physical audio outs, digital I/O with support for multiple sample rates (including 11.025, 22.050, 44.1, and 48), 20-bit conversion, the inclusion of Digital Orchestrator Plus, and the Kurzweil sound engine. If your needs dictate a consumer-priced board but with quality audio, digital I/O, and excellent MIDI instruments, the Pinnacle is a top contender.

## Guillemot Home Studio Pro 64

This $299 bundle provides a 64-voice wavetable synth, analog and digital 44.1 kHz I/O, MIDI sequencing + digital recording, Microsoft standard surround sound output for 2 extra speakers, and a ton of bundled software. Although its consumer heritage shows, this product is tough to beat for value.

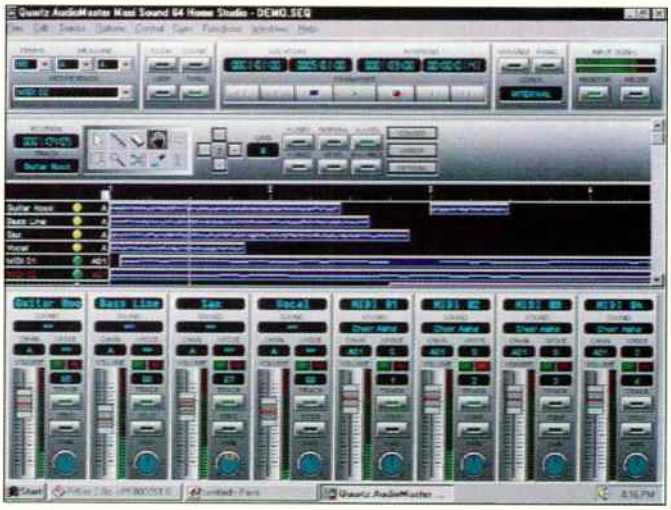
**The Card.** The Sound Blaster-compatible ISA card has minijack line in, mic in, surround sound out (line level), stereo speaker out (4 watts), and stereo line out, along with a DB-15 MIDI/joystick connector and CD drive audio input. The daughterboard has RCA phono jacks for stereo line in, stereo line out, SPDIF in, and SPDIF out. The 16-bit A/D converter and 18-bit D/A give decent analog sound quality; as usual, using digital I/O gives the best results.

An onboard DSP chip adds near-real time effects (pitch-shifting, reverb, echo, chorus, 4-band "paragraphic" EQ, and surround), while recording or during playback. Does the reverb beat a Lexicon? No, but it's usable.

Installing the card (and software) was painless: plug and play worked, and within 20 minutes I had recorded several digital audio and MIDI tracks. The manuals are acceptable but unindexed, and the on-line help needs work. Many terms do not show up in the search; trying to locate info on specific functions is difficult.

**The Synth.** The 64-voice synth includes a 4 MB ROM set and 4 MB of RAM (expandable to 20 MB) for importing samples. Adding a daughterboard provides 32 more voices. The GM set includes the normal 128 instruments along with 9 drum kits, 189 variation sounds (accessed by bank select controllers), and 1 set of FX patches.

On average, the instrument sound quality is good. Interestingly, some sounds that often don't hack it on other cards are pretty cool, such as muted trumpet, pizzicato strings, and harmonica, but others – including strings and guitars – are a bit weak. Still, in comparison to similar budget sound cards, this card more than holds it own. (Note: As this article goes to press, a revised synth sound set is being completed.)



GET WITH THE PROGRAM Guillemot's system comes bundled with plenty of software.

**A Bundle of Software.** You get:

*Quartz AudioMaster*— MIDI sequencer + digital audio

*Maxi FX Home Studio* — A consumer application for adding effects to CDs, putting surround sound on games, etc.

*Maxi Instrument Editor* — Turn sam-

**MANUFACTURER:** Guillemot, 625 Third St., 3rd floor, San Francisco, CA 94107. Tel: 415-547-4050. Web: www.guillemot.com.

**APPLICATION:** Add MIDI synthesis and analog/digital audio recording/editing to Windows computers.

**SUMMARY:** Although designed for consumers, the feature set and low cost make this viable for musicians.

**STRENGTHS:** S/PDIF digital I/O; surround sound; built-in 4W stereo power amp; 64-voice polyphony; lots of bundled software; near-real time effects; excellent value for money.

**WEAKNESSES:** Loading WAV files into the AudioMaster program could be easier; 48 ppqn resolution; no "groove" quantizing; 44.1 kHz only.

**MINIMUM SYSTEM REQUIREMENTS:** Win 95 or 3.1, 486/66 (Pentium preferred), 8 MB RAM, one 16-bit ISA slot, CD-ROM drive.

**PRICE:** $299 **EQ FREE LIT. #:** 120


World Radio History

ples into instruments; supports multisampling and features loop start and end, resonant filtering, three envelope generators, two LFOs, etc.

*Internet Phone* — I'm not sure what this has to do with music, but the more the merrier

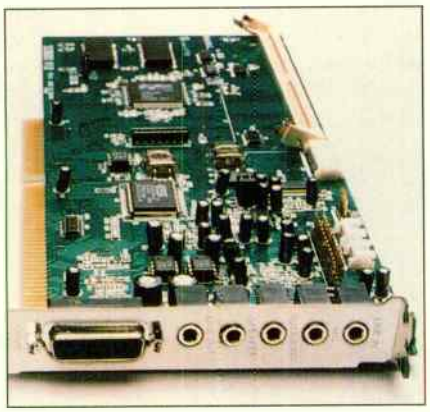
*MIDIsoft Audio Works* — Digital audio editor with loop, cut, paste, silence, echo, fade, reverse, amplitude, compression, distortion, etc., as well as "wave sequencing" tool

*Cakewalk Express*— MIDI sequencer + digital audio

*Classic Rock Guitar Volume 2* — Guitar instruction software

There's even a microphone with desk stand, and a MIDI/joystick adapter cable.

**Quartz AudioMaster Software.** This 8-track hard-disk recorder with MIDI recalls Cubasis, with some of the graphic flair of Cubase VST. Quantization, play lists, arrangement windows, piano roll editing, score window, events list, controller windows, effects buses, MTC sync, logical editing – it's all there. You won't find groove quantization, but the program is pretty complete, right down to the sysex save/load option. Audio editing is primi-



FUTURE READY: Guillemot's card has a surround sound out.

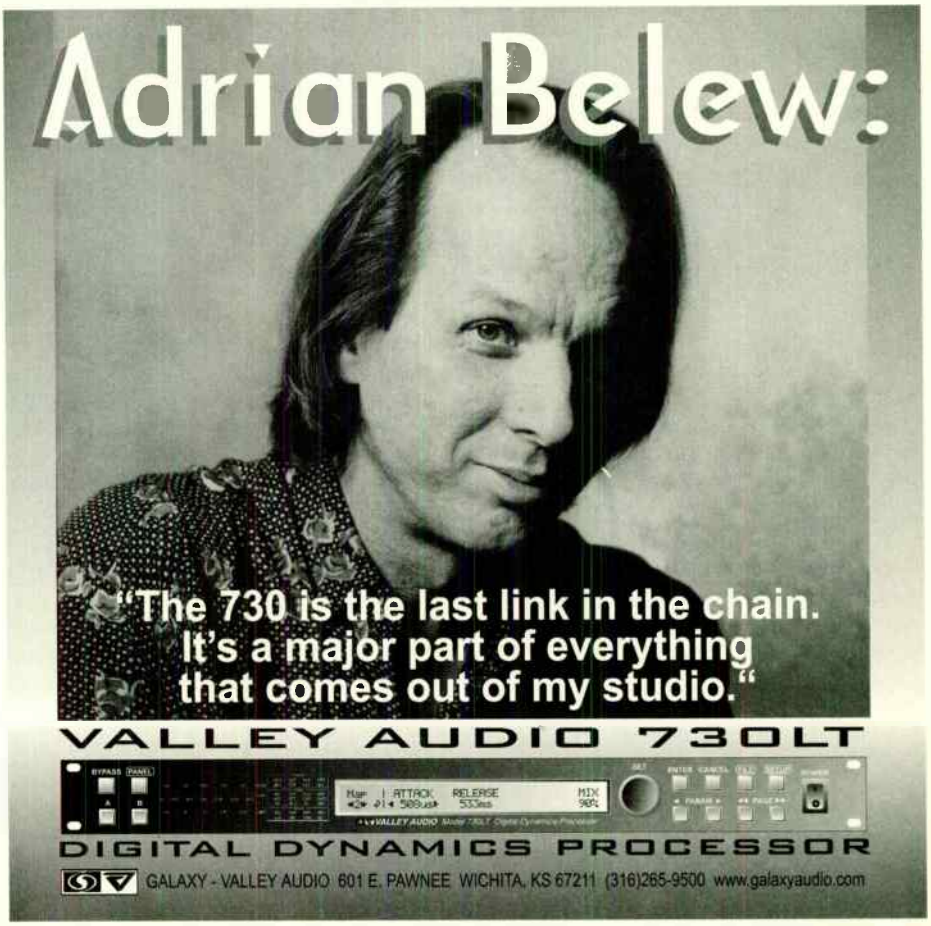
tive, but you can switch to other editing programs (e.g., Sound Forge) within AudioMaster to modify AudioMaster files. I did encounter a few bugs, but they weren't fatal ones.

There are two limitations: first, 48 ppqn resolution is fairly coarse; most sequencers do at least 96 ppqn. Second, importing WAV files directly into the program is a convoluted process. You can't just, for example, drag-and-drop from your hard drive to a track; nor is there a simple "Import WAV" command on the file menu.

**Is This For Real?** If you have a computer and are itching to get into digital audio, Home Studio Pro 64 is quite a starter package; at under $300, it's a steal. Granted, the synth and digital audio quality is not up to the big-time

*continued on page 136*

CIRCLE 23 ON FREE INFO CARD




CIRCLE 19 ON FREE INFO CARD

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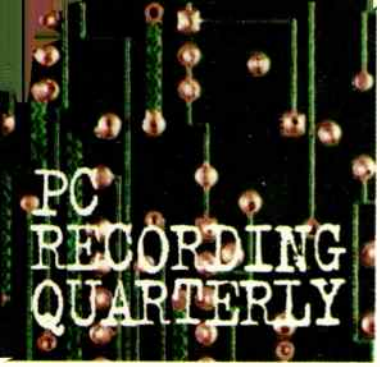


BY
EDDIE
CILETTI

# Networking: It's Easier Than You Think!

DON'T TRASH THOSE OLD COMPUTERS — A NETWORKED SYSTEM LETS YOU GET MORE DONE, FASTER

Computers can be all things to all people, but not necessarily all at once. That's why I have several computers — each dedicated to a specific group of tasks. Recycling that "old" 486 for less demanding tasks like printing and Net surfing can free up ports on that hot-rod music super-computer. Forget "Sneaker Net" (copying files to floppy or other media and running from computer to computer). A hard, Zip, Jaz, or CD-ROM drive on one system can be accessed by all for about $50 per machine.

*Note:* The price of a network card varies from generic models (under $40) to name-brand products in the $60 to $90 range.

In my shop are three systems for office, repairs, and production. The office machine has a standard 28.8 modem, an ISDN interface, a printer, and a DAT backup drive. I do billing, surfing, E-mail, scheduling, messaging, and Web site creation here. On the shop system is a video capture card and a Hi-8 camcorder ready to zoom-in on the sick and the wounded. Pictures are "dragged" over the network and into the production room, which is set up to review equipment, manipulate sound and image, burn CDs, write articles (like this!), and make music.

The production computer must be ready to shed its skin to try new soft- and hardware. In the event of a problem, restored data is sent from the office machine to any other computer — including a laptop — over the network.

## CHOOSING A NETWORK CARD

Apple computers have built-in networking via dedicated connector and their "AppleTalk" protocol. Networking is not "standard" hardware on PCs. The most common network card is "NE2000 compatible" and typically features coaxial/BNC and RJ-45 connectors. Both transmit 10 megabits per second (Mbps). Divide by 8 bits to get 1.25 MB, which is about a floppy disk's worth of information in a second. This is called 10Base-T. For speed demons, there are also 100Base-T cards...

## 50-OHM COAX: THIN ETHERNET

I chose the coaxial connection for my system because it is simple and economical. Each computer gets a "T" adapter that allows them to be daisy-chained. The first and last computers must have 50-ohm terminators. Although the cable and connectors look the same as their video and S/PDIF brethren, the lower system impedance will better tolerate long cable lengths and hostile environments.

## RJ-45: TWISTED PAIR ETHERNET

RJ-45 connectors are part of the modular phone family with eight, rather than four, conductors. The "CAT3" cable has four twisted pairs, one pair for transmit, another for receive, plus two unused pairs. This format requires a "HUB," some of which are smart and can directly route signals between any two computers. Hubs increase the cost somewhat, but also improve the throughput when "traffic" gets heavy. (The daisy-chained approach can cause a traffic jam if all computers attempt to access each other at once.)

## THE PROTOCOL

I don't know why so many people are pissed off at Bill Gates. Windows for Workgroups (WFW) made networking a breeze compared to Novell's Netware. Really cool networking geeks get Novell Certified, but you don't have to geek out too much to get a Windows network up and running. All Windows mutations (WFW3.11, 95, and NT) speak a common protocol called "NetBEUI." At one time I had three operating systems: WFW3.11, Win95, and NT3.51 — preparing each for networking is similar, but there are idiosyncrasies. Fortunately, they're all compatible, which is great if your 486 will not sustain a Win95 upgrade.

## THE HARDWARE

The latest generation of network cards can have their interrupt (IRQ) and I/O Range (hex address) set via plug-n-play software. Both Windows 95 and Windows NT can sniff out hardware pretty easily. Old-fashioned cards — with hardware jumpers — can create conflicts that are more difficult to troubleshoot in WFW3.11. Most cards come with DOS diagnostics that help find, choose, and test the various interrupt and address possibilities.

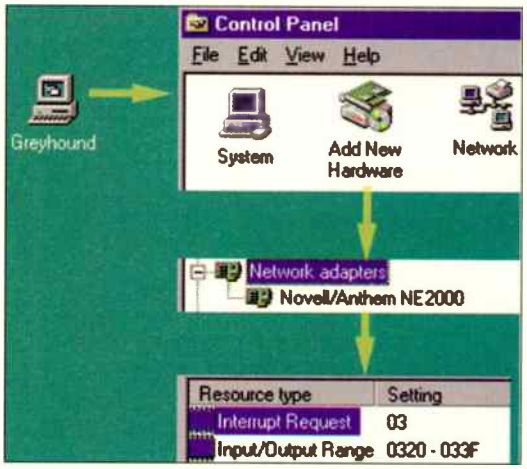


FIGURE 1: Opening the control panel to add new hardware

## OPERATING SYSTEM VARIATIONS

To enable networking under all three operating systems, go to the Control Panel. Under Windows for Workgroups 3.11, press the SYSTEM icon. (You will be adding a component.) From the Windows 95 Control Panel, press the "Add New Hardware" icon. What follows will vary depending on whether the card is plug-n-play or not. Follow the instructions and check fig. 1 for the familiar icons.

## NAME THAT CLONE

Once the card is recognized and Networking


World Radio History

# Is your adat® or DIGITAL MIXER talking to your PC?

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**ADDED BONUSES**

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## Who's using WaveCenter?

*Recording studios, major multimedia designers, theme parks, spot houses, casino shows, home studios, mastering facilities, music schools and many others.*

## How do I use it?

*WaveCenter™ is your path from external digital devices into your PC. Whether you blow the audio in from your ADAT, DAT, digital mixer, or standalone converters, you've got total flexibility without loss of signal quality. Once the audio's in the PC, use your favorite software to edit, time compress/expand, pitch shift, add EQ,... When you're ready to get the audio back out, WaveCenter delivers it with total transparency.*

## Where's the analog?

*Not in the computer. That's the last place you'd want to convert between analog and digital. PCs are brutal environments for analog, and those in the know use standalone converters or the converters they already own in their DATs, ADATs and digital mixers.*

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## Why ADAT optical?

*It's the most popular 8-channel digital interface on earth. So even if you don't own an ADAT format tape machine, there's a whole world of synths, effects boxes, TDIF converters, A/D and D/A converters, and digital mixers that use the ADAT optical interface. (Check out the hot new digital mixers from Yamaha, Korg and Mackie.) If you've got questions about all of this, just call our 800 number for solutions that work.*

**System Requirements** *Windows® 95 on a 486 or Pentium® processor, 16-bit ISA slot, one hardware interrupt, 16Kbytes of adapter space.*

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is enabled, the computer will want to be rebooted. You will be prompted to provide a log-on name (win3.11), specify a password, name the computer, and determine its workgroup. (When working in a large facility, users can be grouped into Design, Production, and Office categories, for example, to make them easier to find on the network.) Fig. 2 shows the Identification window.

**DRIVING THE HARD BARGAIN**

To avoid dealing with their default "letter" assignments, it is more convenient to name hard drives. (Printers can also be named.) From the Windows Explorer, fig. 3 shows two drives (Fuji and Extra-wide) as well as the "share" icon. I have at least two drives in each computer, one reserved for the Operating System (OS) and programs and the other for files (MIDI, text, sound, database, etc.). In the event of a system crash, the OS and programs can and should be reloaded from the original disk(s).

Files should at least have a dedicated folder. ("Shared" folders can be created on an otherwise "locked" drive.) Keeping all important files on a separate disk makes things easier to find, share, and backup.

From Win3.11's "File Manager," select a local drive, open the "Disk" menu, and select "share as." From Win95's Explorer, select the drive, open the "File" menu, and select "Properties," then "Share." To see drives on another computer from Win3.11, go to "Disk" (from File Manager) and "Connect Network Drive." From Win95, opening Network Neighborhood from the desktop should reveal another computer and, after a mouse click, the shared drives/files on that computer.

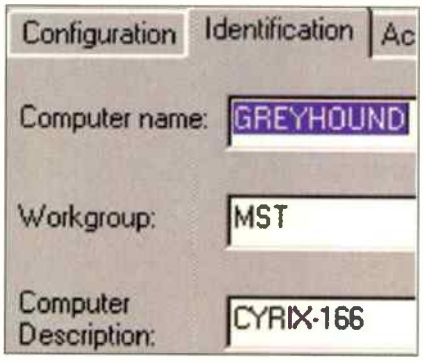


FIGURE 2: "Naming" your computer from the Identification window

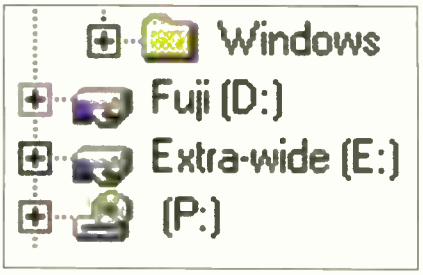


FIGURE 3: Named and Shared drives

If cabling or terminators go bad or get disconnected, Win 3.11 will hang up during the boot process. Win95 and NT are much more forgiving. Network Neighborhood's flashlight will pan back and forth forever (finding squat), while NT will log a message that "one or more services failed to start."

Making use of that "old" 486, with its modem, dot matrix printer and 14-inch monitor will free up ports and slots on that screamer system for a printer-port MIDI interface and those interrupt-hog sound cards. It also means that someone can do business (take messages and do the billing, for example) while you make music.

*Eddie Ciletti's e-mail address is: edaudio@interport.net.*

## First Look: Gefen Systems ex•tend•it TSE Series

BY STEVE LA CERRA

Computers are an essential part of everyday life in the recording studio, and engineers are beginning to experience certain problems in situations where more than one person needs access to the same CPU. With that in mind, Gefen Systems has recently introduced the ex•tend•it Series, a line of monitor and input-device extender/switchers designed to make studio life easier.

Available to interface with Mac and PC platforms, the ex•tend•it Series includes several units. For Mac users, there's the TSE100, TSE150, and TSE200 extenders, all of which allow you to locate your monitor and keyboard up to 500 feet from the CPU (now you can put that noisy CPU in the machine room). The TSE100 is a desktop unit with an external power supply, while the TSE150 (with an internal power supply) was specifically built for monitors with higher resolution. Intended for dual-monitor setups, the TSE200 is basically two TSE150's rack-mounted side by side.

For PC users, Gefen Systems offers the ex•tend•it PCX100 and the PCX150 (high resolution), which enable monitor and keyboards to be located up to 300 feet from the CPU. PCX units also provide a second monitor output for applications that require a second display.

Studios that use more than one computer will want to check out the ex•tend•it TSE241 for Mac and the PCX241 for PC. Both of these units provide switching between two (or more) CPUs and one mouse, keyboard, and monitor. Studios in particular will value this device because many rooms use a "serious" CPU for sequencing and digital audio, and an older unit for less-intensive applications such as billing and faxing. The PCX241 supports any VGA, SVGA, or RGB monitor; the TSE241 supports any RGB monitor with S, H, and V type sync.

Also available in the ex•tend•it Series are the ADB100, a 1000-foot extender for the Apple Desktop Bus and the ADB500, which provides ADB access from five discrete locations. The ex•tend•it VDX600 Monitor Distribution Amplifier provides the ability to simultaneously run multiple monitors from one CPU. Gefen Systems also can provide extension cables for all ex•tend•it products. These units are all currently available at prices ranging from $295 to $795 per device.

*Contact Gefen Systems at 800-545-6900 or fax them at 818-884-3108. Or visit them on the Web at www.gefen.com.*


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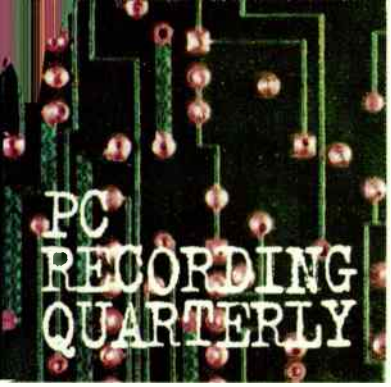


BY
CRAIG
ANDERTON

# Sample Wrench by dissidents

## THIS RECENT ENTRY INTO THE PC AUDIO ARENA OFFERS SOME NICE SAMPLE-HANDLING FEATURES

For years, SampleVision owned the PC sample-editing market; now Sound Forge and Samplitude include sampler-oriented features, although that's not their main focus. So it's good to see another company coming in through the Windows (actually, migrating from the Amiga) with something different.

Wrench installs from two floppies. Its 32-bit code runs under 95 or NT — no Windows 3.1 — and loads files into RAM instead of reading only from hard disk (if physical RAM runs out, the hard drive provides virtual memory). The extra speed allows real-time previews for many functions so you can hear your edit instantly. This is wonderful, although some of the more complex processes (spectral warp, resynthesis) do require processing time.

### DOING WINDOWS

In fig. 1, the Effects menu shows the fun DSP options (the Function menu accesses more traditional processing like EQ, normalize, mix, etc.). The main window separates into an upper overview and a lower view that displays selected waveform sections.

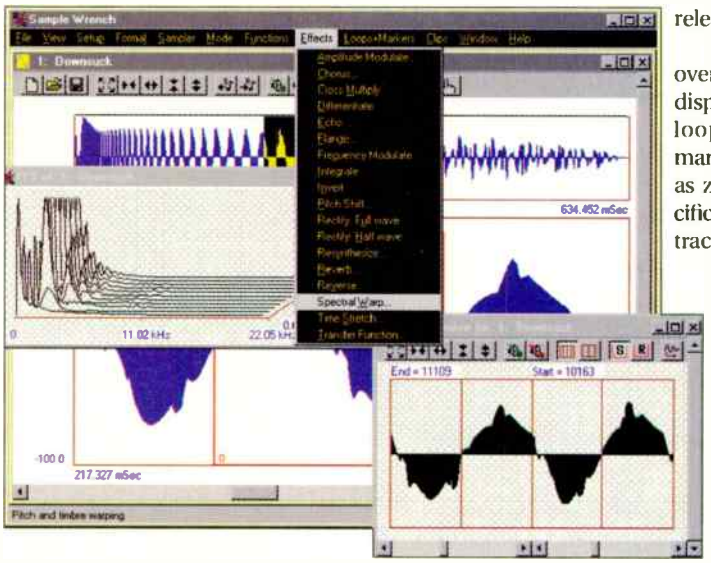


FIGURE 1: The Effects menu

The lower right window is for loop hunting; zoom in to zero in on loop points. The FFT to the mid-left looks cool, so I included it to catch the attention of casual readers. Up to 99 editors can be open simultaneously.

The user interface is functional, despite a few quirks (e.g., Wrench calls "scale to full" and "remove" what the rest of the world calls, respectively, "normalization" and "cut"). You can save and recall 10 "views" for zipping among various zoom levels and window layouts, customize colors, calibrate the horizontal axis in time, bars/beats, SMPTE frames, or sample words, and calibrate the amplitude in numerical value, percentage, dB, or RMS.

Wrench gets high marks for clipboard functions: clip snippets until the disk space runs out, and they're all namable. This is especially important because there's only one level of undo — clip, or "save as," periodically as you develop a sound so you can backtrack to a previous version (multiple levels of undo is slated for the next release).

Incidentally, the overview is no static display. You can set loop points and markers on it, as well as zoom in on specific portions and extract clips.

Another useful feature allows click-dragging a highlighted piece of audio to wherever you release the mouse button. There's scrubbing, but it's a bit odd: click-drag over a region, and the region plays (but does not loop) when you release the mouse. If you drag backward, the region plays backward. Don't drag past the screen borders, though, or nothing plays. This makes it very difficult to catch sample beginnings and endings when zoomed out.

### DSP

There's a ton of DSP, including time-based effects (reverb, chorus, flange, echo), pitch shift, dynamics, time stretch, a variety of EQ, amplitude and frequency modulation, hand-drawn amplitude envelopes,

**MANUFACTURER:** dissidents, 10325 Woods Rd., Utica, NY 13502-6723. Tel: 315-797-0343. E-mail: info@dissidents.com; Web: http://www.dissidents.com

**APPLICATION:** Editing digital audio, with sampler transfer and file translation options.

**SUMMARY:** This nonconformist program makes up for some occasional klunkiness with sheer power and a useful, creative feature set.

**STRENGTHS:** DSP dares to be different; very good-sounding time and pitch stretch for mono signals; multiple, namable clips; user-customizable via Visual Basic; real-time previews for many functions; fast operation; supports Windows NT and 95; very usable waveform draw tool; overachieving overview.

**WEAKNESSES:** Only one level of undo; no standard plug-in architecture support; couldn't transmit samples to some test samplers; no automatic peak recalculation when processing.

**SYSTEM REQUIREMENTS:** 486/50 or better processor, Windows 95 or NT, 8 MB RAM, sound card. Also available for Amiga (no real-time preview, some DSP functions missing).

**PRICE:** $299, $259 for electronic-only version (no manual, only the online and context-sensitive help)

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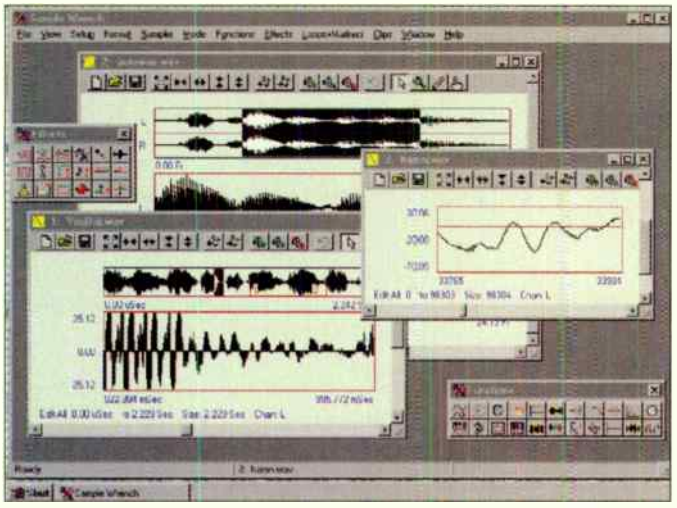


DISS IS IT: Sample Wrench gives plenty of control.

sample-rate conversion, resynthesis, spectrum shift, FFT analysis, and various mathematical operations (rectify, cross multiply, integrate, differentiate), and more. You can save favorite settings ("EQ for Tony's amp") as presets.

This is where you find "jaw drop" sounds and effects. Take one signal's envelope and superimpose it on another, or draw a freehand envelope. Spectral shift makes out-of-this-world sounds, and both time stretch and pitch shift are very good — I tried them on everything from voice, to drum loops, to bass guitar, and when used even slightly reasonably, the quality was surprisingly good in mono (stereo creates a sort of "phase-like" effect that's actually kind of cool). Program material is somewhat less forgiving, but still quite acceptable. Even the reverb is clean and usable, despite a slight metallic timbre. (Since these effects are hard to describe in print, I've uploaded reverb, time stretch, and spectral shift examples to my AOL site — go keyword: SSS > EQ Online > Review unit demos.)

The resynthesis DSP is very intriguing. As a noise reduction algorithm it's not perfect, but it did transform some pretty noisy samples into totally clean samples. It also does extended time and pitch shifting compared to the dedicated time/pitch modules.

The main limitation with these effects is no automatic recalculation to prevent clipping. If you hear clips, immediately undo, reduce the gain somewhat, then try again. If there's already distortion in a file you're editing, try the Unclip option (no kidding!). It doesn't solve everything, but can help in some cases (particularly a few light clips).

### LOOPING

The program supports multiple loops, as well as sustain and release types. A Loop window shows the loop points simultaneously, or "spliced" together to check how they match. Loops can be forward, backward, or crossfaded with adjustable transition smoothing; automatic loop point finding is available.

### GIMME SUPPORT

Recording samples into Wrench is straightforward. Side-by-side peak hold and normal meters indicate not just the instantaneous level, but the highest level reached. Wrench can also import and export WAV, AIFF, 8SVX, VOC, AU, Sound Designer Type 1, Studio 16, and RAW file formats. It can export, but not import, RealAudio files.

On the sampler side, Wrench handles 12- and 16-bit Sample Dump Standard devices (Akai S1000 series, E-mu Emax, Roland S750 series, Yamaha TX16W, Peavey DPM-3 and -4, etc., Ensoniq EPS/EPS 16+/ASR-10, Akai S612, Korg DSS1, and Prophet 2000/2002. SMDI is slated for inclusion soon. There's also a nifty Keyboard window for playing samples at different pitches, or playing the sampler itself.

I tested Wrench with a Peavey DPM-3, DPM-4, and SP, as well as an Ensoniq ASR-10 and Macintosh sample-editing program. With SDS, the program could receive DPM-3, -4, or Mac samples, but could not send samples to these devices (interestingly, the Mac sample editor could communicate with the DPMs). However, SDS with the Peavey SP worked flawlessly. Both the EPS and EPS 16+ drivers worked fine with the ASR-10, but the ASR-10 driver didn't work. Go figure.

I configured a boot drive with only Windows 95, MIDI drivers, and Wrench, but the same problems occurred. In fairness to dissidents, this has happened before with other sample editors I've used. Usually the problem is some small nonstandard implementation or timing issue. Hopefully future bug fixes will take care of this.

User support consists of on-line and context-sensitive help, as well as E-mail. The manual is conversational and contains useful background information, although some tighter editing wouldn't hurt.

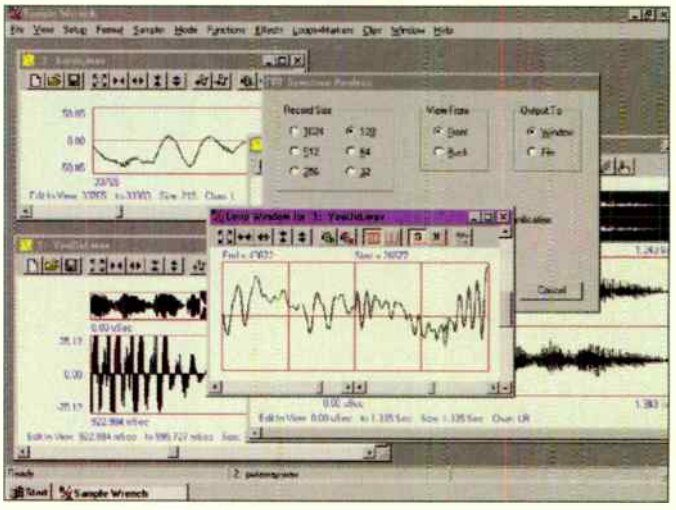
### SAMPLE THIS!

Sample Wrench is for serious sample editing fans, but it's also a fine general-purpose audio editor. The program is a bit nonstandard, but has real power — even the waveform draw option is superb, and not an afterthought.

My only disappointment is that some samplers just didn't work. Hey manufacturers — loan this guy some gear so he can fix whatever bugs keep this from being the big-time Windows 95 sample editor we all want.

In any event, the DSP is wonderful, and, for programmers, there's even a Visual Basic-compatible scripting language so you can get "under the hood" to change defaults, automate repetitive tasks, or create "plug-in" effects. As such, it's the only sample editing program I've met that not only urges you to customize it, but tells you how.

If you've found 2-track digital audio editors lacking as sampler tools, give Sample Wrench a shot. You'll have to roll up your sleeves sometimes, but it's worth it. EQ



SAMPLE CITY: Wrench makes editing easy.



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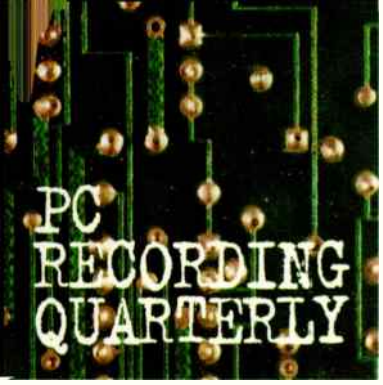


BY
DAVID
MILES
HUBER

# Digital Audio Labs V8 Multitrack Workstation Platform

## DAL TURNS YOUR PC INTO A REAL-TIME POWER PERFORMER

Those of you familiar with Digital Audio Labs' high-quality CardD+ and Digital Only hardware sound cards have for some time been aware of the impending release of its new multitrack hardware platform, the V8. Well, the system has finally hit the showroom floors, and I've been able to pop the hood and take a look at this powerful, new multitrack hardware system for the PC/Windows 95 platform.

Digital Audio Labs is right in calling the V8 a "Multitrack Workstation Platform." It certainly doesn't qualify as a sound card, any more than Digidesign's Pro Tools system for the Mac could be called a sound card. In fact, beyond its ability to access up to 16 input/output channels at a time, the part that really tickles my fancy is its ability to dish up some amazing real-time DSP power on the PC. The concept behind the V8 is to integrate the system in such a way that all the processing burden is taken off the main CPU, allowing the system to carry out serious mixing, signal processing, hard-disk recording, and even have audio signal and transport access to your ADATs. All in real time! I've watched the notoriously nonreal-time PC evolve into a serious audio production tool, but the V8 represents a evolutionary leap into the realm of real-time multichannel audio production.

### A LOOK UNDER THE HOOD

The V8 is a modular hardware system that can be designed around your current production needs or budget and can then be expanded in the future as you see fit. At the heart of the system is a full-length ISA Main Board, that handles all of the hard-disk access (up to 16 tracks) at sample rates of 44.1 kHz and 48 kHz. It's also used to carry out all of the real-time signal-processing functions. Even though the V8's Main Board comes standard with two Motorola 56002 processors, in order for real-time DSP to be carried out you'll need to purchase at least one DSP Supercharger (which adds two Motorola 80 MHz 56002 processors to the system).

Depending on how third-party developers write their plug-ins, the user may also require the use of a RAM Induction Module (which piggybacks onto a DSP Supercharger and speeds up the real-time processing by adding 128K of fast SRAM). This'll give you access to several real-time signal-processing functions; however, if you really want to rev up those engines, you can easily beef the system's DSP power up by plugging up to three of each of these modules into the Main Board. (See fig. 1.)

When the subject turns to the kinds of I/O interface that you'd like to connect to the Main Board, there are a number of options. For example, my system is currently fully loaded with a Big Block (an external, rack-mountable box that has 8 balanced 1/4-inch analog inputs and outputs, front and rear AES/EBU and S/PDIF digital interface connections, as well as a rear-panel optical interface), plus a digital 8-track custom card for ADAT (an 8-bit ISA card that optically interfaces with the 8 inputs and outputs of an ADAT, while of-

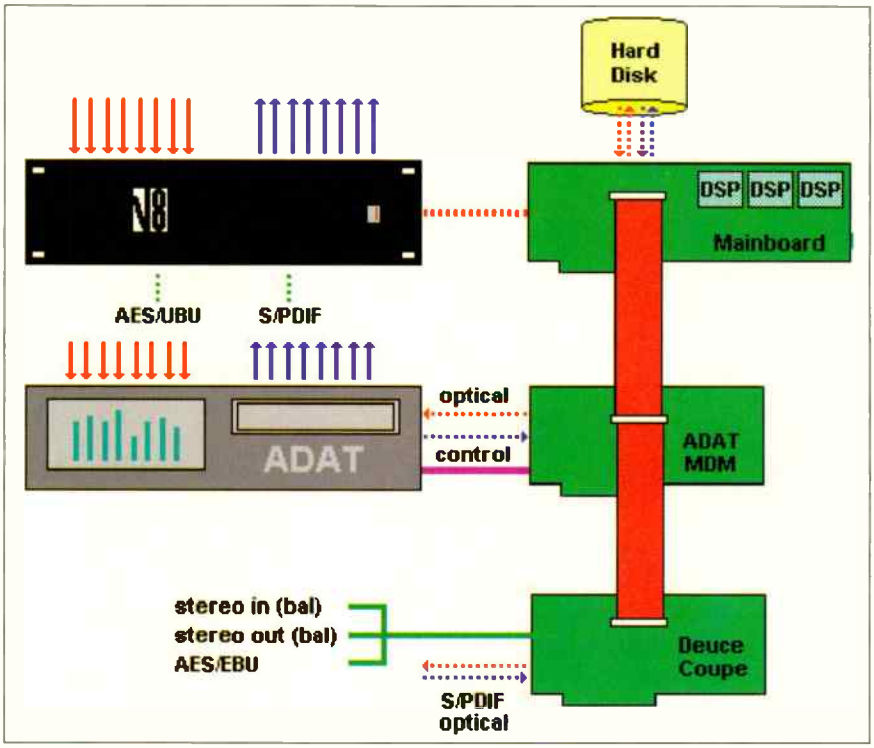


FIGURE 1


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fering full transport control and sample accurate sync between the V8 and multiple ADATs).

I could've connected the system to what Digital Audio Labs calls the Deuce Coupe (an 8-bit ISA interface that sports stereo, balanced 1/4-inch analog in and outs, as well as AES/EBU, coax and optical S/PDIF ports), but I already own a CardD+ stereo sound card and decided to plug that into the system's chain for use as a stereo Monitor Out instead. You, on the other hand, might want to connect the Main Board to the digital 8-track card, so you can use your ADAT as an 8-channel interface — or simply connect it to a Deuce Coupe or CardD+ so as to take advantage of the real-time DSP options. (See fig. 2.)

The V8 can have hundreds of channels of I/O connected to the V8's bus, but no more than 16 ins and outs can be active at any one time. What this means, essentially, is that you can have several devices connected to the V8, such as 15 ADATs, 4 Big Blocks, etc., but no more than 32 (16 in, 16 out) of those I/O connections can be active at any given time. For example, two Big Blocks or a digital 8-track custom card for ADAT and a Big Block could be actively selected to pass audio on the V8 bus. Likewise, various combinations could exist whereby 4 ADAT channels, 8 Big Block analog channels, 2 Big Block digital channels, and 2 analog CardD+ channels could be selected.

Hooking the system up was relatively easy. As you probably know, finding the real estate on your PC's motherboard to plop a full-length hardware card into isn't always easy. Fortunately, once I pulled out the PC's poorly designed speaker terminal (who wants to hear all those beeps anyway), I was able to fit the card into the last slot by the hair of my chinny-chin-chin.

Once the Main Board was in, the rest was smooth sailing. Digital signal flow between the Main Board and other sound card options is carried out via standard SCSI ribbon connector cables that can be chained from one device through to the next. Connections to the Big Block is handled through the use of a 12-foot, specialized cable (it can even be ordered in lengths of up to 40 feet — three cheers for giving us enough length to actually place the interface where we want). In addition, multiple big Blocks can be cascaded together using standard, rear-panel SCSI cables.

### WHO'S IN THE DRIVER'S SEAT?

The V8 is strictly a hardware system; no software is shipped with the package except for the drivers that are necessary for the system to work. So, when it comes to integrating the system with digital audio editing software, the V8 can work in either of two modes: either the system's Wave Drivers are used or the V8's drivers are directly accessed.

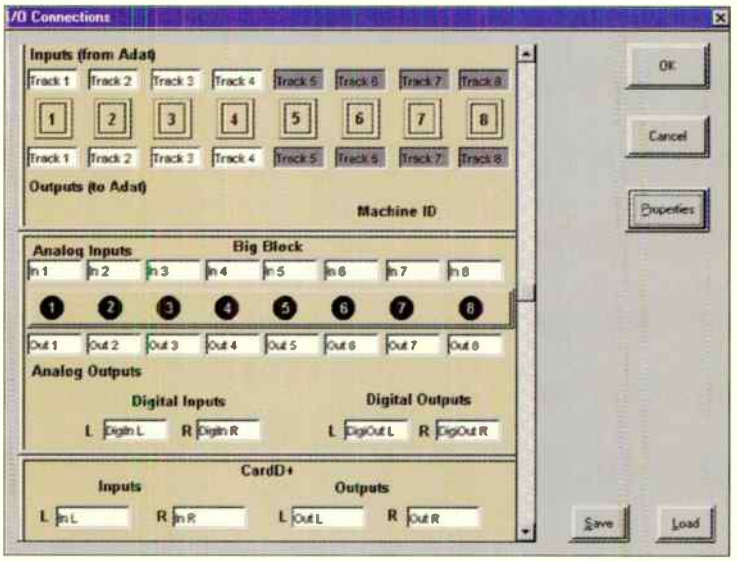


FIGURE 2

When software that has been designed for traditional sound cards is used, the V8 will initiate its Wave Drivers. These are then seen by the host software as four, separate, full-duplex stereo sound cards, meaning that a system which includes a Big Block or ADAT/digital 8-track card combination will have eight tracks at its disposal. Unfortunately, these Wave Drivers cannot access the real-time DSP capabilities of the V8. In order for this to happen, the host software has to be "Gearhead Approved" (meaning that the software has been specifically written to make use of the V8's mixing, patching/routing and real-time DSP capabilities). Currently, only two software packages have been written for the V8 — Cakewalk 6.0 from Cakewalk Music Software and MxTrax from Minnetonka Software (SEK'D will soon join the ranks with a Gearhead Approved version of Samplitude 4.0). Of these, only MxTrax has been developed specifically for the V8 and, as such, I'll be

**MANUFACTURER:** Digital Audio Labs, 13705 26th Avenue North, Suite 102, Plymouth, MN 55441. Tel: 612-559-9098. Web: www.digitalaudio.com.

**APPLICATION:** The V8 is an end-user configurable, digital multitrack hardware platform for the PC.

**SUMMARY:** A digital audio hardware platform that allows up to 16 inputs and outputs to be routed to any hard-disk track, mixer component, or I/O channel within the system. On-board DSP allows for extensive signal processing functions to be assigned to any channel/grouping and output in real-time.

**STRENGTHS:** DAL's digital converters sound great; the system is extremely flexible, allowing you to configure the system according to your needs and budget; the Waves V8 pack (Power Pack) real-time effects are top notch.

**WEAKNESSES:** As of this writing, only a few software editors can make use of the V8's full processing power, and of these, only one has been written specifically for the V8.

**MANUAL:** The cool, notebook-bound manual adequately covers the basics for installing the system's hardware and drivers into your computer. There's plenty of room in the notebook for future updates, notes, and related hardware/software updates.

**SYSTEM REQUIREMENTS:** Windows 95 or NT; Pentium 90 MHz or faster CPU; 16 MB of RAM (48 MB of RAM recommended); 5200 RPM IDE/SCSI hard drive (8–12 hard-drive tracks) or 7200 RPM SCSI hard drive (16 hard-disk tracks at 48 kHz).

**PRICE:** V8 Main Board, $1795; DSP Supercharger, $495; RAM Induction Module, $295; Big Block, $1995; Deuce Coupe, $695; digital 8 track custom for ADAT, $695.

**EQ FREE LIT. #:** 122


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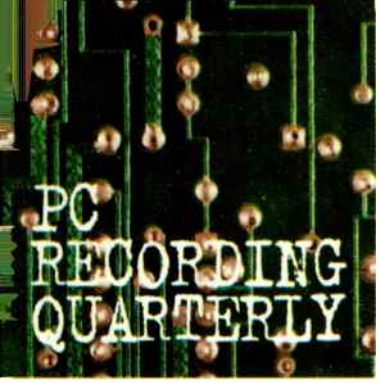


using it as the vehicle for taking the hardware for a test drive.

### THE ROAD TEST

MxTrax (fig. 3) can be thought of as an integrated digital audio workstation package for the V8 that includes real-time mixing, hard-disk recording, full ADAT I/O and transport control, and real-time plug-in signal processing capabilities.

The mixer section can be fully configured by the user to create mixer surfaces that have as many input strips, subgroups, and master outs as are required by a project. Each input strip can be built up from the Components Toolbox, allowing you to place level and pan controls, status buttons, real-time EQ (which, alas, doesn't sound very musical to my ears), multiple effects sends, subgroup bussing, and real-time effects plug-ins directly into each strip. Each strip component can then be chained through in a standard signal path fashion and/or fully configured and routed to any of the V8's available signal sources and destinations. Any number of mixer layouts can be saved and recalled to disk under a specific name or can be saved along with a session's Project file.

Since I use the stereo outs on most of my MIDI gear, I took the plunge and configured the V8 to be my studio's main mixer. I figured I could plug most of it into the eight inputs of the Big Block, and whatever was left over could be plugged into my Mackie 3204 mixer. If I'd ever need more inputs, I could simply plug the extra eight sources into the ADAT. It worked amazingly well. The DAL D/A converters, as usual, are top notch and totally transparent!

The only plug-ins currently available for the V8 come in the form of a special version of the Waves Power Pack (reviewed in the May, '97 *EQ*), which will be known as the Waves V8 Pack. This means users can insert plug-ins such as Waves TrueVerb high-quality reverb, Q10 Paragraphic EQ, C1 Compressor, L1 UltraMaximizer, or S1 StereoImager into any channel they choose and hear the results in real time! Plus, using MxTrax, users can automate changes in effects settings, so the changes can be automated and reproduced in real time during playback. Likewise, all mix moves can be fully automated, updated, and reproduced in real time. I can hardly wait for other plug-ins to become available.

I've never before been interested in having a virtual mixer, but this puppy is quite different. I can lay the system out the way I like, it's quiet, sounds great, and the capability of having such high-quality plug-ins available in real time is mind-bogging. Even to this skeptic, it's like having a top-notch mixer, a very expensive hardwired effects rack, ADAT integration, and a hard-disk recorder all rolled into one. Still, even though Mxtrax shows off many of the V8's capabilities admirably, it has its shortcomings. For example, I find the hard-disk editor isn't the most intuitive I've ever come across (the system's designed more for straightforward tracking than for loopy-loopologists like me) and the signal routing layouts could be a little more direct. All-in-all, I found that MxTrax showed off the real-time "get-up-and-go" that the V8 has to offer.

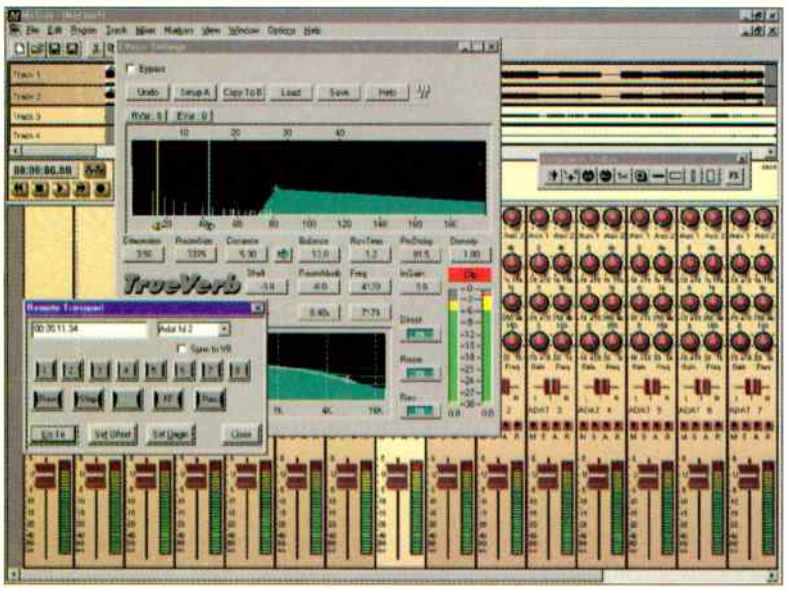


FIGURE 3

### SYNC ALONG WITH ME

Sync'ing a MIDI sequencer to both the mixer's automation moves and to hard-disk tracks was a snap. This is due to the V8's internal SMPTE/MTC sync driver that locks any slaved software to the Main Board's master timing clock. Selecting the internal driver as the sequencer's sync source always resulted in instantaneous and rock-solid lockups.

Although the ability to use the ADAT as a digital I/O interface and even to remote the ADAT from the PC's screen is totally cool, I found the sync'ing of an original formula ADAT unit to the V8 when the system's sample clock is set to 44.1 kHz to be a different story. It seems that the original ADAT can't auto-detect that the sample clock is at 44.1, and freewheels at its standard 48 kHz rate. As a result, the ADAT lost 24 seconds over a five-minute period relative to the program. DAL says that if you look at the MxTrax time and not at the ADAT, you'll always be in sync. Fortunately, the ability to detect the master sample rate has been implemented into the newer ADAT XT. One other ADAT-related problem that can be traced to the system (when using an original ADAT unit) is a loud pop that occurs whenever an original ADAT's transport is engaged into the play mode. I've been assured that this has been corrected in the form of a "Mute ADAT Until Sync" option within the Devices menu, which unmutes the original ADAT's outputs once play is engaged.

### MY 2 CENTS

It really is amazing to sit back and watch my notoriously non-real-time PC jump through some hefty real-time processing hoops. The ability to mix multiple channels, have more real-time signal processing than I know what to do with, and record multiple tracks in a nonvirtual environment is a big kick.

The big challenge for the V8 will come with the development of future "Gearhead Approved" software. The DAL folks have gone out of their way to make the software code easy to integrate into current software packages. I will be interested to see what innovative rabbits developers will pull out of their hats to add the real-time processing power and multichannel capabilities of the V8 to their existing or unborn software. EQ


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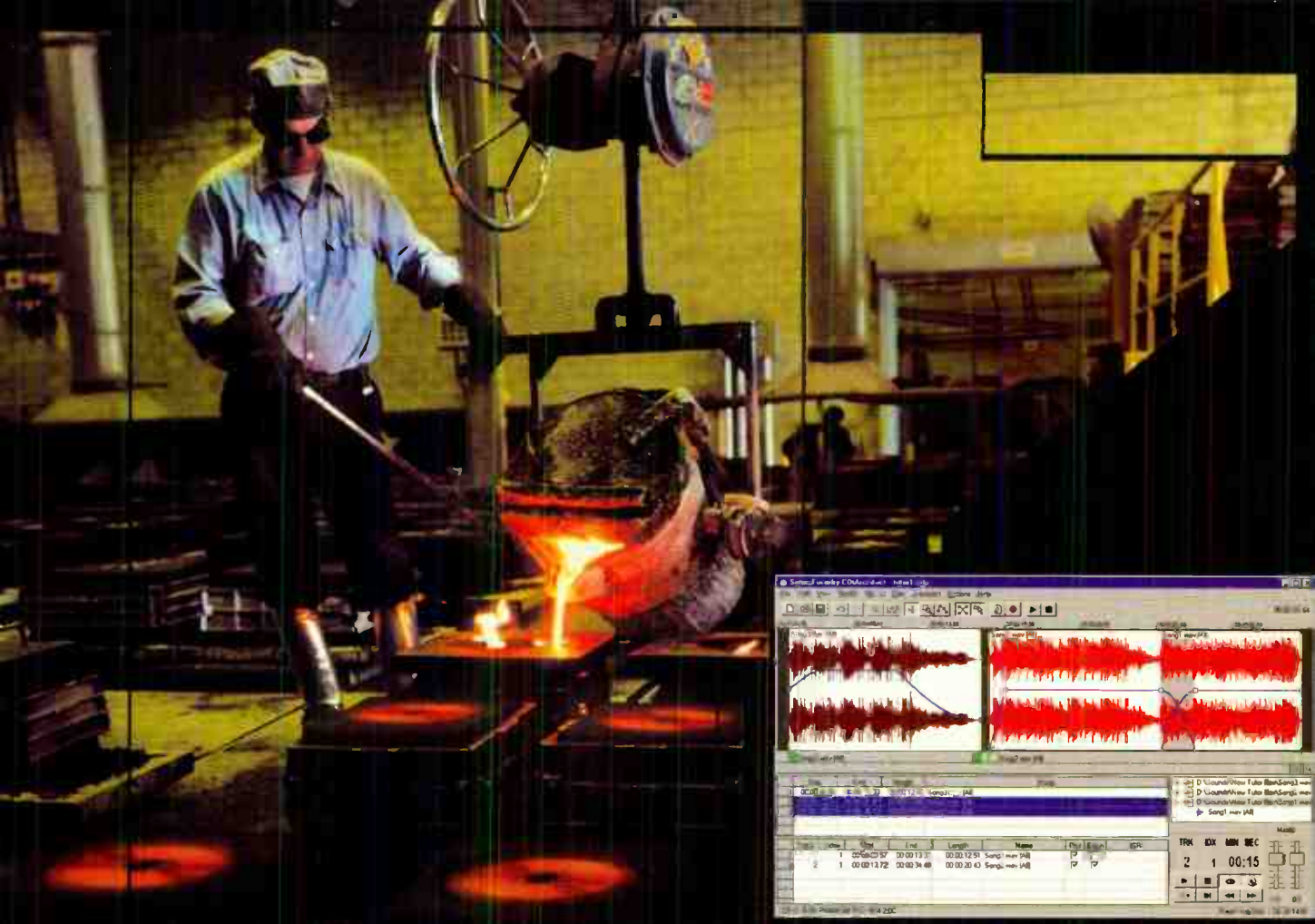

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# Seer Systems Reality

## GETTING GOOD-QUALITY SYNTHESIZED SOUNDS FROM YOUR PC IS NOW A REALITY

BY CRAIG ANDERTON

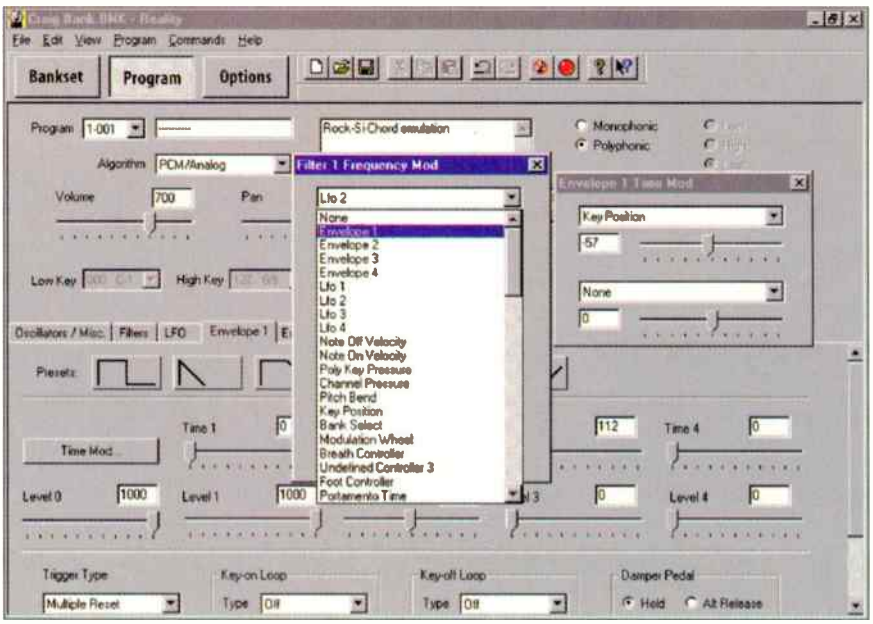
This is a tough product to write about because it merits a 5000-word review, and my assignment is 1000 words. Fortunately, it's easy to summarize the bottom line: if you're into synthesis and sampling, this is the coolest thing since physical modeling hit the streets. There are some definite limitations, but they're worth working around for the good stuff.

### THE SOFT MACHINE

Reality is a program for Pentium-based computers, and it generates sounds in software. These play through a Sound Blaster AWE 64 (about $100 extra, or $200 for the AWE 64 Gold with S/PDIF I/O). Onboard audio codecs with Creative Labs drivers will also work.

The maximum quoted polyphony is 64 voices, but this requires a super fast processor, lots of RAM, and simple patches. Back in the real world, two oscillators and one filter at 44.1 kHz uses up 5 percent of a Pentium 166's resources. If you allocate 80 percent of the computer's resources (this is adjustable) to Reality, the typical maximum is 16 voices, with less for some complex models. An MMX processor increases this voice count by about 50 percent, and a Pentium Pro doubles it. There are ways to optimize the system if hiccuping occurs, or to gain more voices; one of the simplest is to use a 22 kHz playback rate on noncritical sounds.

Reality is multitimbral, although this is not clear from the manual. If you send data over a specific channel preceded by a program change, it will play the specified sound on the specified channel. However, because of polyphony restrictions, unless you have a *really* fast machine, this is not really a "workstation" machine with lots of voices playing over multiple channels. Nonetheless, favoring software over hardware opens up a cornucopia of sound-making potential. Synth engines include physical modeling, PCM/sample-based synthesis (you can load in your own WAV files, too), analog emulation (with up to four oscillators, four filters, four envelopes, and four LFOs), FM synthesis (three 4-operator algorithms with the ability to incorporate PCM samples), waveguide, and "modal" synthesis (resonant filter bank driven by impulse) for percussive sounds. Think of Reality as the '90s version of the old modular synths, but polyphonic — and with a lot more modules.




SEER WHAT WE MEAN?: Good PC-generated synth sounds are a Reality.

### INSTALLATION

Reality comes on CD-ROM. A hardware copy-protection dongle inserts in your printer port line. Installation was problematic until I used an AWE 64, at which point everything worked fine.

I wish Reality had a MIDI In monitor so you could be sure the program was getting input (according to Seer, this will be added soon); this is important because stressing the AWE 64 MIDI interface can cause it to choke. You have to go to the options page, turn off "stand-alone connection," then turn it on again to restore operation. This happened to me mostly when sending significant amounts of controller data.

There are three main screens: the Bankset "librarian" that shows all the bank's patches (the CD-ROM is packed with example banks), Program (a patch editor), and Options (includes controls like volume, computer resource tweaking, MIDI response, global signal processing, etc.).

Fig. 1 shows the Program screen for PCM/analog patches (there's a similar screen for modeled patches), with an envelope selected for editing. Multiple dialog boxes can be onscreen at one time, making it easy to tweak, for example, filter envelope amount and envelope times without menu-hopping.

### SOUNDS? ZOUNDS!

The sounds — up to 1336 programs in banks of 128 — will knock you out. They're clean, powerful, and cover a wide range of tonalities. Furthermore, "Patchwork" programs can assign different patches (with pan, transpose, detune, etc.) to different key ranges. If you get too nuts, you'll run out of voices, but for the fattest monophonic bass lines in the galaxy, look no further.

There are also extensive modulation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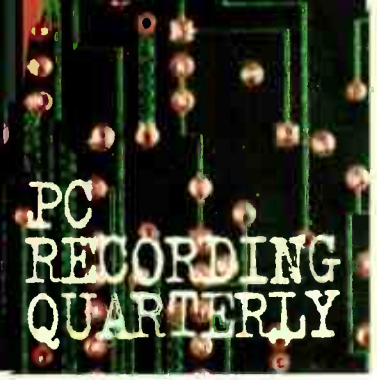


options, including real-time MIDI control. A Peavey PC1600 MIDI fader is a great Reality accessory.

Regarding the wish list, I'd like an adjustable velocity curve for each program, as the huge available dynamic range demands an exceptionally skilled keyboard "touch." The global velocity offset control is a start, but not enough. I'd also like calibrated parameter values—e.g., filter in Hz, envelope in ms, etc. Almost all parameters go from 0 to 1000, and while I appreciate the resolution, I'm curious what the numbers mean. Ensoniq included a chart with its synths correlating parameter numbers to real-world values, maybe Seer could do the same.

### I CAN SEER CLEARLY NOW

Frankly, I haven't been too impressed with software synthesis, and wasn't expecting much. After all, over the years synths have become somewhat of a commodity product—lots of voices, a GM or XG instrument set, a few hundred presets, and a low price tag. I expected this would simply be translated to a computer environment. Thankfully, I was 100-percent wrong. Reality is more like a musical instrument executed within a computer, which is perhaps not surprising given that Dave Smith, the main force behind the Prophet-5, heads up the Seer team.

If you like programming or playing synthesizers, have a really hot Pentium machine, want a sound generator that can do many types of synthesis, don't need lots of simultaneous voices, and place a premium on sound quality, Reality is the ticket. If this is what the next generation of synths is about, I'm ready. Apparently, so is Seer. **EQ**

**MANUFACTURER:** Seer Systems, 301 South San Antonio Rd., Los Altos, CA 94022. Tel: 415-947-1915. Web: http://www.seersystems.com.

**APPLICATION:** Synthesize virtual sounds using various sound creation techniques.

**SUMMARY:** Turns any high-performance Pentium computer into a multivoice synthesizer with great sounds and programming options.

**STRENGTHS:** Professional quality interface and attitude; wonderful sound quality; multiple synth engines; software updatable; S/PDIF out with AWE64 Gold card; can provide sounds for W95 sequencers running concurrently; includes several useful sound banks; real-time editing; extensive MIDI real-time control.

**WEAKNESSES:** Essentially requires Sound Blaster AWE 64; resource-intensive; can hiccup when the computer runs out of horsepower; limited number of voices; incompatible with Cyrix/IBM 6x86 processors; no per-program velocity curves.

**SYSTEM REQUIREMENTS:** Pentium 133 MHz (Pentium Pro recommended), Windows 95, 24 MB RAM (32 MB recommended), Level 2 cache, CD-ROM drive, Creative Labs 16-bit audio board.

**PRICE:** $495, $695 bundled with AWE64 Gold card **EQ FREE LIT. #:** 123

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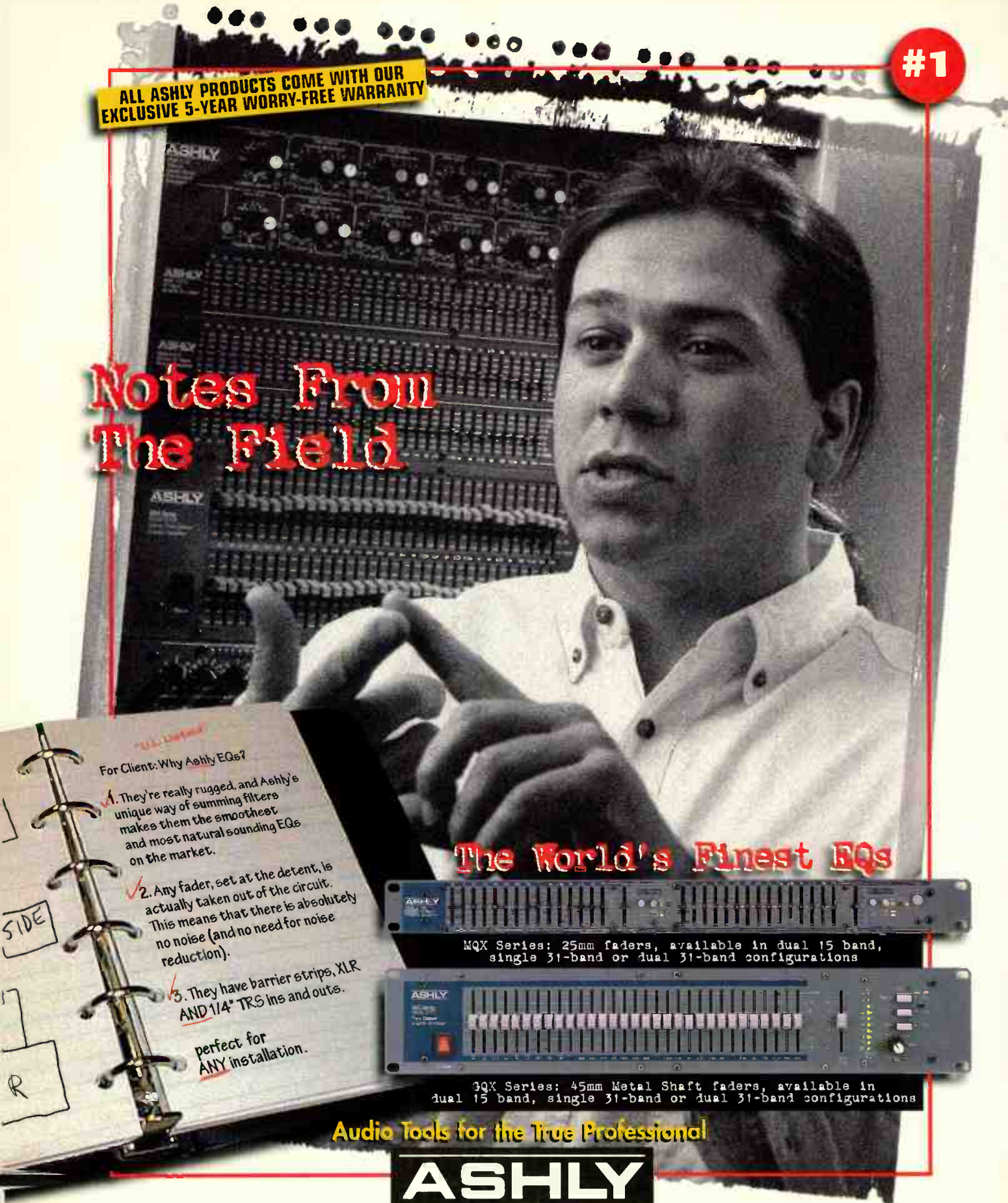


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# EQ LIVE

*How* **AEROSMITH** *Gets the Quality Live Recordings They Need for an Upcoming Album without the Truck.*

**LIVE RECORDING TIPS**
PAGE 108

AEROSMITH PHOTO COURTESY OF CORBIS.

World Radio History

# Live Recording Without the Truck

AEROSMITH PACKS THEIR OWN FOH RECORDING RIG FOR THEIR CURRENT TOUR

By David Frangioni

Working on assembling any element of an Aerosmith tour is always a very exciting and challenging endeavor. This being the third tour on which I have worked (I previously designed the keyboard rigs for their "Pump" and "Get a Grip" tours), I was excited for this newest challenge. My mission was to design and implement a recording rig for their front-of-house mixer, Kevin Elson. In the past, Kevin has worked with Michael Jackson, Don Henley, and Journey, as well as on the second leg of the "Get a Grip" tour. Initially, the band requested that I find a way to record every show with a high enough quality that would eliminate a need for mobile truck recording. This new recording tactic would allow the band to not only record every night of the tour, but also save thousands of dollars. When Kevin and I met to discuss the details, it was clear that simplicity and reliability were the first priorities. Of course, quality went without saying — the band was expecting to use these tracks for an upcoming live album.

READY TO ROLL: The front view of the machine rack.

SOUNDCHECK: David Frangioni and Kevin Elson in Hartford, CT at pre-tour rehearsals.

## TOYS AT THE FOH

Kevin requested TASCAM DA-88 tape machines because they would enable him to record the entire length of a show on one tape. This prevented any tape changes from having to occur during the show. We decided to install four DA-88 machines for 32 tracks wired to 96-point patchbays. Kevin and I have always been strong advocates of utilizing patchbays. We both agreed that patchbays would offer the most flexibility. Three Switchcraft TT96 patchbays were wired to rear-panel-mount ELCO connectors mounted on the back of the machine rack (see photo 1). The ELCO panel then connected via ELCO snakes to the proper terminations of each piece of external gear.

Kevin wanted a prefade send from each of the direct outputs of the Yamaha PM4000 (FOH) console, enabling him to record every channel coming into the console *without* any processing. We wired a snake that had 32 XLR connectors on the console end to an ELCO that connected to the rear panel of the machine rack. From there, the ELCO panel connected to the back of the bay and was labeled "Yamaha Direct Outputs." The DA88's were connected directly to the patchbays because they were mounted in the same rack. The outputs of the Yamaha were normalled to the inputs of a Mackie 32•8 at the bay.

We needed an easy way to monitor what was coming off the DA88's, so I recommended a Mackie 8•Bus console. Kevin agreed, and we wired three additional audio cables to the Mackie line inputs, with


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All through the audio industry people are talking. The big people. People like Humberto Gatica. They know what it means when a truly superior product comes along. It makes the job easier. It makes the client sound better. It gives the producer a little peace of mind. Humberto has been down the road once or twice; recent engineering credits include Barbara Streisand, Celine Dion, Michael Jackson, Rod Stewart, Natalie Cole .... you name 'em, Humberto's recorded 'em. His gear better work. That's why Humberto uses the dbx 160S Stereo Compressor. He knows that he has the music industry's most versatile, robust compressor. With the engineering on the inside to match the gorgeous architecture of the exterior, the 160S almost does it for you.

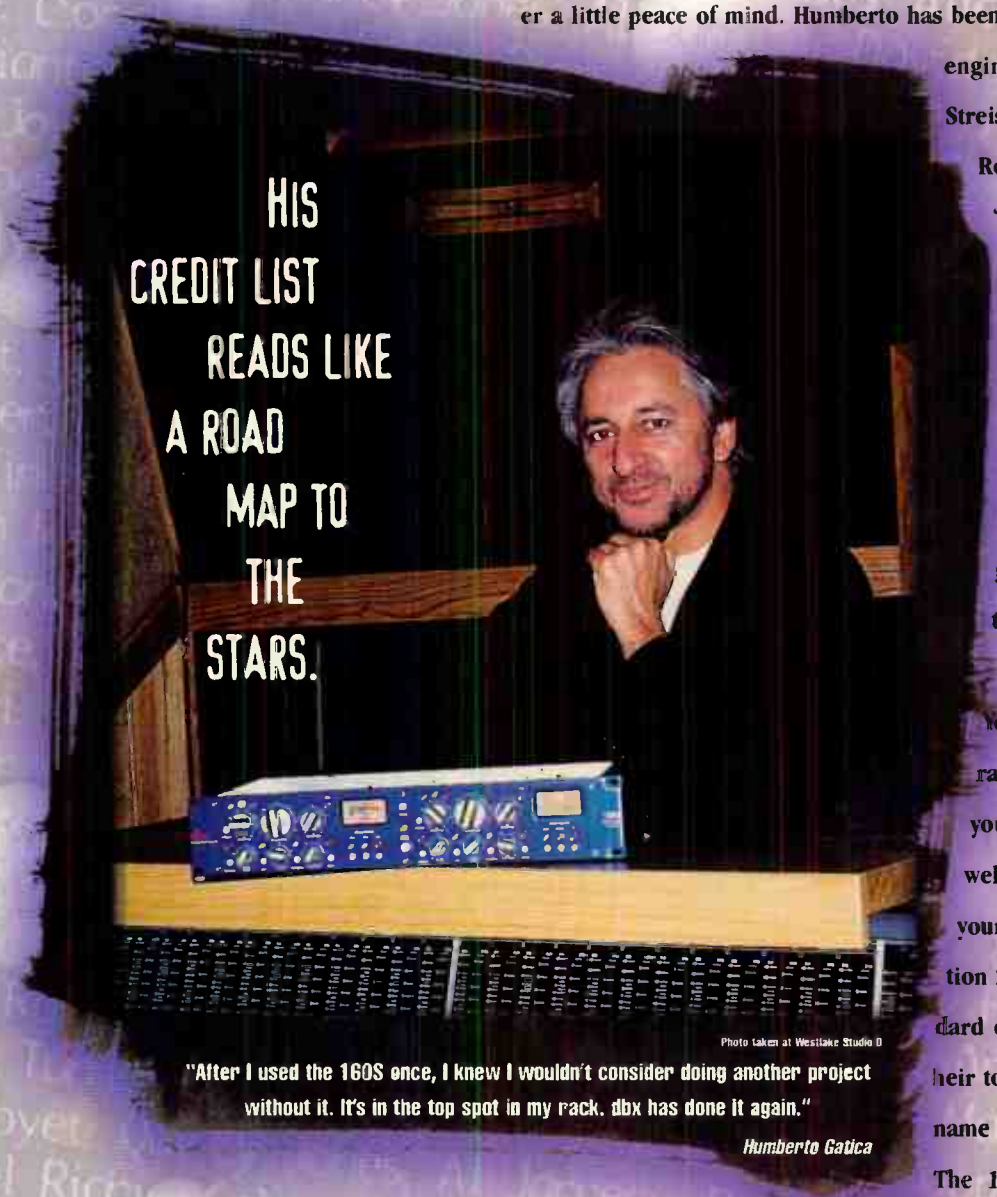


Photo taken at Westlake Studio D

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*Humberto Gatica*

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ELCO connectors on the other end. The Mackie was a key element to the system's flexibility. With it, Kevin could group any of the FOH channels to any other single or grouped tracks. For instance, if he wanted to group the direct and amplified bass sound to one track, it was no problem. He could also choose to record each track one-to-one as they were coming from the Yamaha. The system's flexibility was the result of all connections going to the patchbays and then, through normalling, being routed to their destinations.

QUICK SET: The Mackie console wired to ELCO snakes that detach from the rear of the machine rack and fold into the Mackie console case. Total setup time is under five minutes.

### THE OTHER SIDE

The outputs of the DA-88 were normalled to the tape inputs of the Mackie. This configuration routed all of the inputs and outputs in a logical way — very similar to a recording studio environment. In addition to the ins and outs, we had to address how Kevin would add any EQ or compression to the signal (if necessary). To meet that requirement, we wired eight dbx 160XT compressors, three Summit tube equalizers, and a couple of miscellaneous outboard pieces of equipment (Yamaha SPX900, etc.). This allowed Kevin to break the normalled connection and insert a processor before the signal reached the DA-88 tape, as he noticed that some instruments such as bass drum and vocals sounded a little thin going to digital without any EQ or compression.

On this tour, the cables, panels, and connectors were also of the utmost importance. Unlike a studio, where sound quality is number one, reliability is first on the "live list." I have experimented with virtually every type of cable available, and they all sound and perform differently. In fact, in every cable shootout that I have ever attended, the differences were audible from one type to another.

My favorite cable is Monster cable. Although they are known for their high-end audiophile interconnect and speaker cables, they also make an extraordinary multi-pair and single-strand cable. Not only does their cable sound great and reject interference, noise, and other gremlins, it also lasts forever. It does take a little longer to work with because of the rigidity of the cable, but in the end, it's worth it.

The digital recording rig has been on the road for a while now. Fortunately, there have been no problems (fingers crossed as we go to press!). The combination of equipment, implementation, and proper wiring resulted in a solid, roadworthy setup. So far, the "train has kept a rolling," and it better, as we wouldn't want to lose one of our Nine Lives! EQ


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# LIVE RECORDING TIPS

*Don't let a bad board tape ruin your rep with the band — here are some tips for getting the right sounds.*

PHOTO BY MICHAEL ZAUSNER

## How not to get board (*ouch*) making a live recording for the band

**By Steve La Cerra**

There comes a time in every sound-reinforcement engineer's career when the artist they're working for requests a recording of their show. Why is this is such a scary proposition? Is it because we're afraid to let the artist hear the mix? Is it because we're worried about the tapes being stolen and bootlegged? Or is it because the sound heard at the mix position — being a combination of the PA and direct stage sound — is not what the tape recorder hears? It's all of the above, plus the "more me" psychology of many artists.

The easiest way to record a live performance is to run the L/R outs from the desk into a tape deck, preferably DAT. The sound will be clean and green, but there are problems relating mainly to the size of the venue. In a very small club, you might not have the drums miked. Acoustically, the mix could be great at FOH. Play that tape back and guess what? No drums, because the tape deck was not hearing the acoustic propagation of the drums through the room. On the other hand, if the show is at a huge, flat, outdoor field, you're not going to hear much sound directly off the stage anyway, so the board tape will be more indicative of what's heard at FOH.

Another problem with a board tape is that you can often hear mics being switched on and off. Many conscientious engineers will mute unused backing vocal and guitar amp mics to keep the mix tight. Well, when you hear that back on the board tape, it sounds like someone is messing around with the ambient environment. And, instruments that rage onstage (like rowdy guitar amps) often sound too low on board tapes — they don't need to be in the PA a whole lot to make them articulate to the audience.

An alternate idea is to put up a pair of mics at the mix position, near your ears. Effectiveness of this approach depends on several factors including how good or bad the acoustic design of the room is, not to mention how good your ears are. It also depends on how rowdy the audience gets — you might wind up with a 2-hour DAT of some drunken fool yelling out, "Whipping Post!" at a Kiss concert. Use a pair of condensers in X-Y


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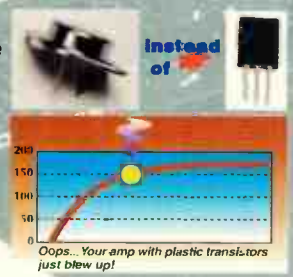
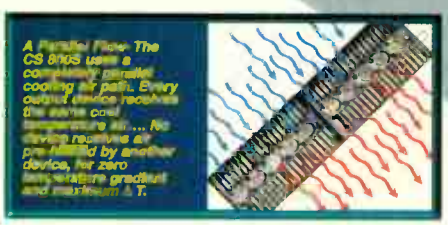
Popular wisdom says "don't change the recipe when you're making good biscuits." The reason the CS® 800 has remained dominant for over twenty years is that we've only changed it a few times and when we did, we knew what to throw out and what to keep.

**What to Keep**

The new CS 800S uses metal (TO-3) power transistors, because plastic devices just don't deliver equivalent thermal performance. While metal devices can be used right up to silicon junction failure, plastic devices degrade 50°C (90°F) sooner. This margin of "thermal headroom" can be the difference between a really loud finale and something more final.



Oops... Your amp with plastic transistors just blew up!




Books have been written about thermal management, but it all boils down to three things: air flow, heat sink area, and Δ T (the difference between the heat radiator and ambient air). The CS 800S uses a unique "parallel flow" heat sink alignment so every transistor receives the same cool temperature air for optimum Δ T.

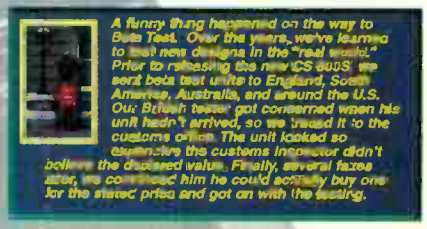
With two variable-speed 32 CFM fans cooling hundreds of square inches of heat sink area, and metal (TO-3) power devices (in the air stream), the CS 800S will play very loud for very long (years - not minutes or seconds).

The audio amplifier section uses proven Class A/B ultra-linear complementary topology with several improvements that further reduce the distortion/noise floor even lower than the already "audiophile quality" CS® 800X (40 v/µsec, <0.03 % thd, etc.)

Our exclusive output circuit design (patents pending) completely compensates for amplifier output impedance. We conservatively spec damping factor at 1000 but it is only limited by component tolerance.

Modular inputs and outputs provide flexibility in configuring the CS 800S for your application. Binding post, or Speakon® outputs, it's your call. A clever input circuit accepts anything from XLR balanced line level signals to single-ended speaker level signals. Caution: don't try this with a non-CS amplifier; speaker level input signals will fry most amps on the market today!

**DDT™** - A fast-acting limiter, triggered by clipping or current limiting, which prevents speaker/equipment damage, is probably our most copied feature. Only Peavey Electronics offers "true" DDT. (U.S. Patent #4,318,053)




**What to Change**

The new CS 800S is two rack spaces high and weighs only 23.5 lbs! The CS800S wasn't lightened by using a smaller power transformer and fewer output devices on a "trick" heat sink. We used our years of digital and "switchmode" experience to develop an advanced high frequency power supply. More than just a replacement for the old heavy iron transformer, intelligent load and thermal sensing dynamically interact to provide more power, longer, and more reliably than previous approaches.

This, combined with our more than 30 years of experience building the most reliable solid-state amplifiers in the world, allowed us to redesign the whole amplifier from input to output, merging the best of the old with the best of the new to deliver 1,200 watts of superior performance without breaking your back or your pocketbook. The CS800 just keeps getting better!

# 1200 W
# 23.5 lbs.

# CS® 800S

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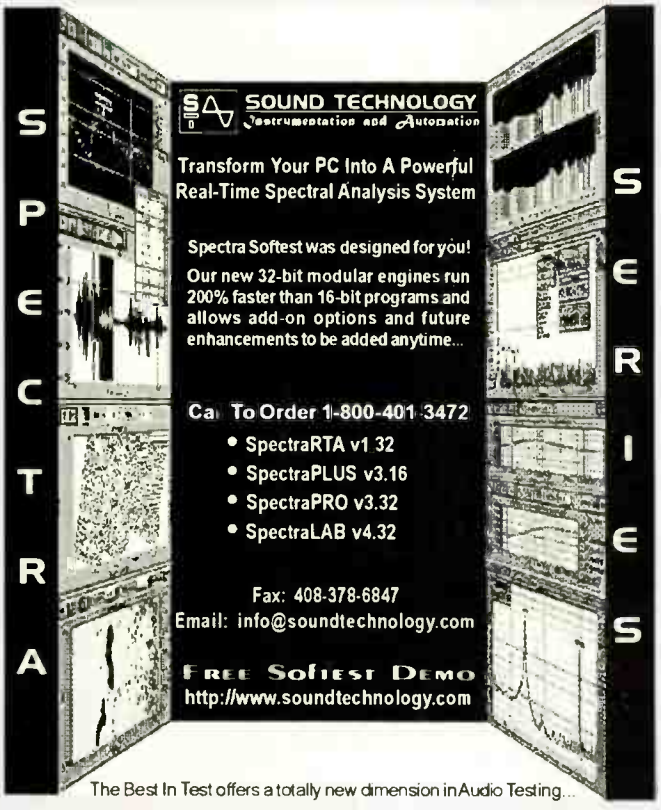


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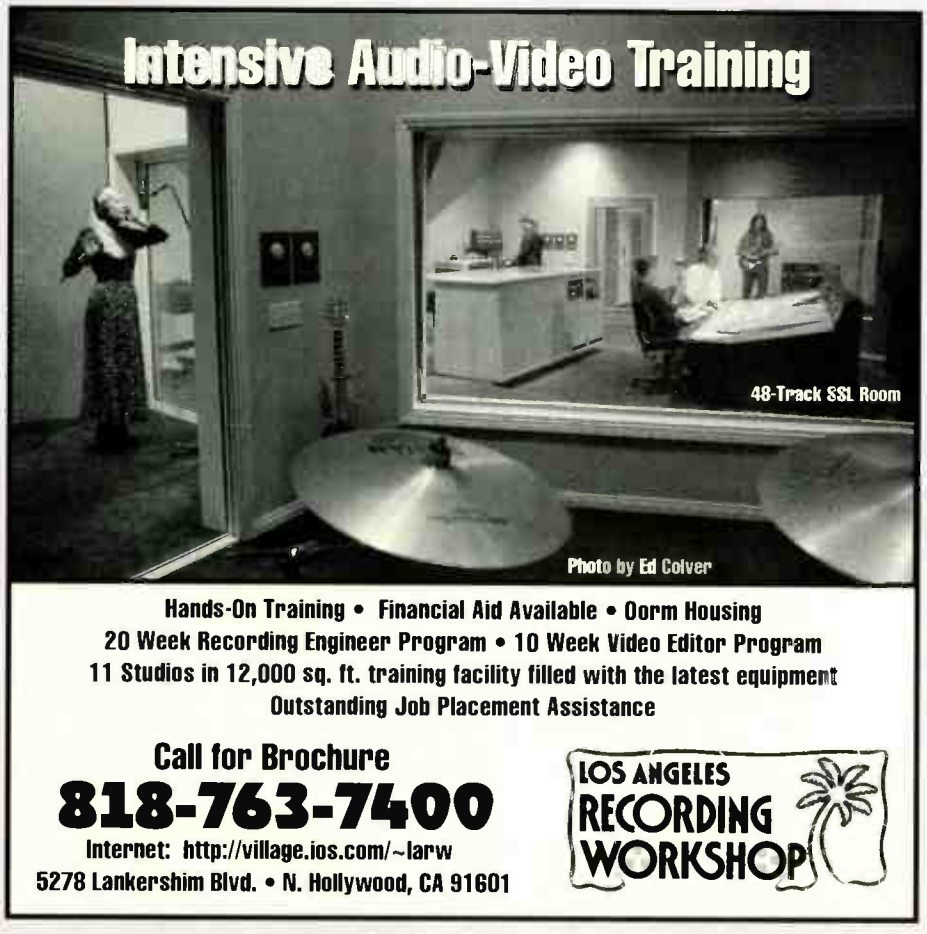



CIRCLE 68 ON FREE INFO CARD

EQ LIVE

configuration placed just above your head. You may want to close the angle down from the normal 90 degrees to about 45 to 60 degrees to reduce some of the side wall reflections.

When the mix position is under any kind of "hospitality" tarp or tent, your low end is likely to build up in there, so take a quick walk around for a reality check. If you don't mind the idea of leaving your mics out of arm's reach, you could place one mic in front of each PA stack, but don't get too close — you want to mic the PA as a coherent whole, not just, say, the midrange packs. A potential problem here is that the mics are not where your ears are, so there could be a big discrepancy in balance, especially when recording in a small indoor club. Using this approach outdoors you'll be amazed at how great a flanger the wind can be, if things get gusty.

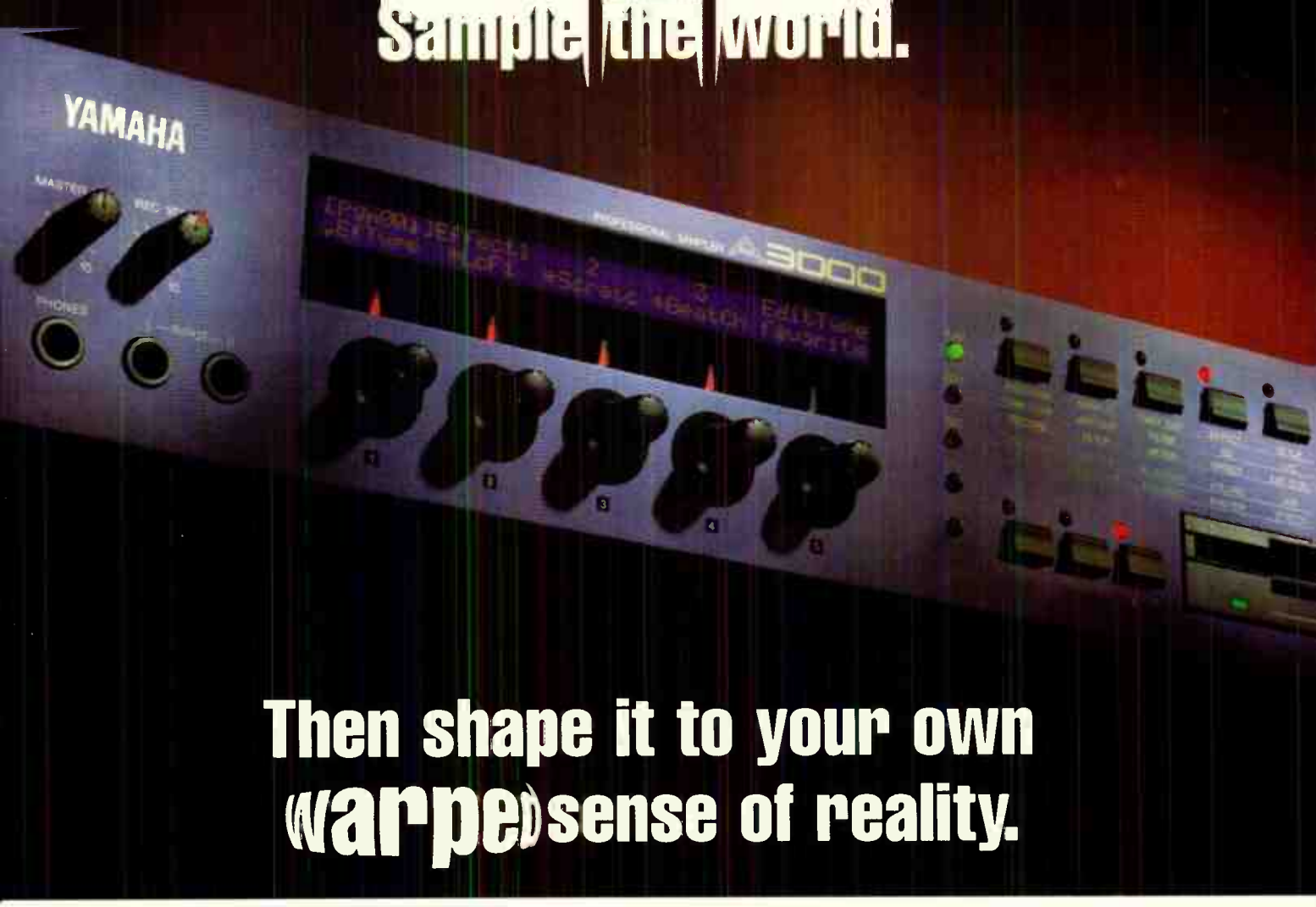
Some engineers have had success at feeding the L/R board mix to a matrix and the matrix to a DAT. By adding a pair of room mics into the matrix feed (you'll have to experiment with the ratio), you can record a combination of ambient mics and the board feed. Placing the room mics at FOH gives you the potential for a beautiful slapback echo that will render your tape unintelligible. This stems from the fact that sound from the stage reaches the close mics first and reaches FOH mics later, roughly 1 millisecond per foot from the stage. If you have a spare stereo DDL laying around, run the board's L/R out into the delay, apply 1 millisecond of delay per foot from the stage, run the delay output back into the matrix via two open channels (What? You don't have any open channels??) and pray. This 1 millisecond/foot idea is only a guide, since the actual speed of sound in air varies with temperature and humidity conditions. To avoid this whole delay dilemma, place the mic close to the PA. See Steve Folsom's "Feels Like the First Time" in the August 1995 *EQ* for specific techniques.

When considering any of these options, make sure that you're playing by the venue's rules. Certain halls under union guidelines have very specific rules about recording...stay tuned to *EQ* for more about the politics of recording live!

*Steve La Cerra is constantly seeking new ways to record live shows. His latest technique employs a string and a tin cup.*


World Radio History

# Sample the world.




# Then shape it to your own warped sense of reality.

**The Yamaha A3000** gives you the power to capture any sound and stretch, warp, duplicate, or blast it into any form that you can imagine.

With its on-board effects processor, the A3000 does more than just record and play samples; you can turn everyday sounds into art without the need for any other (expensive) gear. You can run three effects simultaneously for total control—choose from the A3000's algorithms for EQ, lo-fi, even time stretch and compression. Once you get ahold of the controls, who knows what the world is in for.

To change the world, you need a lot of firepower. The A3000 gives it to you; it's loaded with 64-note polyphony and allows you up to 128MB of RAM so you can access and play hundreds of samples as you need them. Imagine having all your samples at your fingertips. You'll never again curse the limitations of 32-note polyphony and 32MB of RAM.

Speaking of capacity, store your warped world on the A3000's internal floppy disk drive, optional internal hard drive or even an external hard drive for unlimited storage capacity.

The Yamaha A3000 isn't just powerful, it's easy to use. Turn the knobs, push a few buttons and you can accomplish anything, including internally resampling to include effects with the sample data. Applying 4-band total EQ. Adding parametric EQ to each sample. Or freely mapping EQ to key and velocity ranges with layers and/or splits.

Now play your music. The Yamaha A3000 comes standard with SCSI and stereo plus two assignable outputs with options for six additional analog outputs, S/PDIF and digital outs. You're covered, whether you're on a stage or in the studio.

All of this power comes at a price. Fortunately, it's exceptionally low—just $1999 MSRP. This much power has never been available to you for anything close. So get a Yamaha A3000 sampler today and shape the world's sound to your own warped sense of reality.

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World Radio History

# ROAD GEAR

Nady Silver Series

## HI-HO SILVER!

Nady Systems, Inc.'s Wireless 331 and Wireless 332 Silver Series systems provide enhanced value in high-band VHF wireless. The 331 features a single antenna while the 332 offers two antennas as well as Nady's advanced DigiTRU Diversity digital processing circuitry for maximum dropout protection. The receivers are compact and rack-mountable with front-mounted antennas and 1/4-inch and XLR output options. Each unit also features Nady's patented companding circuitry for up to 120 dB dynamic range. The Silver Series starts at only $199.95. For more details, contact Nady Systems, Inc., 6701 Bay Street, Emeryville, CA 94608. Tel: 510-652-2411. Circle EQ free lit. #124.

## GET FLOORED

Designed to complement the affordable S-Series loudspeakers, Electro-Voice has introduced the two-way S15M floor monitor. This 250-watt, high-efficiency, constant directivity floor monitor boasts a direct-radiating 15-inch woofer and an 80-degree x 55-degree horn coverage angle. E-V has designed the S15M to sit at 50 degrees, 65 degrees, or perpendicular to the floor. A DH2010A compression driver and a convex-drive Time-Path™ phasing plug are included in the high-frequency section for smooth extended response. The S15M utilizes EV's PRO™ circuit, a self-resetting protection system that helps to prevent accidental overload of the high-frequency driver. The bass section of the S15M was designed using a Thiele-Small-vented enclosure design to produce solid performance to 77 Hz. For further details, contact Electro-Voice, 600 Cecil Street, Buchanan, MI 49107. Tel: 800-234-6381. Circle EQ free lit. #125.

EV S-Series

## TO DI-4

The DI-4 from ARX combines four direct boxes and a 4-channel stereo line mixer with an Aux send and a stereo return. The DI-4 has been designed so the user can set it up any way that they want — as four DI units, as a four-into-two line level mixer (at the same time), or any combination of ins and outs needed. The Aux send can either drive an effect or generate a separate mix while the stereo return can either return the effect into the mix or bring a stereo tape or CD signal into the mix. Channels 1 and 2 can be switched in or out of the mix via the DI-4's rear panel controls. The rear panel also offers balanced XLR outputs for channels 1 to 4, each with its own audio ground-lift switch and status LED. The stereo outputs are both balanced XLR and unbalanced jack connector for maximum flexibility. For further information, contact ARX Systems, 4411 Brookford Ave., Woodland Hills, CA 91364. Tel: 818-225-1809. Web: www.arx.com.au. Circle EQ free lit. #126.

ARX DI-4

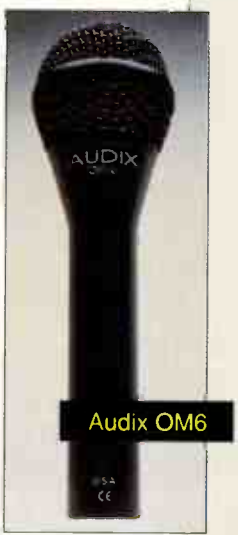
## RUBBER MEETS THE ROAD

Telex Communications has designed the new TD Series wired handheld microphones — the TD-26, TD-22, and TD-16 — for sound-reinforcement applications. The TD-26 dynamic microphone offers a hypercardioid pickup pattern and an extended frequency response of 30–19 kHz. The TD-26 also offers a sensitivity rating of –71 dBV at 1 kHz, and a tapered, ergonomic housing. The cardioid pattern, dynamic TD-22 features a frequency response of 35–19 kHz, an impedance rating of 250 ohms, and a sensitivity rating of –71 dBV. With a frequency response of 45–17 kHz, the TD-16 utilizes a full 1/2-inch rubber shock mount to protect the mic element from abuse. The TD-16 offers a unidirectional pickup pattern, a sensitivity rating of –74 dBV with an impedance rating of 330 ohms. For further details, contact Telex Communications, Inc., 9600 Aldrich Avenue South, Minneapolis, MN 55420. Tel: 612-884-4051. Circle EQ free lit. #127.

Telex TD Series

## MIGHTY MIC

Audix's OM6 vocal microphone offers a wide, flat frequency response (48 Hz–19 kHz) and enhanced off-axis rejection characteristics. The OM6 features a hypercardioid pickup pattern, a –69 dB sensitivity, and a maximum SPL rating greater than 144 dB. The mic weighs in at 10.5 ounces and has a rugged fusion coating to survive the abuse of the road. The OM6 is available at a price of $349. For more information, contact Audix, P.O. Box 248, Lake Forest, CA 92630. Tel: 800-966-8261. Web: www.audixusa.com. Circle EQ free lit. #128. EQ



Audix OM6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## Balanced Power is ideal for the most critical, ultra-low-noise installations.

In much the same way that balanced audio lines can reduce the pickup of hum and other types of electromagnetic interference, the use of balanced AC power lines in sensitive audio, video, or computer installations can make an enormous difference in residual system noise. The Furman IT-1220 Balanced Power Isolation Transformer can supply your facility with 20 amps of 120/60V single-phase balanced AC power, using the well-known common-mode cancellation effect to drastically reduce hum and buzz caused both by ground currents from power supply filtering and by radiation from AC supply cables. In turn, this can reduce the need to adopt cumbersome and expensive star-ground systems or use massive bus bars or heavy ground rods. There is no need to "lift grounds" or compromise the integrity of safety ground wires to achieve hum reduction. Furthermore, balanced power for technical power applications is now recognized in the US National Electrical Code (Article 530).

The IT-1220's heart is a specially wound and shielded toroidal isolation transformer with a center-tapped secondary, allowing the AC power to be balanced at its source. The current-carrying wires are no longer "hot" and "neutral" (0V), but two 60V lines of opposite polarity (referenced to the safety ground connected to the center tap), whose difference is 120V.

The IT-1220 provides 14 balanced outlets (two front and 12 rear) and includes an accurate, self-checking "smart" AC voltmeter, an Extreme Voltage Shutdown circuit, and a "Soft Start" circuit to prevent large inrush surge currents.

**FURMAN**

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World Radio History

EQ LIVE

# SONY 800 WIRELESS SYSTEMS

## SONY ADDS THREE NEW COMPONENTS TO ITS POPULAR SERIES OF UHF WIRELESS COMPONENTS

**By Steve La Cerra**

Sony's 800 Series of UHF wireless components is already well-established in a variety of applications such as television broadcasting, concert sound, and live theater. So, it doesn't come as much of a surprise that Sony is once again expanding the 800 Series with the introduction of several new components. What does come as a surprise, however, is that these new components were developed for performers and musicians, placing high-level UHF performance within a price area normally associated with VHF wireless gear.

These new components are available in three different prepackaged configurations: a handheld mic system, lavalier mic system, and guitar/bass system. All are compatible with existing 800 Series units and can coexist peacefully while running up to 11 channels simultaneously. Users have a choice of 94 frequencies.

First the transmitters: the WRT-805A UHF Synthesized Transmitter is designed for use with either a lavalier mic or an instrument. In addition to a very handy Phase switch, the unit also has a switch to toggle between instrument and microphone level sensitivity. An LCD on the pack shows transmitting channel, attenuator level, and the number of hours on the battery (very clever). A single AA-type alkaline battery will run the WRT-805A for up to six hours of continuous operation with a maximum RF power output of 10 milliwatts.

When battery reserve reaches a critical point, the unit transmits a "low battery" alarm to receivers in the 800 Series that support that feature. Sharing the alarm feature is Sony's WRT-800A UHF Synthesized Wireless Microphone. Furnished with a very compact antenna, the WRT-800A uses an electret condenser element and can push a 5-milliwatt RF power output for up to 12 continuous hours on a single AA-type alkaline battery.

On the receiving end of the 800 Series, Sony has introduced three new devices. First there's the WRR-801A UHF Synthesized Diversity Tuner, which will undoubtedly become popular with touring professionals and theater sound system designers. In a single rack space, the WRR-801A is designed to simultaneously accommodate six receivers. It comes with one WRU-801A UHF Synthesized Tuner, which is a dedicated plug-in for the WRR-801A. Each WRR-801A offers Sony's Space Diversity Reception. A total of six of these modules may be fitted to a single WRU-801A. When a new module is added to the WRU-801A, the system automatically assigns an open channel to the new tuner module.

Performers with more modest requirements will be interested in the WRR-800A UHF Synthesized Diversity Tuner. Employing a single channel of Space Diversity Tuning, this half-rack-space unit has dual front-mounted antenna, output volume control, and an LCD display for channel selection and battery alarm. These new components are scheduled for availability in October 1997.

*Suggested list price for each system is $1095. For more information, contact Sony Electronics, Inc., 3 Paragon Dr., Montvale, NJ 07645. Tel: 201-930-1000. Circle EQ free lit. #129.*


World Radio History

# Summit MPC-100A Mic Preamp/Comp-Limiter

**By Mike Sokol**

The Summit MPC-100A is a little different from your standard mic preamp or compressor/limiter. That's because it's both in a common case, with tube-based overdrive effects available for either or both parts of the signal chain. This makes it a real processing tool, not just a wire with gain, such as a more traditional preamp.

The first thing that attracts attention is the retro "Fender Red" power indicator and the black phenolic-like knobs. In addition to the quality feel of the rotary pots, all switches are large bat-handle type, just like in professional radio station gear. No question if a switch is on or off on this unit. Placed against the 2 RU brushed aluminum panel with black lettering, it makes for a handsome-looking package. A pair of "tube drive" LEDs lets you know when soft clipping is occurring in either the mic pre or compressor stage. The basic input gain is stepped in 5-dB increments, and there are Phase Reverse, Phantom Power, and Line/Mic Selector switches. Attack and release times are Slow, Medium, or Fast, and the Compressor slope is continuously variable. There's also an additional small red knob next to a 1/4-inch phone input jack...but more on that later.

As a straight preamp (not being overdriven), the sound was very satisfying with a low noise floor and excellent RF rejection. But I was more than a little curious about those "tube drive" LEDs, so I took it on the road to the Western Maryland Blues Fest for a weekend of high-intensity mixing.

First up was Rory Block, a female blues guitarist/singer. She has a playing style that can be very soft and melodic one second, and then go into full-tilt thrashing the next. We inserted the MPC-100A on her acoustic guitar pickup ahead of the preamps in the house board and started playing with some settings. With a little experimenting you could get a very warm, flattering sound on the low volume parts and let the tube drive kick in on the hot licks to add some even harmonics. The compressor stage then controlled the dynamics, which would have been overwhelming without it. Block's engineer says he's going to add one into her road rack; I think he was in love....

Next up we patched into the vocal mix for Luther Allison on a Shure SM58. Luther has a tremendous amount of dynamics — he can be crooning to the audience one moment and then screaming at the top of his lungs the next. The MPC-100A did a great job, allowing a little natural "tube limiting" in the preamp stage, and then doing some final level riding in the compressor stage. I really liked the additional "phat" harmonics when it was hit hard. This is totally unlike any effect you can get with a transistor preamp or compressor. When a transistor circuit hits the wall, it's fuzz city. But a tube circuit can be designed to be much more graceful and forgiving. This is especially nice at a live show, where the talent can get a little out of control and you're expected to do sonic magic without anyone being the wiser.

One really interesting feature is the ability to plug an unbalanced instrument directly into the front panel.

## ROAD TEST

**MANUFACTURER:** Summit Audio, Inc., PO Box 223306, Carmel, CA 93922. Tel: 408-464-2448.

**APPLICATION:** Mic preamp and compressor-limiter with tube overdrive useful for adding level control and warmth/overdrive processing to voice and electric and acoustic instruments.

**SUMMARY:** Single-channel, world-class mic pre with an attitude. Goes from "sweet sounding" to "bad as you wanna' be" with the turn of a knob.

**STRENGTHS:** Rugged construction; great sound due to nicely balanced blending of tube processing and IC driver circuits; tube drive LEDs let you see soft clipping; variable impedance loading for instrument DI input.

**WEAKNESSES:** A little expensive for some project studios and road racks; no connector documentation on back panel; runs a bit warm in a tight, filled rack (but what do you expect from tubes?).

**PRICE:** $2400

**EQ FREE LIT #:** 130


World Radio History

This could be an electric bass or guitar or an acoustic instrument pickup. The previously mentioned "small red knob" allows you to vary the input impedance of the DI input from 10 kohm (ten thousand ohms) up to 1 Meg ohm (one million ohms), or any value in between. This will make a big change in how much high frequencies come from passive pickups in your instrument. At the 10 kohm setting, the sound was similar to a standard passive direct box, with lots of the highs gone due to transducer loading. At the 1 Meg ohm setting, it sounded like a best-grade direct box, such as a Country Man Associates FET unit. But this direct box also has tube overdrive and compression, so a lot more sound effecting was possible, with a reasonable "guitar stack" distortion attainable. [The red knob loading control also has a click stop at its full clockwise point, which is the 10 Meg setting. This may be selected as a "cal." position for any pickup by selecting an appropriate resistor value. This can be done directly at the factory or at an authorized service center.]

The only real quibble I have is the documentation — specifically the lack of it on the unit. Even though the manual notes that pin 3 of the output is hot (while the rest of the world is pin 2 hot), it really should be screened on the back panel to avoid confusion when using insert cables. And the stereo-link/sidechain TRS connector function is not evident until you read the manual. This is probably OK in the studio where the wiring is permanent, but for touring sound, you never know where you'll land or what you'll have to patch into.

This is a great unit with a great sound. While a little pricey for a single channel of anything, its flexibility gives it a lot of bang for the buck. It can be a best-grade mic pre, an excellent compressor/limiter, or a world-class direct box whenever the occasion calls for it. Just like the famed Leatherman Tool of touring road crews, the Summit MPC-100A will perform whatever job needs to be done without a lot of fuss. EQ

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# back to school special

It's that time of year once again where thoughts turn toward higher education. And if you are in the market for a solid audio institution, these three schools are a good place to start. So sharpen those pencils...

## The Recording Workshop

Located in Chillicothe, Ohio, The Recording Workshop is a hands-on school for audio engineering and music production. Established in 1971 and licensed by The Ohio State Board of Proprietary Schools, The Recording Workshop continues to be a leading gateway for individuals pursuing careers in professional audio.

Sessions are offered seven times each year. The curriculum consists of a five-week, 200-hour core program called The Recording Engineering and Music Production Program ($2190). For those wanting to supplement this core program, there are three optional extension programs. They are The Studio Maintenance and Troubleshooting Program (one week, 40 hours, $450), The Advanced Recording Engineering and Music Production Program (one week, 60 hours, $675), and The Newtech Computer-Based Audio Production Program (one week, 36 hours, $675).

The Recording Workshop's eight-studio training facility includes four 24-track music production studios, one 8-track commercial production studio, one mastering studio, and two media production studios with full-blown Pro Tools 4.0 workstations. To round out the facility, there is also a 6-station computer lab, an analog editing lab, and a lecture room.

Students from around the world and all fifty states attend The Recording Workshop. They can stay on campus in a variety of affordable housing options. Financial assistance is also available for those who qualify. Upon program completion, Recording Workshop graduates utilize a very active job endorsement and referral service that helps them find work in all areas of professional audio. Workshop graduates also enjoy the unique benefit of being part of a strong alumni network, with a 25-year history of grads helping grads.

For more information, phone: 800-848-9900 or 614-663-2544, fax: 614-663-2427, E-mail: info@recordingworkshop.com, or write: The Recording Workshop, 455 Massieville Rd, Chillicothe, Ohio 45601.



World Radio History

AUDIX

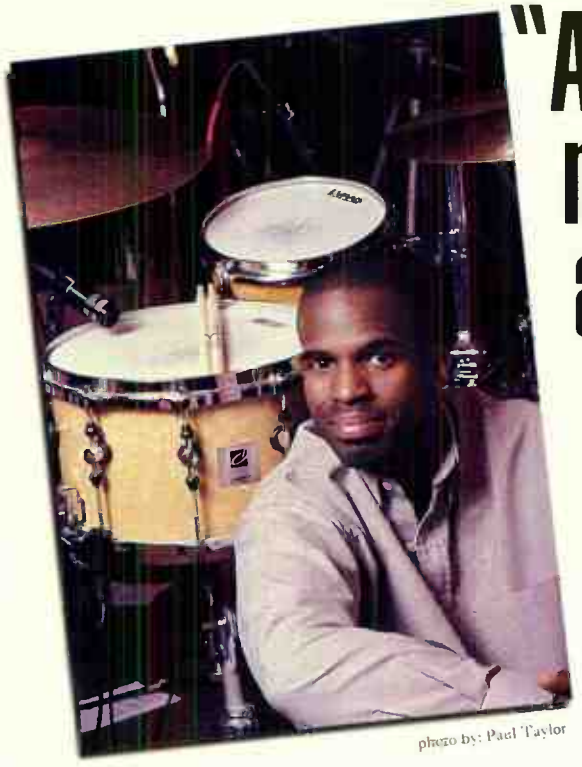

photo by: Paul Taylor

# "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

For more information call 1 800 966 8261
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# The Conservatory of Recording Arts & Sciences

The Conservatory of Recording Arts & Sciences in Tempe, AZ has emerged over five years as a major force in recording education. In 1992, this ACCSCT-accredited school started with only a handful of students. Recently, the school has seen a larger enrollment than ever before, but individual classes remain limited to only 12 students. "We practice a selective enrollment policy to keep classes small for several reasons: To provide more one-to-one between teachers and students, to allow for more hands-on training, and to keep classes populated with serious students," says Kirt R. Hamm, Conservatory Administrator. The Conservatory has one of the best student-teacher ratios in the business.

"What separates us from the competition is that we get our students an internship at a location of their choice and require them to complete it in order to graduate. We offer this along with nearly the same curriculum and industry-standard gear as all of the other programs out there," says Hamm. The Conservatory's internship program has established ongoing relationships with the recording industry, which has resulted in getting students placed in real jobs. Hamm says, "The word is out that our graduates are competent. We've even had studios like A&M and Ocean Way contact us to request our students for internships."

The Conservatory's curriculum is well-rounded and offers many different kinds of employment opportunities. According to Hamm, "If a student is serious about going to work in the recording industry, the Conservatory is by far the best choice."

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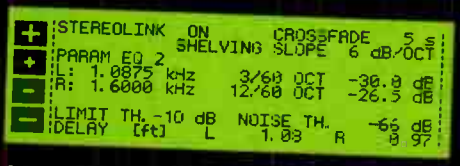


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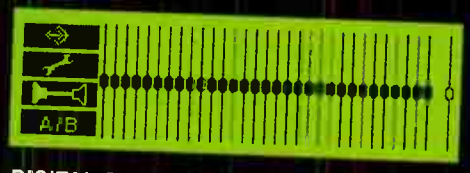


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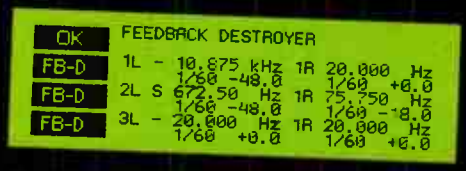


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# Yamaha 03D *Digital Console*

THIS REVIEW ORIGINALLY APPEARED IN *STUDIO SOUND*, OUR SISTER PUBLICATION.

## Yamaha's latest digital console combines surround mixing, automation, and signal processing with ever-keener pricing

**BY ROB JAMES**

Yamaha has enjoyed huge success with its ProMix 01 and 02R compact digital mixing consoles. The formula is now well known: a ridiculously high "bang-for-the-buck" ratio traded off against user interface and slightly inflexible I/O.

In keeping with the earlier models, the 03D offers unrivaled functionality at the price — 24 mono inputs, one stereo input, 18 outputs (including eight on an optional YGDAI, Yamaha General Digital Audio Interface card), 40 dynamics processors, 40 4-band parametric EQs, and two very high-quality onboard stereo multieffects processors. In addition, there are scene memories and full dynamic automation.

There is also a mouse port for the first time on a Yamaha mixer and an ESAM-II port for connection to a VT edit controller (software not yet available) and a "host" RS422 mini DIN for connection to a PC without a MIDI interface.

The control surface has a total of 39 buttons for control functions plus two buttons associated with each of the 19 fader strips. The faders are 60-mm-throw motorized units. There are also latching switches for 26-dB pads on channels 1–8 and a latching Monitor Out switch that selects between 2-track in-solo. The parameter wheel, which is arguably the busiest control on the surface, has excellent feel and well-chosen ballistics. The bright LCD is a 320 x 240 dot matrix and is complemented by a stereo LED meter ladder.

You pay for all this low-cost power in a learning curve that tends to the vertical — don't expect to sit down and do a session on day one. That said, the 03D handsomely repays the time spent learning to drive it. Once you know your way around, the lack of dedicated channel strip controls is no real handicap and parameter changes can be achieved with speed and finesse.

The control model is a mixture of assignable and layered, so for many functions there are two or more methods of achieving the same end. Sometimes it is

## EQ LAB REPORT

**MANUFACTURER:** Yamaha Corporation of America, 6600 Orangethorpe Avenue, Buena Park, CA 90620. Tel: 714-522-9011.

**SUMMARY:** Yamaha's latest cost-effective digital console.

**APPLICATIONS:** Recording and postproduction facilities, as well as sound reinforcement.

**STRENGTHS:** Good bang for the buck; surround panning modes; quality signal processing; compact size.

**WEAKNESSES:** Tough learning curve makes it difficult to use initially.

**PRICE:** $3,699; CD8AT 8-bus/8-channel interface card to ADAT digital format, $299; ADAT I/O 15.5' long cable (two required for each CD8AT), $45; CD8TDII interface card to TASCAM digital format, $299; CD8AES 8-bus/8-channel interface card to AES/EBU format, single slot, $$359; 03D SMPTE (03D automation requires MTC), to use 03D with SMPTE purchase JLCooper adaptor box, $169.95.

**EQ FREE LIT. #:** 131



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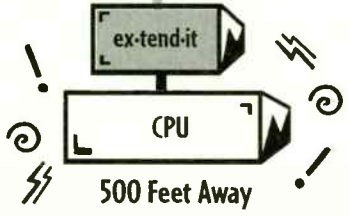


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quicker to select options to change with the mouse while setting parameters with the wheel, while at other times selecting with buttons and setting parameters with the mouse feels more natural. Result: every operator will establish their own preferred method of doing things.

Even when you become accustomed to expecting a huge feature set from Yamaha, there are still some surprises. The 03D comes as standard with three surround panning modes. There are a few more mixers around these days with surround panning, but nothing else even close to this price point — let alone with full automation. The three modes offer quadraphonic or 2+2 with, as you would expect, L-R front and L-R rear channels; 3+1 (LCRS); and 3+2+1 (LCR front channels, Left and Right Rear plus Subwoofer) for Dolby AC-3. Within these assignments, a mono or stereo source can be flown around on any of seven basic trajectories with endless variations or simply moved around the soundstage with the mouse. The trajectories can be recorded, dynamically, using Automix, and what happens to the L-R components of a stereo signal can be chosen from eight Pattern options. The display shows position with mini bargraphs for level on each of the surround outputs. There is divergence control available — CSR ratio in Yamaha speak — which controls the amount of center channel sound sent to the left and right speakers.

When the desk is in 3+2+1 surround mode, the panner outputs are fed as follows: front L-R from the Stereo out, Center from Bus Out 1, Sub from Bus Out 2, rear LR from Bus Out 3&4. Surround monitoring arrangements are up to you.

This is a very powerful and flexible surround panning tool, so much so it would be worth considering using an 03D as a surround panning addition to an existing film console.

### JUST FOR EFFECT

The effects units use the same chips as Yamaha's outboard processor, the ProR3 (see *EQ*, November '96) and offer 64 preset and 32 user-definable memories for further effects. The reverb is startlingly convincing, highly complex with tails fading to black and none of the mushy mess usually found on low-price units. Two of the programs are only available on effect two. These are the very useful Freeze (sampling) program, with nearly three seconds of storage, and the HQ.Pitch program, which is a mono pitch changer with long delay. The phaser effects, which I greatly enjoyed, are deep and can be spine-tingling.

I co-opted a friend with a Fender Strat to experiment with the guitar effects. He usually plays with no effects and relies on the amp to achieve the sound he wants. We were both impressed with what could be achieved with the Strat plugged straight into the 03D. With a little care, it is perfectly possible to get a convincing result without the bother of miking the amp and messing about with DI boxes.

In summary, the onboard effects enable a battery of wild effects to be achieved or very natural and convincing enhancements to real-world sounds. All of this can be done quickly and with little effort. If this isn't enough to whet your appetite, effects changes can be recalled by the automation.

### CHANNEL SURFING

The 03D can be used to remote control MIDI functions on an external kit. Templates are included for Yamaha 01, 03D, and 02R digital mixers, Rev 500 and ProR3 effects, XG or General MIDI tone generators, and Digidesign Pro Tools. Other MIDI devices can be controlled with user-definable MIDI commands operated with the 03D's faders and On buttons.

Channels 1–16 are analog inputs with 20-bit linear 64x oversampling converters. Channels 17–24 are digital inputs type dependent on which optional YDGAI card you have installed. The stereo input can be either analog or AES digital. There is an additional unbalanced 2-track analog input for monitoring purposes.

Channels 1 and 2 have unbalanced inserts on 1/4-inch stereo jacks following the usual tip-send, ring-return convention. Channels 1–8 have XLR and jack balanced inputs, switchable 48 V phantom powering, and gain variable from –16 to –60 dB with an additional 24-dB pad. Channels 9–16 and the analog stereo input have balanced jacks and a gain range of +10 dB to –20 dB. Adjacent odd and even channels from 1–24 can be paired for stereo, as can busses and auxes.

All input channels can be phase reversed, and they all have a maximum of 200 ms delay available, usable as delay, echo or slap echo. This delay can be used to compensate for mic placement or simply as an effect.

There is an On button associated with each channel that functions as a mute and is also used when selecting solos, while the Select button calls the assignable controls attention to the channel. The fader controls Aux and Effect send levels, as well as input, depending on status. Aux and Effects sends can be pre- or postfader.

Most channel settings (other than EQ


World Radio History

and Dynamics, analog gain and pad) can be stored in one of 49 user memories and recalled or copied from one channel to any other equivalent channel, similarly aux, bus outs, stereo out, and effects returns settings can be stored and recalled to their respective sections.

**DUE PROCESSORS**

If you run out of dynamics on the 03D, I would be very surprised. Processors are available on all input channels, the stereo output, aux sends, onboard effects returns and the four main bus outs. There are 40 presets and 40 user memories. The key here, as with many other aspects of the 03D, is flexibility. The dynamics can be triggered in any of four ways: the program signal Post EQ or Pre EQ, Aux 1 or 2 out Pre EQ, or by any other mono channel or either the left or right leg of the stereo channel. In use, the dynamics have the kind of surgical precision that only high-quality digital devices supply. Unless you want to hear them working, you don't have to — they simply solve problems and let you concentrate on what you are trying to do. All the usual favorites are available: soft or hard-knee compression, gating, expansion, limiting and ducking. If you want to get your hands dirty, it is trivial to set up your own parameters and store them in a user memory.

EQ follows the dynamics philosophy, and wherever there are dynamics available, there is also an equalizer. There are four bands each with 18 dB of boost and cut, frequency variable 21 Hz–20.1 kHz, and Q 0.1–10. The low and high bands can be used as shelves or HP-LP filters, respectively. There is EQ in-out switching and an attenuator on the input so if you want to apply ludicrous amounts of boost, you can do so without overshoot. The EQ page has meters so you can see what is going on, including gain reduction if there are dynamics in the path. As with the dynamics, there are 40 preset programs and 40 user memories. Settings can be also be copied between channels.

Without previous experience of this degree of assignability, I had thought the lack of at least one knob per band would prove frustrating. In practice, it becomes second nature to use the access buttons and parameter wheel and, if anything, it can be quicker than discrete controls.

The main stereo output is available on XLRs in analog and as S/PDIF and AES-EBU digital. The analog Stereo Out and Monitor Out have 20-bit 8x oversampling D/As, while the bus outs have 18-bit D/As. The four bus and four aux outs are available in analog on balanced 1/4-inch jacks, or in digital via the optional YGDAI card, which alternatively carries channel direct outs selected from channels 1–16. The AES-EBU and YGDAI ports output 24-bit wordlength. Dither is provided to reduce this gracefully to anything down to 16 bits independently on each output. There are two unbalanced analog outs which can be either Stereo Out or Bus 1 and 2 Outs.

Delay of up to 45.4 ms (at 44.1 kHz) can be applied independently to the bus outs and Stereo Out, which should come in handy for sound-reinforcement applications, although the delay could be more generous here since this is only equivalent to a maximum of around 15 meters from source.

There is comprehensive monitoring for stereo or mono via the Monitor Outputs and Phones socket via the Solo Setup button. There are three Solo modes: Recording Solo, where the solo bus feeds the monitor out (nondestructive to the main Stereo Out); Mixdown Solo, where the stereo out is connected to the monitor bus destructively; and SIP, which routes the solo bus to the monitor output. These selections are further modified by solo safes and PFL, AFL, or Fad-

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# *Focusrite* Green Series

This cost-effective series of processors makes it possible — and smart — to put a Focusrite in your studio

**BY ZENON SCHOEPE**

Such a buzz has accompanied the arrival of the Green series of processors — mainly because they promise ordinary folk the kudos of being able to screw the Focusrite name into their outboard racks.

The Focus EQ and the Voicebox are targeted to a purpose that none of the company's other boxes are — they are ideal single channels for going direct to tape. If you use a lot of MIDI gear, but still need a high-quality and adaptable path for real sources like mics and electric instruments, the

## EQ LAB REPORT

**MANUFACTURER:** Focusrite Audio Engineering, Ltd., UK; distributed by Group One, Ltd., 80 Sea Lane, Farmingdale, NY. Tel: 516-249-1399 (East); 310-656-2521 (West). E-mail: sales@g1ltd.com. Web: http://www.focusrite.com

**APPLICATION:** Project and commercial studios, post, live sound.

**SUMMARY:** High-quality dual-mic preamp; single channel 4-band EQ with high- and low-pass filters; mic preamp and line- and instrument-level inputs; single-channel voice processor combining mic preamp, expander, compressor, de-esser, and 3-band EQ.

**STRENGTHS:** Extremely cost effective; outstanding performance; Focus EQ and Voicebox are powerful and very useful.

**WEAKNESSES:** Focus EQ and Voicebox are single channel; Focus EQ instrument input is on rear panel; cosmetics may not be to everyone's taste, but what ever is?

**PRICE:** Dual-mic preamp, $1099; EQ, $1249; Voicebox, $1349 **EQ FREE LIT. #:** 132



World Radio History

Focus EQ has an instrument input.

Visually, the Green series might not be to everyone's taste, but they certainly look different. Some of the cutouts around the processing sections make reading the settings a little difficult; more significantly, none of the pot caps actually pointed to 12 noon when detented.

All the units share the same mic preamp as the Dual Preamp unit and all have XLR connectors for inputs and output with jacks sockets used for a rear-panel instrument input on the Focus EQ for stereo linking the compressor and de-esser sections in the Voicebox and for remote muting on the Dual Preamp and Voicebox.

The Dual Mic Preamp has a gain pot (around 60 dB) and switchable phantom power, phase reverse, and a 75 Hz high-pass filter, all with LED indicators. There's also an overload LED on the Dual Preamp and Voicebox, and LEDs that indicate external muting and manual mute buttons.

## FOCUS EQ

EQ is arguably what Focusrite is most famous for, and this box delivers with a single channel of 4-band with high- and low-pass filters and handles mic, line, and instrument inputs selected by switch with an associated ±12 dB input trim pot.

EQ and filters can be switched into circuit separately, the latter sweeping 10–320 Hz and 4.7-30 kHz. You're then into four ±18 dB bands with sweepable 30–470 Hz LF and 3–18 kHz HF shelves that can also be individually switched to peaking response. The two mids are fully parametric, with Qs variable from 0.3 to 1.8, and feature x3 multiplier switches to cover 40 Hz–1.2 kHz and 600 Hz–18 kHz. It's wrapped up by an output level pot and overload LED.

## VOICEBOX

Fitted with an output level pot and overload LED, the Voicebox combines an expander, compressor, de-esser, and EQ. The expander works on a single threshold pot, while the compressor has fully variable threshold, ratio, and make-up gain pots plus an Auto Release switch that takes over from the default setting (optimized, we are told, for vocals). The section can be bypassed and switched to read gain reduction on the VU reading input level bargraph-style meter by a novel single-dot display.

A De-esser section, which can be bypassed, has continuously variable threshold and frequency range pots, and is followed by three bands of bypassable ±18 dB EQ with sweepable LF (100 Hz–1 kHz) and HF (1–10 kHz) shelves, and a switchable broad or notch peaked swept mid operating over 600 Hz–6 kHz.

## IMPRESSIONS

All units have wonderfully clean and quiet mic preamps, and while there's little more to say about the Dual Preamp, the other units build on this. The instrument input on the Focus EQ is nice and open, true to guitar tone, and good on bass. You've got to, however, wind back on the input level if you intend to use a lot of EQ, as it's a touch on the hot side.

The unit's filters are excellent, while the 4-band's bottom end control is exquisite with an elegant difference between shelf and peaking curves at ultra low settings. Mids can be subtle with a just a twist either side of zero over what are wide and sensibly divided frequency ranges that still have enough overlap to stack a broad band on a notch if you need to.

The Voicebox's 3-band arrangement is predictably less impressive, but still has enough to make a cheap mic sound more substantial and to lift the character out of an expensive one.

The compressor is great, and the two release settings are different enough to be useful. It's a very classic sounding section, and possibly the best feature of the Voicebox. The expander is simple, click-free, and hard to fool, and the de-esser works fine.

I'm tempted to suggest that the various sections included in these boxes could be presented in different combinations, but it's likely that Focusrite is already thinking of this. Whatever it does, it ought to include instrument level inputs as a point of principle.

These boxes are excellent. Don't entertain any suspicions that they are in some way sonically inferior to other units with the Focusrite badge, because the trade-off is just in ergonomics and the fact that the processors are single channel.

Judge them against what is available anywhere else for the money, as I believe they score highly. And most people thought Focusrite couldn't build boxes at this sort of price. Solid, reliable, and classy performance. Try them. EQ


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# Peavey CS 800S *Power Amplifier*

The model name may seem familiar, but this version has been completely redesigned for a variety of uses

**BY WADE MCGREGOR**

By model name, the new CS 800S from Peavey — well known for its robust power amplifiers — sounds like just a mere update to its popular CS 800X power amp. It's not. This new amp has been redesigned from the ground up, providing better audio performance in less rack space. The internal construction of the unit is clean and appears very roadworthy, with a modular design approach that can simplify field service. But wait, there's more...

First, the CS 800S, because of its switching power supply, is smaller and much lighter (23.5 lb.) than its predecessor. The switching power supply also significantly reduces the hum field produced by the power transformer. This allows devices such as active crossovers and equalizers to be installed in adjacent rack spaces without the typical hum-induction problems of conventional power supplies.

Furthermore, audio improvements include more power at very low impedances (<4 ohms) and a damping factor at low frequencies in excess of 1000. This is due to the new output section design that has a significantly lower impedance than the previous CS 800. This improvement is especially important for powering bass and subbass loudspeakers, which often are very low impedance loads that require the amp to control multiple drivers running in parallel.

Listening tests revealed a fine-sounding amplifier that stands up when compared to other sound-reinforcement and studio amps. The cooling fan noise is inaudible except in very quiet surroundings and, therefore, may only be a limitation when using the unit in very quiet studio monitoring applications. This fan varies its speed in almost direct relation to the output level, allowing even the noisier high-speed mode to be masked by the typically louder sound from the loudspeakers. (This is unlike many variable-speed amplifier fans that don't slow down again for some time after the signal level has been reduced, thereby making their presence known.)

The amp is clean and quiet and adds little to the audio signal, except gain. With a transient power capability of up to 1700 watts, the CS 800S offers sufficient power for common loudspeaker loads down to two

## EQ LAB REPORT

**MANUFACTURER:** Peavey Electronics Corporation, 711 A Street, Meridian, MS 39301. Tel: 601-483-5365. Web: www.peavey.com

**APPLICATIONS:** A power amplifier designed for sound reinforcement and studio monitoring.

**SUMMARY:** An efficient and versatile power amplifier that can reduce the weight and complexity of many sound-reinforcement systems.

**STRENGTHS:** Solid construction; 1200 watts (@ 4 ohms bridged-mono) in a 2U case weighing 23 lb.; good protection circuitry; very practical input/output modules.

**WEAKNESSES:** Boring black finish; modules don't fit neatly.

**PRICE:** $899.99 **EQ FREE LIT. #:** 133


World Radio History

## MANUFACTURER'S SPECIFICATIONS

**Maximum Output Power at 1% THD:**

*Bridged-mono mode*
840 W at 8 ohms
1200 W at 4 ohms

*Stereo mode with both channels driven*
260 W at 8 ohms
420 W/ch at 4 ohms
600 W/ch at 2 ohms

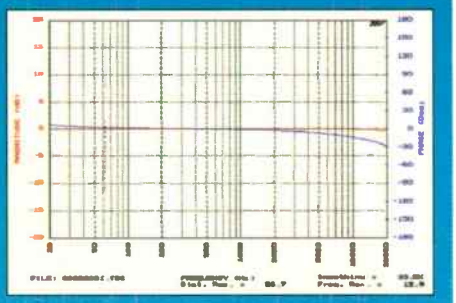

FIGURE 1: Peavey CS 800S frequency (red) and phase (blue) response.

**Continuous Average Output Power:**
*Stereo mode with both channels driven*
400 W/ch <0.03% THD at 4 ohms
240 W/ch <0.02% THD at 8 ohms

**Voltage Gain:** 29 dB at 1 kHz into 4-ohm load (stereo mode); 35 dB at 1 kHz into 4-ohm load (bridged-mono mode)

**Power Bandwidth:** 10 Hz-50 kHz (+0, -3 dB)

**Frequency Response (stereo mode — both channels driven):** 3 Hz–60 kHz (+0, –1 dB)

**Distortion:** <0.03% at 4 ohms 10 Hz to 20 kHz

**Noise (stereo mode — both channels driven):** 100 dB below rated output at 4 ohms

**Damping Factor (stereo mode — both channels driven):** >1000 at 100 Hz with 4-ohm load

**Size:** 3.5" (H) X 19" (W) X 17" (D) or 89 mm (H) X 483 mm (W) X 432 mm (D)

**Weight:** 23.5 lb. (10.7 kg.)

ohms. The frequency response is flat throughout the audio band and the phase response is also relatively good (see fig. 1), but, as might be expected, not as flat as some high-end studio amplifiers. [The CS 800S was designed for the SR environment.] The protection circuitry is unobtrusive until the amp reaches clipping and then efficiently goes to work to ensure that clipping is not going to blow up the compression drivers.

The DDT™ (Dynamic Distortion Threshold) compression circuit, while less audible than some clipping protection circuits, should still be able to audibly alert the aware sound system tech that the system has reached its limits. The circuit senses the onset of clipping and reduces the gain in relation to the waveform rather than simply hitting a threshold value, thus allowing the user to use every last watt. When the DDT indicator on the front panel begins to illuminate, however, distortion is audible on some (especially percussive) program material. With solo piano the protection is fairly obvious (hey, buy more efficient loudspeakers or turn down that piano), but DDT is quite subtle on the sound of a band playing flat out.

While the CS 800S's front panel has a minimum of indications, it provides adequate information to the informed user (that is, someone who has read the owner's manual). The large input level controls provide positive indication of the input sensitivity. Above these controls are two Power indicators that display the amplifier's status, including standby mode (during power up), protection mode, and bridged-mono mode. Above these indicators are two yellow LEDs that display the activation of the DDT overload protection circuitry. A beefy, recessed Power switch completes the front-panel controls.

A very industrial-looking screen covers the two front-panel air exhausts for the fan cooling, but the two fans are mounted on the rear panels where their modest noise is even less obvious. The rear panel also includes recessed switches that disable the DDT overload protection and switch the unit between stereo mode and bridged-mono mode. The detachable, IEC-type power cable allows the amp to be removed from the rack without dismantling the cable harness.

The CS 800S includes modular

*continued on page 137*

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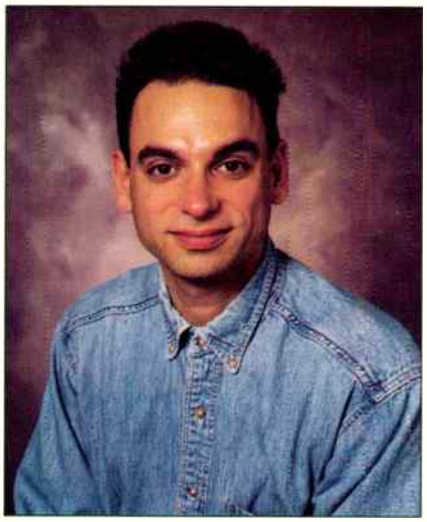
# *The Jammed* Sessions

## How to get out of (tape) jams and other helpful hints

**BY EDDIE CILETTI**



Yes, it's time again to share some digital tape machine tips. First, though, please note that I have updated my World Wide Web site (www.tangible-technology.com) with more information about digital tape machines "and other stuff" from past *EQ* articles. In the process of creating links to related sites I discovered that Craig Anderton has a presence at the Alesis site (www.alesis.com/alesis/cc/index.html).

Another good source for digital tape machine information can be found in TASCAM's faxback service (800-827-2268). Their "index" numerically lists documents about past, present, and future products, and includes new features available through software updates. If you've got a heap of old *EQ*s sitting around your house, see the sidebar for a list of some back issues on tape machines.

### PUMP UP THE JAMS

One recent week in June was particularly unusual: five jammed tapes and one formerly happy-go-lucky machine gone awry. It was unusual because a deck that snags a tape like a dog with a favorite chew-toy usually gives some advance warning. The first time 'round there is *maybe* a 30-percent chance that either the tape or the shell is at fault. Sometimes little pieces of the plastic shell can break off and get lodged in the mechanism. No matter what the cause, don't ignore the hint. It's service time.

Make a point to regularly check the error rate — especially after formatting a new tape. If you've gone three years or 500-plus hours without a glitch, don't wait for distortion. Once the error light is on, it's too late.

### HOW TO REMOVE JAMMED TAPES

The best way to free a magnetic hostage is through careful negotiation, not by prying the tape or the loading mechanism with a penknife. Don't laugh. I've even had customers get blood on the head drum. More damage is done to tapes and mechanisms by over-anxious users than by momentarily crazed machines. If the tape is really important to you, have a tech pro remove it. My policy is to remove tapes for free provided the customer leaves the machine for service.

Before your machine ever gets the munchies, pop its cover and observe how the cassette is first loaded, then the tape is pulled from the shell and threaded around the head drum. Loading and threading are two separate processes. Often you may be able to unload the cassette, but the tape will still be wrapped around the head.

*Note: It is good practice to leave a five-minute pad at both ends of a tape in the event that a tapedectomy is required. Though illegal in some states, a tapedectomy is allowed in cases where the life of the studio owner/engineer and/or machine is at risk.*

Machines that allow manual manipulation of the loading mechanism are: the TASCAM DA-30 and DA-30 mkII, blackfaced ADATs and XTs, all Panasonic tabletops except the SV-3500, and some Sony machines. Only Alesis machines allow easy access to both the threading and ejecting mechanisms.

For all machines, first determine if the deck is "frozen" or simply can't/won't eject the tape. If possible, wind to the head or the tail so that only the least important part of the tape is exposed to potential damage.

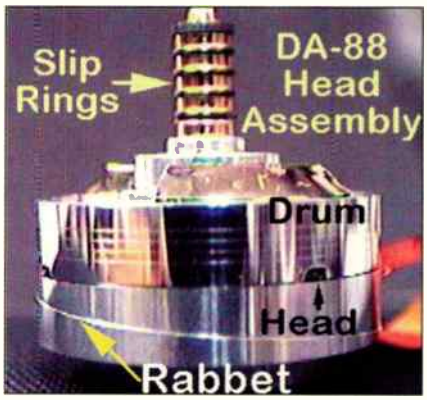



FIGURE 1: DA-88 Head Assembly

### THE EXCEPTION

TASCAM's DA-38/88 mechanism is programmed to halt at the first sign of trouble. Repowering clears error messages (for many machines). If so, eject first, then try a noncritical tape. DA-88 load mechanisms can't be manually manipulated, but users can enter Test mode by simultaneously pressing FF, STOP, and PLAY on power-up and then immediately pressing STOP. ("Test" should appear in the display. No message means try again, and "Hung Servo" means fageddaboudit.) After the VU meter message antics are over, press Eject. If nothing happens, go to the nearest repair facility.

*More Notes: Once in Test mode, pressing the Remote switch turns meters 1 & 2 into an error-rate display for the A & B heads, respectively. Don't leave the machine in Test mode.*

### EQ BACK ISSUES

Some back-issues of *EQ* featuring specific articles on tape machines:

| EQ ISSUE | SUBJECT |
|---|---|
| May 1995 | DAT |
| August 1995 | Digital Tape, Part 1 |
| September 1995 | Digital Tape, Part 2 |
| January 1996 | Hidden Features and Error Messages |
| October 1996 | "Quiet" Modifications |
| December 1996 | Manual Head Cleaning |

This information (and links to other sites) is also available at: www.tangible-technology.com.



World Radio History

**RELAX**

There's not enough room here to provide extraction details for each machine. That will be saved for a future article. Massaging the machine into coughing up your master means you won the battle, not the war. If a broken piece of cassette shell caused the problem in the first place, it must be found and removed before it does further damage. Unfortunately, the other source of transport problems is a defective "Mode" or "Load" switch. Both are responsible for status reports back to the microprocessor. These are not user-serviceable parts.

**HEAD CLEANING FACT**

Head cleaning is not a panacea — not even manual cleaning [vs. a cleaning tape] solves all problems. The following tips will help keep you on higher ground, but eventually you may end up in the valley of the rabbet. ("Rabbet" is not misspelled. See below.)

- Wind tapes end-to-end before use. (I stole this tip from Craig Anderton!)
- Know how to call up the error-rate display.
- If the machine does not have an error-rate display, call the manufacturer and ask, "Why?"
- Learn how to manually clean the heads.
- Use a cleaning tape only after determining that the error rate is high, but no more frequently than every 50 hours. Each use of a cleaning tape reduces head life by five hours.
- Do not use a cleaning tape more than twice in one trouble period.
- For stubborn problems, try a different brand or batch of tape.

**GETTING TO KNOW THE RABBET**

The "Rabbet" is a mechanical ledge on which the lower edge of tape travels as it passes around the rotary head assembly (see fig. 1). Neither cleaning tapes nor manual labor can remove debris that collects on this "bunny." Don't lose your recording head to a momentary judgment lapse of your human head. (Translation: Only squirrels go nuts with cleaning tapes.)

I am not going to tell you how to clean the rabbet — it's curds and whey dangerous — but fig. 2 shows how dirt can "pinch" the tape and reduce signal output to the point where DSP can no longer reconstruct the audio data. Please don't experiment at home, kids.

Once wrapped around the DA-38/88 head assembly, each swipe of the head lays down (in this order) timecode, tracks 1 & 2, 3 & 4, the Automatic Tracking Frequencies (ATF), tracks 5 & 6, and 7 & 8. Arrows point to places in the RF envelope where Rabbet dirt reduced signal output. Note that only half the waveform is shown (tracks 5 & 6 and 7 & 8 would be to the right).

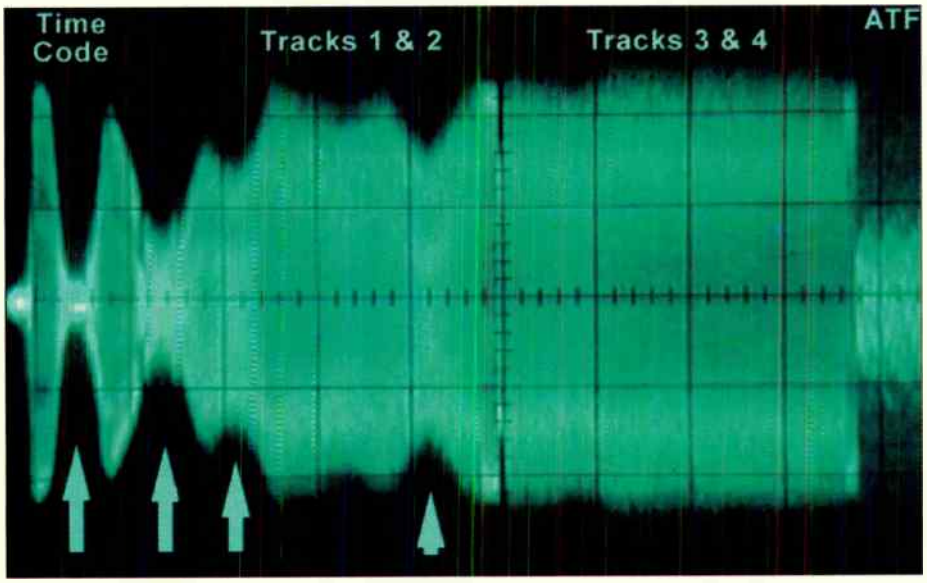



FIGURE 2: How a dirty Rabbet affects RF output (the signal from tape)

Signs that DA-88 rabbet is clogged or that heads are worn:

- Timecode will "stutter" in fast wind mode.
- Tracks 1 and 2 will have intermittent or noticeable distortion.
- The error LED will be illuminated. EQ


Warning.

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CIRCLE 24 ON FREE INFO CARD




World Radio History

# *Get* **Involved!**

PHOTO BY STEVE JENNINGS

## How a project studio owner with a computer may influence the standardization of audio on the Internet

**BY JON LUINI AND ALLEN WHITMAN**

You are a creative person. You can focus — for hours at a time — on your music, in your studio, to the exclusion of all else. The creative process is better than football, better than parties, and better, almost, than sex. Even deeply focused people must come up for air, though, and find out what's influencing the artistic atmosphere in which they breathe.

In this month's column, we touch on the organized players who have a stake in the way music is made, stored, transmitted, marketed, and commercialized on the Internet. And how you can add your voice to a community that actually welcomes input.

The Web is a loose, hybrid structure of interrelated elements. Often, however, it appears that the system works only when the stars are aligned. Upon this celebrated, hypothetical, celestial convergence, the angelic choirs sing and millions of dollars get deposited in your name into a bank account on the island of Grand Cayman. Is that why you stay up so late, agonizing over the placement of a quarter note? Get out of the music business now! Go do something where you are guaranteed a huge profit or a quick end to suffering, like arms dealing.

Using the Internet for getting your music heard involves becoming active and involved in a fresh and constantly morphing playground. Meet some of your playmates.

These high-profile groups can be arranged on a loose framework of tech companies and their trade groups, the "record" labels and their trade groups, the transmission group (telcos and satellite companies), the collection societies (SESAC, BMI, ASCAP, etc.), and you, the artist (or, in the jargon of this baby industry, "content creator"). We place you, dear artist, last in this list to most bluntly show you how the music industry thinks of you when they are deciding how best to position themselves to get what they want.

The FezGuys know that you, the artist, are the reason they exist. We encourage you to take responsibility for that. So here's who they are, their apparent public position, and the beginning of a dialogue that asks the musical question: "Where, oh where, can my little dog be...oh where, oh where can it be?" Sing along with us.

### THE TECH COMPANIES

Audioactive
Headspace
Liquid Audio
Microsoft NetShow
Progressive Networks (RealAudio)
Shockwave
Xing

These are the some of the tool providers for the artist painting on the canvas of the World Wide Web. All of these companies have slightly different kinds of tools and each is scrambling to be the technology standard for audio distribution on the Internet. Next month we will closely examine the subtle differences between these companies.

Supporting the tech community are several trade groups, including the AES (about which much has been said elsewhere in this magazine) and the International Webcasters Association (IWA). By being involved in these surprisingly democratic organizations, the artist opens up to a free exchange of useful information about his or her community and the opportunity to participate in its ongoing creation. We're not just whistling "Dixie" here, this Internet/audio industry is being born as you read

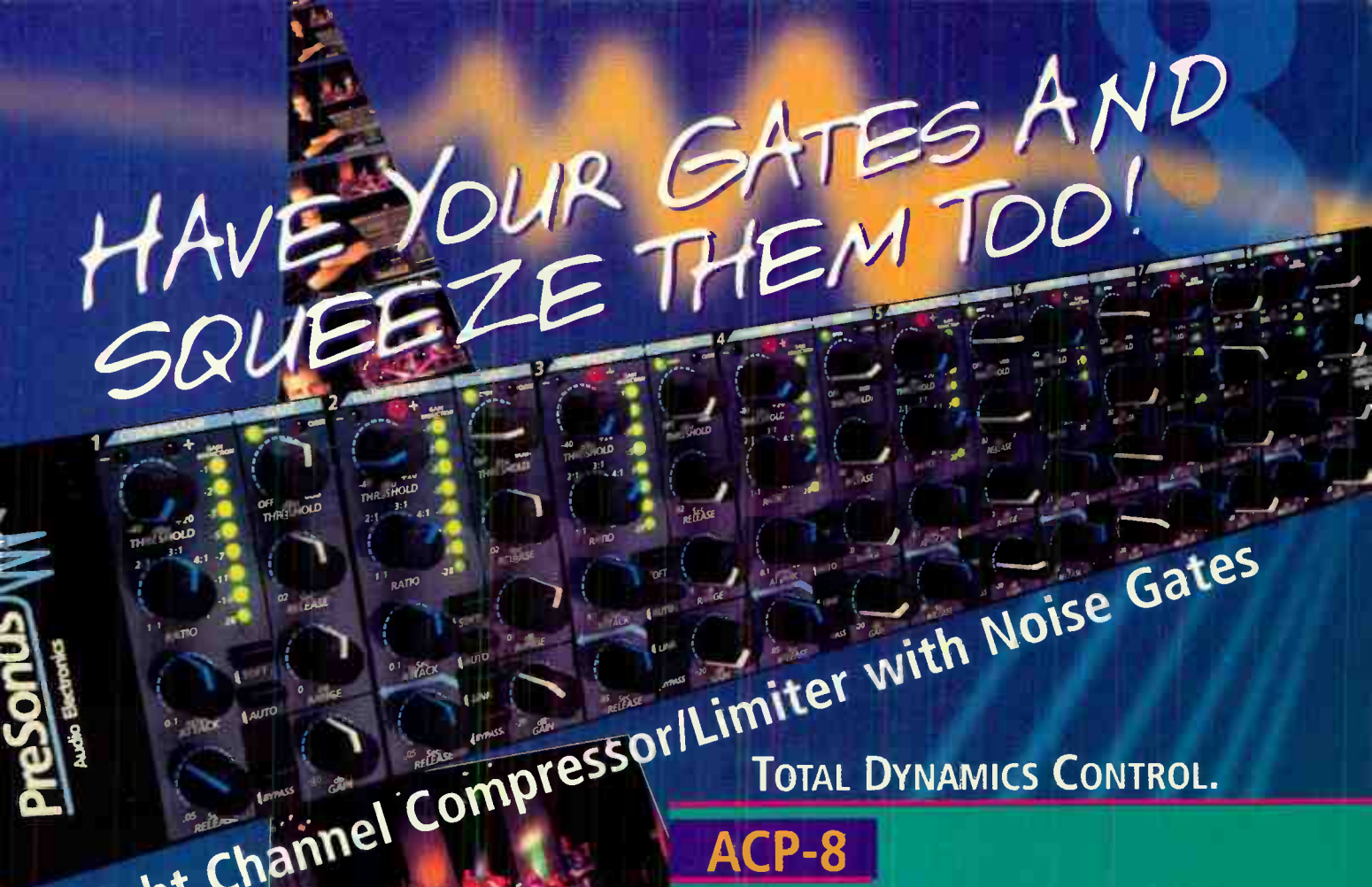
### THINGS THAT ARE NEW AND/OR USEFUL

**New:** Progressive Networks (RealAudio) is focusing its technological and marketing resources on video. Audioactive has redone its Web site (**www.audioactive.com**). Liquid Audio is aiming for an end of summer 2.0 release of its entire suite of tools (incorporating the ability to sell and track your music). Xing Streamworks 3.0 (optimized for MMX chips) should be out of beta now and into the market. (It uses the MPEG – Layer I audio codec, and the server supports PC, UNIX, LINUX, Solaris, and Windows/NT while the player works with all of the preceding plus Mac. The whole suite is backward compatible with its 2.0 version.)

**Useful:** A fast explanation of some copyright protection terminology for audio on the Internet, in this case: the difference between tagging and watermarking. In a nutshell: tagging is including copyright information (authorship, ownership, status of "right to use") within the header of the encoded audio file. Watermarking is placing this same information within the actual audio waveform (within the music) prior to encoding of that music into a digital file.


World Radio History

# HAVE YOUR GATES AND SQUEEZE THEM TOO!

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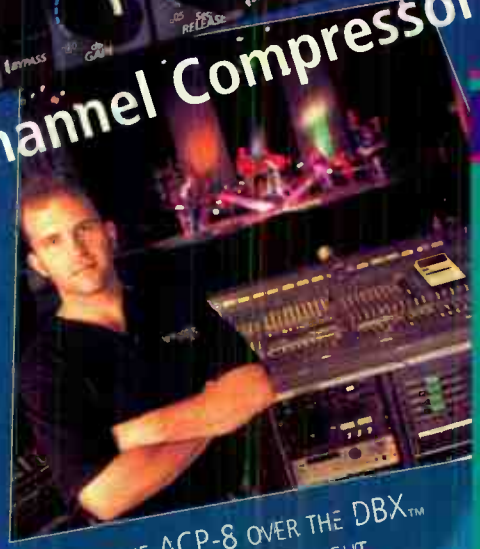

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CIRCLE 43 ON FREE INFO CARD

## A MEETING OF SOME MINDS

We recently attended the 14th international AES conference called: "internetaudio.aes.org." Clever, no? During the course of many meetings and discussion groups, the FezGuys took note of the core level of interest and excitement generated by most of the attendees. It seems that the audio community is being knocked on its proverbial ear by the explosion of new technologies. Everyone wants to play, and it is interesting to observe that the contribution of the artist is made conspicuous by its absence in these proceedings. Still, much information was exchanged and much support sought and received.

Among the "experience bites" of the three-day event were: an eighth-grade level explanation (with pie charts) of how ASCAP does business, presented by a man in a black buttondown shirt and very expensive shoes; the consistent hardware and software problems with every observed demonstration using a laptop (of any variety); lost keys; beautiful weather; charming German MPEG scientists ("one percent packet loss is UNACCEPTABLE") carefully explaining the often incomprehensible physics of psychoacoustics ("it sounds like someone scraping glass under water"); inappropriate and time-monopolizing (but impassioned) corporate plugs for Web Radio stations during technical meetings; rampant networking; lattice filters; Bessler membranes; vectors of frequency co-efficients; and, accepting the award for most unclear on the concept, the flow chart showing a state-of-the-art multimedia production studio that used a Mac Classic icon to represent the workstation itself. Second prize goes to the representative of Microsoft who began his demonstration of NetShow in front of a roomful of audio engineers by stating (in a remarkable display of hubris): "This is where Microsoft is taking broadcast technology." When asked, by your correspondents, to make a comment on the conference, an audio engineer (employed by Dolby Laboratories) was heard to state boldly: "I think everyone here is very happy."

Serendipitously, during the flight back home, a conversation was had with a lawyer responsible for negotiating international rights surrounding Lockheed/Martin's placement of a network of five satellites in geosynchronous orbit, operating in the K band, for the purposes of data transmission (read: Internet). He predicts that, in five years, one little antenna outside a window is all you'll need for high-bandwidth connectivity. Asked if he could be more vague, he pointed to his kids who were playing with a handheld Chinese Tamagotchi analog called a "GigaPet." The landing was uneventful.

this. Now is a good time to make your feelings known.

### THE TRANSMISSION COMPANIES

Delivery and Connectivity: we gotta drive to town (or take the train), and somebody maintains the roads and tracks. The transmission companies own (or lease) this info turnpike. Tolls are charged and access is limited. Satellite and telephone companies play for huge money stakes of which data transmission of audio on the Internet is a small part, monetarily, but a big part in showing up the limitations of the existing network. Streaming media is causing traffic jams on systems designed to carry voice transmission. Since most publicly held companies of this size are interested in the quarterly statement (instead of long-term common-sense), their profit motive drives policy. For example: in America, PacBell and Bell Atlantic have gone to court to get permission to charge local ISPs around the country to receive calls from their subscribers (as with cell phones). It's interesting to note that some of these telcos also have subsidiary companies who are ISPs themselves, and you can imagine there's likely to be some perks for them by playing both sides of the fence. Result: Baby Bell ISPs can put other ISPs out of business by ensuring the lowest fees. These telephone companies want to be your one and only ISP. A monopoly is a monopoly is a monopoly....

### THE COLLECTION SOCIETIES

The name says it all. If you are under contract to one of these self-described "collection societies" (BMI, ASCAP, SESAC, and others), they promise to aggressively extract payment from anyone that plays your song in a profit-oriented environment and they will make sure that you get some of that money. Their business model and its methods are based on a distribution technology and an arts culture that is half a century out of date. They need a new approach if they are to survive and be useful in the medium of the Internet. One that goes beyond merely protecting their special interests. The collection society is where artistic expression comes to a grinding halt. Think of the Girl Scouts paying a fee for the right to sing their own theme song.

### THE LABELS

Traditionally the most visible element of the music business community, the six major labels seem to be adopting a wait-and-see approach to the commerce of music on the Internet. Maybe they don't want to offend their traditional distribution arms. Hey, if the system works, why change it? The label support group, the Recording Industry Association of America (RIAA), is howling about Internet piracy and furiously waving the American flag. Yes, piracy exists. It's not that big a problem, gang.

If one looks at the real-world figures, one realizes that the statistic of retail sales dollars lost to piracy is a fantasy number. There is no way to measure and calculate such a figure. Are bootleg CDs in your face like the latest album from U2? No. And they never will be. Keeping our attention focused on such fabrications blurs the urgency of actual reforms hinted at by the creative use of Internet-related technologies. Lower costs, closer contact with an artist, simpler promotion, and the ability to choose between many different musical voices instead of (mostly) profit-oriented "product" are possible here. Time to stop covering your collective asses, dear "record" labels, and take some artistic chances.

### YOU

The major player in the micro-universe of audio on the Internet is you, the artist. It is the music you make that tosses a pebble in a pond making ripples that lap far shores. The above-mentioned organizations and groups want to help you get your wave to that shore, and they all have a different way of seeing themselves do that.

*continued on page 137*



World Radio History

# reality™

## Professional Software Synthesis

# You deserve professional results...

...and Reality delivers with more synthesis power than any other synth. Period. Reality gives you the power of at least $10,000 worth of professional synthesizers all for the price of a software program.

Physical Modeling with WaveGuide synthesis, Subtractive "analog" synthesis (big and fat), FM (with filters and PCM modulators), full Sampling (PCM) capabilities, and Modal Synthesis (something new!) all available simultaneously, at multiple sample rates, and without delay. Reality offers real-time MIDI response. Each voice can use up to four oscillators, four dynamic multi-mode filters, four multi-stage looping envelopes, and four complex LFOs, all working in concert with an extensive modulation matrix allowing you phenomenal control of Reality's powerful voice architecture. And no more looking at tiny LCD screens! Throw in reverb, fully adjustable chorus, digital output, 64-note polyphony and 80 bit internal audio processing and you are ready to reap the rewards Reality has to offer.

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"Reality is a groundbreaking product. I'll definitely be recommending it to anyone who will listen to me rant!"

*—Craig Anderton*
*Author/Musician*

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*—Dr. Richard Boulanger*
*Professor,*
*Music Synthesis Department*
*Berklee College of Music*

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Reality™ is available directly from Seer Systems in North America and in retail stores throughout the rest of the world.

World Radio History

# EQ SHOPPER


## CD-Recordable Technology for the Audio Professional

Featuring: PlayWrite 2X, 4X CD-R Systems (supported by MasterList CD) bundled with *Red Roaster* editing software.

*Red Roaster is the first Windows based package that edits PQ subcodes and sets index/track numbers, pause, start time and emphasis.*

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CIRCLE 35 ON INFO CARD

## Sound Advice

| | |
|---|---|
| Rick Chertoff | Ray Benson |
| Joan Osborne | Ray Kennedy |
| William Wittman | Steve Earle |
| Too Much Joy | Willy DeVille |
| Cyndi Lauper | The Steve Miller Band |
| Butch Vig | Asleep At The Wheel |
| Soul Asylum | John Cale |
| Garbage | Freedy Johnston |
| John Siket | Audioforce |
| Sonic Youth | Millbrook Sound |
| The Dave Matthews Band | Bearsville Studios |
| Tom Jung | Justin Niebank |
| The Roches | Martin Brass |
| Boonshoft Vintage Rentals | Freddy Jones Band |
| Mark Egan | Stuart Sullivan |
| John Scofield | Bob Mould |
| Royaltone Studios | Appaloosa Sound |
| Stewart Lerman | Kevin Beamish |
| Joe Chiccarelli | Dave Thoener |
| John Agnello | Bon Jovi |

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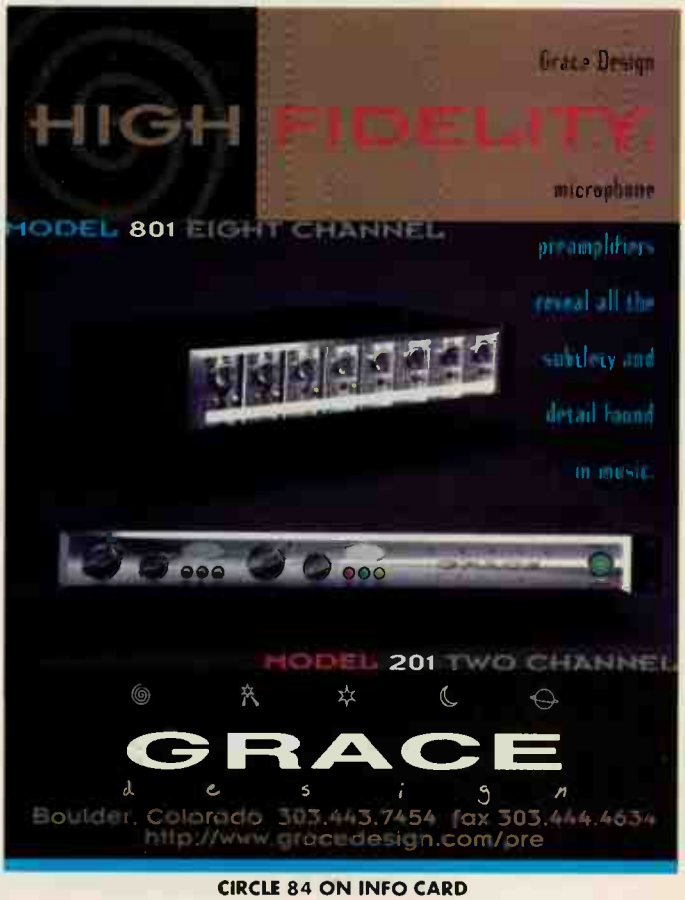
CIRCLE 22 ON INFO CARD



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## GET SERIOUS!

It takes a lot of hard work to create an audio masterpiece. Rocksonics professional audio tools can make the job a whole lot easier. Whether you need an "Xtra Hand" to automate a mix or a Multi-Band Compressor to fine tune your master, Rocksonics has the tool for the job.

*DRP-2a Stereo Dynamic Range Processor*

*MVCA-4 Xtra Hand MIDI Controlled Quad VCA*

*PL-2 Dual/Stereo Peak Limiter*

*MB-3X Multi-Band Stereo Compressor*

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World Radio History

# EQ SHOPPER

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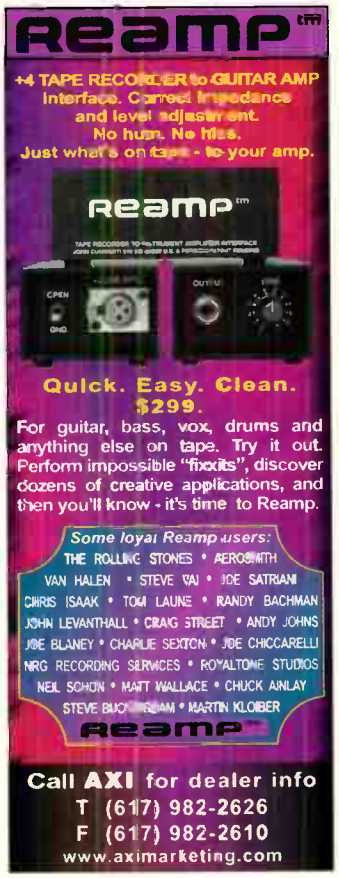


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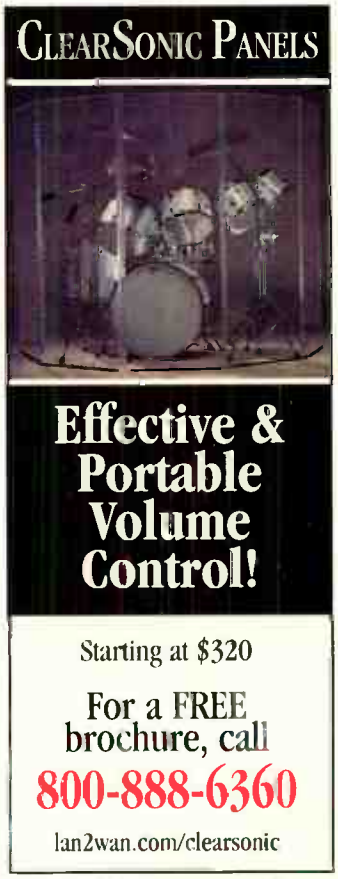
CIRCLE 6 ON INFO CARD

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## HARD DISK RECORDING

digidesign — A Division of Avid Technology, Inc.

### ProTools Project™
**Digital Audio Workstation for Macintosh**

With Pro Tools Project you get 8 tracks of digital audio &, on some Power Mac systems, up to 16 tracks of playback & 64 virtual tracks! The Pro Tools Project system includes an audio card as well as award winning Pro Tools software. You choose either an 888 or an 882 I/O to complete the package. Project also features MIDI recording and playback as well as Quickpunch™ punch-on-the-fly & when your ready to ugrade, its ready too.

***REQUIRES–***
- Qualified NuBus or PCI Macintosh CPU
- Hard Drive, system software 7.1 or greater
- 24MB RAM minimum
- 14" monitor (17" recommended)

### ProTools 4.0 Software
**Digital Audio Software for Macintosh**

Pro Tools version 4.0 software provides the next step in the evolution of Digidesign's award-winning digital audio production software for the Mac. Fully Power Mac native, 4.0 features noticable improvements in every major area. ProControl™ support, improved automation features, realtime fader groupings & group nesting, plug in MIDI personality files, multiple edit play lists, Sound Designer II™ funcionality, Finder-style searching & sorting, and I'm out of breath.

### Session 8™
**Digital Audio Workstation for Windows**

Session 8 is a professional quality digital audio recording, editing, & mixing system created specifically for personal and project recording studios. Designed to operate with Windows 95 or Windows 3.1. Session 8 offers professional recording features, powerful random access editing, automated digital mixing, & unparalleled integration with most popular MIDI sequencers.

***FEATURES–***
- 8-channel direct to disk digital recording
- Random access, non-destructive editing
- Automated, intuitive digital mixing environment
- Built-in volume & pan automation
- Complete SMPTE frame rate support
- Frame accurate sync with built in .AVI video playback window
- Digital parametric EQ
- Support for multiple hard drive partitions
- Auto sample rate convert to 44.1 or 48 kHz mono .WAV file format
- Choice of audio interface options

### SOUNDSCAPE
**DIGITAL TECHNOLOGY LTD.**

### SSHRD-1
**Hard Disk Recorder/Editor**

A professional Multitrack Digital Audio Workstation, the SSHDR1 combines the highest quality processing hardware with easy-to-use Windows-based software. The most complete and affordable solution for high quality digital audio on the PC, the SSHDR1 has over 50 powerful editing tools and is expandable from 8 to 128 tracks, with up to 32 inputs and 64 outputs. Ideal for a wide range of applications ranging from project studios, to multi-unit 32, 48 and 64 track systems for major TV and film studios needing audio post production linked to video.

Version 2.0

**SSAC-1**
**Accelerator Card**

The new SSAC-1 is a DSP card that can be added to any existing SSHDR-1 system for faster processing as well as an additional 8 channels of I/O in the form of a TDIF port. This card is needed by anyone who wants to upgrade an existing system to V2.0.

**SS810-1**
**8 Channel I/O**

This rack mount unit connects to the SSAC-1 card via the expansion port to give you 8 XLR ins & outs with superb A/D-D/A conversion. It also features an ADAT Optical interface. The **SS810-D** comes without the analog converters for connecting an ADAT without additional channels.

## CD & CASSETTE DUPLICATION

### marantz
### CDR615 / CDR620
**Compact Disc Recorder**

Both next-generation stand-alone write-once CD recorders, the CDR615 & 620 offer built-in sample rate conversion, CD/DAT/MD/DCC sub-code conversion, and adjustable dB level sensing. Additional features include adjustable fade in/fade out, record mute time, & analog level automatic track incrmenting. A 9-pin parallel (GPI) port and headphone output with level control are also included.

**CDR620** ***Additional Features–***
- SCSI-II Port • XLR (AES/EBU) Digital In/Out and Digital cascading
- 2x speed recording • Index Recording and playing*
- Defeatable copy prohibit and emphasis • 34 key, 2-way wired remote (RC620)

*Available on CDR615 w/optional Wired Remote (RC620)

### Telex
### ACC2000/ACC4000
**Cassette Duplicators**

Designed for high performance & high production, Telex duplicators offer easy maintenance and operation. The **ACC2000** is a 2-channel mono duplicator while the **ACC4000** is stereo. Each produces 3 copies from a cassette master at 16x normal speed & by linking additional copy modules, you can duplicate up to 27 copies of a 60 minute original *in under two minutes.*

**ACC2000XL/ ACC4000XL**

The XL Series feature "Extended Life" cassette heads for increased performance and wear characteristics. They also offer improvements in wow and flutter, frequency response, S/N ratio & bias.

## STUDIO DAT RECORDERS

### SONY
### PCM-R500
NEW PRODUCT

Incorporating Sony's legendary high-reliability 4D.D. Mechanism, the PCM-R500 sets a new standard for professional DAT recorders. The Jog/Shuttle wheel offers outstanding operational ease while extensive interface options and multiple menu modes meet a wide range of application needs.

***FEATURES–***
- Set-up menu for preference selection. Use this menu for setting ID6, level sync threshold, date & more. Also selects error indicator.
- Includes 8-pin parallel & wireless remote controls
- SBM recording for improved S/N *(Sounds like 20bit)*
- Independent L/R recording levels
- Equipped with auto head cleaning for improved sound quality.

### TASCAM
### DA-20/DA-30mkII

- Multiple sampling rates (48, 44.1, and 32kHz).
- Extended (4-hour) play at 32kHz.
- S/PDIF Digital I/O, RCA Unbalanced In/Out.
- SCMS-free recording, Full function wireless remote.

***DA-30mkII Additional Features–***
- Variable speed shuttle wheel.
- Digital I/O featuring both AES/EBU and S/PDIF.
- XLR balanced and RCA unbalanced connections.
- SCMS-free recording with selectable ID.
- Parallel port for control I/O from external equipment.

### Panasonic.
### SV-3800/SV-4100

The SV-3800 & SV-4100 feature highly accurate and reliable transport mechanisms with search speeds of up to 400X normal. Both use 20-bit D/A converters to satisfy even the highest professional expectations. The **SV-4100** adds features such as instant start, program & cue assignment, enhanced system diagnostics, multiple digital interfaces and more.

### FOSTEX
### D-15

The new Fostex D-15 is the least expensive timecode DAT on the market. It has a host of new features aimed at audio post production and recording studio environments.

***FEATURES–***
- Chase mode functions built in
- Hold the peak reading on the digital bargraphs with a choice of 5 different settings
- Set cue levels and cue times
- Supports all frame rates including 30df
- Newly designed transport is faster and more efficient utilizing a 4-motor design. 120 minute tape shuttles in about 60 seconds.
- Parallel interface
- Front panel trim pots in addition to the level inputs

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## MICROPHONES

AKG

JUST IN

### C414B/ULS

A reputation for flawless performance & uncommon flexibility in the most demanding studio & concert sound applications.

- Dual 1" Gold-sputtered diaphrams.
- Flat on-axis response. • 126dB dynamic range.
- Switchable 10dB and 20dB pad. • 20Hz–20kHz.

CAD

### E-300

**Studio Condenser Microphone**

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

***Shown with optional ZM-1 Shockmount***

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

audio-technica.

### AT4050/CM5

**Cardioid Capacitor Microphone**

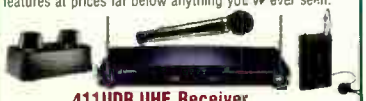
The AT4050 multi-pattern condenser expands upon the AT4033 to set the standard for studio performance mics.

- 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 consoles 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

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## PRO CASSETTE DECKS

### TASCAM
### 202 MKIII / 302

These decks provide high-fidelity sound reproduction and a wide frequency response, as well as a host of fediting & play back features.
- Dual Auto Reverse, Normal and high-speed dubbing.
- "Dolby HX Pro" extends high frequency performance and minimizes distortion.
- Auto sensing for Normal, Metal & CrO2 tape.
- Intro Check, Computerized Program Search, Blank Scan and One Program quickly find the beginning of tracks.

**302 *Advanced Features–***

The 302 is 2 independent decks, each with their own set of RCA connectors, transport control keys, auto-reverse, and noise reducing functions. Cascade and Control I/O let you link up to 10 additional machines for multiple dubbing or long rec & playback.

### 112MKII/112RMKII

A classic "no frills" production workhorse, the 112MKII is a 2-head, cost effective deck for musicians and production studios. It features a parallel port for external control and an optional balanced connector kit for integration into any production studio. The **112RMKII** features a 3-head transport with separate high performance record and playback heads as well as precision FG servo direct drive capstan motors.

## SIGNAL PROCESSING

### BEHRINGER
### MDX 2100 Composer

- Integrated Auto/Manual Compressor, Expander & Peak Limiter.
- Interactive Gain Control (IGC) combines a clipper and peak limiter for distortion-free limitation on signal peaks.
- Servo-balanced inputs & outputs are switchable between +4dB & -10dB. ***NEW LOW PRICE!***

### APHEX
### 107 Tubessence
#### 2 Channel Mic Preamp

The 107 delivers outstanding sonic performance, as well as a great degree of presence, detail, & image.
- Up to 64dB of gain available
- 20dB pad with red LED indicator, 2 LED input meter
- Full 48V phantom power with red LED indicator
- Low cut filter at 80Hz, 12dB/octave
- Polarity inversion switch with LED indicator
- Switchable +4dB/-10dB output, 1/4" Balanced.

### 109 Tubessence
#### Parametric EQ

The Aphex 109 is an extremely versatile,high performance parametric vacuum tube EQ with professional flexibility and sound quality.

***Great for "warming up" digital signals.***

## EFFECTS PROCESSING

JUST IN

### Lexicon
### PCM-80 & PCM-90
#### Digital Signal Processors

A great combination for any studio owner with an ear for the best. The **PCM-80** delivers high quality multi-effects based on the legendary PCM 70, maintaining Lexicon's high standards for sonic clarity and extrodinary processing power. The **PCM 90** is a digital reverb with its roots stemming from the studio standard 480L and 300L effects systems. Reverbs from telephone booths to the grand canyon, the PCM 90 is incredibly realistic. Together, they make an excellent addition to any rack mount arsenal

**Buy a PCM-80 and receive a FREE Pitch FX Card**
offer valid thru 8-31-97

### Lexicon MPX-1 Multi-Effects Processor

Lexicon's latest addition to thier Digital effects family, the MPX-1 features top-quality effects in an easy to use, 1 rack space unit. With 56 Pitch, Chorus, EQ, Modulation, Delay, and world-class reverb effects accesable from the front panel, as well as TRS and XLR balanced I/O and complete MIDI implementation, the MPX-1 creates a new standard for cost and quality in a multi-effects device.

### t.c.electronics
### Wizard M2000 Studio Effects Processor

The M2000 features a "Dual Engine" architecture that permits multiple effects and 6 different routing modes making it a great choice for high-end studio effects processing.

***FEATURES–***
- 250 factory programs including reverb, pitch delay, chorus, flange, phase, EQ, de-essing, compression, limiting, expansion, gating and stereo enhancement
- 20-bit A/D conversion AES/EBU and S/PDIF digital I/O.
- "Wizard" help menus, 16-bit dithering tools.
- Tap and MIDI tempo modes.
- Single page parameter editing, 1 rack space

### SONY
### DPS-V77 2 Ch. Master Effects Processor

Sony's latest effects processor, the DPS-V77 yields excellent sonic quality combines with realtime control, a digital I/O and many more features that will put a smile on the face of any discerning studio engineer.

***FEATURES–***
- 198 preset & 198 user-definable programs.
- Control up to 6 parameters in realtime via MIDI information and an optional foot pedal
- Use the AES/EBU & SPDIF digital I/O to link multiple V-77s together & when working with digital mixers
- 10-key pad input
- Shuttle-ring equipped rotary encoder allows for quick patch changing.
- A noise gate circuit is provided ahead of the input for guitar players and other instrumentalists who want top quality effects without sacrificing tone.

### ALESIS
### QuadraVerb 2 2 Ch. Master Effects Processor

Alesis' most powerful signal processor, the Q2 offers amazing audio fidelity in a versatile multi-effects unit. Great for professional & project studio owners, its large backlit display making parameter editing intuitive and quick.

***FEATURES–***
- 100 preset & 200 user-editable programs.
- Octal Processing allows use of up to 8 effects simultaneously in any order.
- Choose between over 50 different effects types for each block, including reverb, delay, chorus, flange, rotary speaker, pitch shift, graphic and parametric EQ, overdriver and more.
- 5 seconds sampling, triggered pan, and surround sound encoding are built in.
- Selectable -10 dB and +4dB levels, servo-balanced TRS inputs and outputs
- ADAT Digital Interface allows you to work entirely in the digital between the Q2 and an ADAT XT.

## PRO HEADPHONES

### AKG
### K240M

The first headphone of choice in the recording industry. A highly accurate dynamic transducer and an acoustically tuned venting structure produce a naturally open sound.
- Integrated semi-open air design.
- Circumaural pads for long sessions.
- Steel cable, self-adjusting headband.
- 15Hz–20kHz, 60Ω

### SONY
### MDR 7506

The Sony **7506's** have been proven in the most trying studio situations. Their rugged, closed-ear design makes them great for keyboard players and home studio owners.
- Folding construction
- Frequency Response 10Hz to 20k Hz
- 1/4" & 1/8" Gold connectors
- Soft carrying case
- Plug directly into keyboards

### beyerdynamic
### DT 770 Pro

These comfortable closed headphones are designed for professionals who require full bass response to compliment accurate high and mid-range reproduction.
- Wide frequency response
- Durable lightweight construction
- Equalized to meet diffused field requirements
- Padded headband ensures long term comfort

### SENNHEISER
### HD 265/HD580

The **HD-265** is a closed dynamic stereo HiFi/professional headphone offering high level background noise attenuation for domestic listening and professional monitoring applications. The **HD 580** is a top class open dynamic stereo HiFi/professional headphone that can be connected directly to DAT, DCC, CD and other pro players. The advanced design of the diaphragm avoids resonant frequencies making it an ideal choice for the professional recording engineer.

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### TASCAM DA-P1

- Rotary 2 head design 2 direct drive motors.
- XLR mic/ line inputs (w/phantom power)
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- 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.
- MS (Mid-Side) Matrix Sync matrix 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.

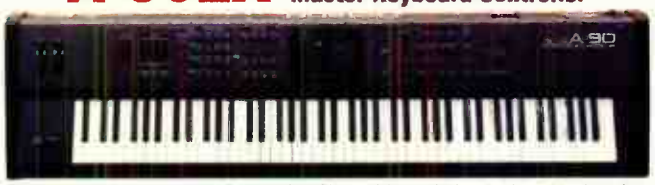
JUST IN

### 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

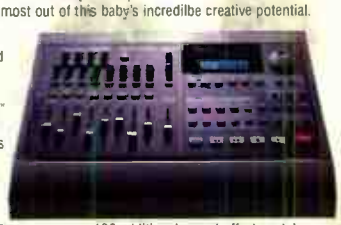
***FEATURES–***

- 8 note polyphonic, 49-key velocity sensitive keyboard.
- Newly developed DSP oscillator
- 'Motion Control' recalls parameter changes in realtime
- 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 (38 total) including Voice Transformer, Mic Simulator, 19-band Vocoder, Hum Cancelor, Lo-Fi Sound Processor, Space Chorus, Reverb 2, 4-band Parametric EQ, 10-band Graphic EQ, and Vocal Canceler.
- 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 it's 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 sequncing software also available.**

JUST IN

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

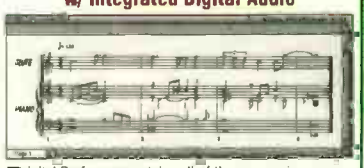
The MTP AV takes the world renowned MTP II and adds synchronization that you really need like video genlock, ADAT sync, and word clock sync, even Digidesign superclock!

- 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.
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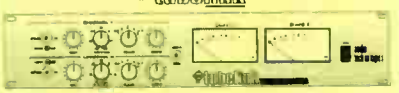

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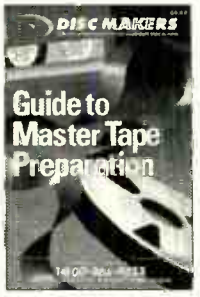


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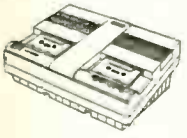

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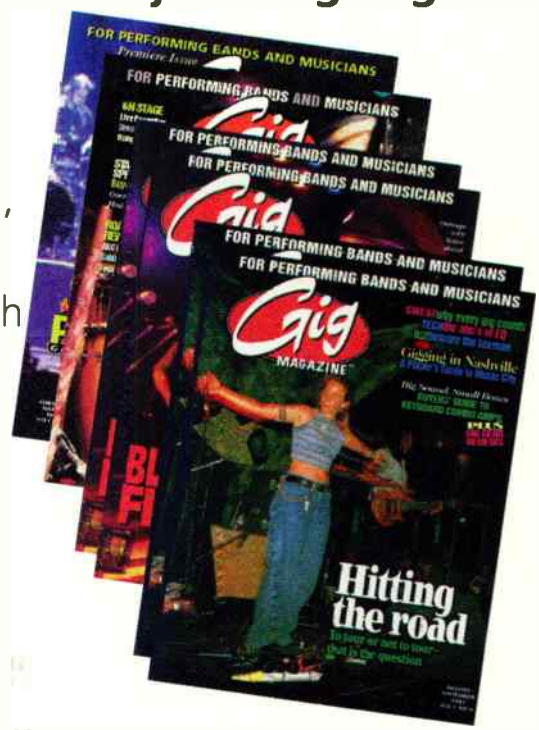


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# *The Life You Save May Be* **Your Own**

## How to avoid a shocking situation when working with vacuum tube equipment

**BY MARTIN POLON**

If we should go "back to the future," to the early 1960s, we might find yellowed pieces of paper hanging on the bulletin board of the tech shop in the average recording studio. These scraps, cut out from magazines such as Ziff-Davis's *Radio and TV News* and Hugo Gernsback's several publications and McGraw-Hills' *Electronics* (no *EQ* then), might say "Eleven Mils Kills" or other corny puns. What this was all about — the high and dangerous voltages used for powering vacuum tube technology audio equipment — was well known to all who worked in audio since tube technology was all there was.

With today's strong push "back to the future," with tube audio equipment now reappearing — as an option at the least — in many large mainstream studios as well as boutique studio operations, the lowering of prices has placed tube gear into the arsenal of the project studio as well. The tube gear might exist as microphone preamps, compressors, equalizers, limiters, and, of course, power amplifiers in any and all number of combinations thereof.

What is being both sought and bought is the sound of vacuum tube electronics — whether it is the thermal decay environment of the vacuum tube or the phase changes created by the "heavy iron" power, input and output transformers, or the time constant of electrolytic capacitors, etc. Unfortunately, the wonderful analog warmth of tube sound comes with what could be well considered a truly fatal flaw — high voltages!

The people working in recording audio today have grown up with both a level of safety designed into their solid-state products and an easy comfort with low DC voltage transistorized audio equipment and computers in general. The power supplies either are plug-in "wall warts" or are plug-in sealed metal modules, so that access to even the relatively high voltages of AC power input are virtually inaccessible. The only exception to that generalization are the video monitors found in use with PCs, digital audio editing workstations, etc. Monitors are well sealed, and almost nobody fixes their own. Those that do are competent enough to take precautions.

That is the "rub" with tube audio equipment today; especially in an recording industry that will attempt a "hot" equipment exchange or even live troubleshooting and repair as standard operating procedure. In almost all cases, that will possibly place an individual piece of equipment in jeopardy, but not threaten a human life.

The following rules are vitally important when using vacuum tube gear, and should be heeded without exception.

1. If you have even more than one piece of tube gear, invest in a tube checker. The old logic is that if a tube machine fails, the problem is probably with the failure of a tube. If you can fix a unit without going into the chassis, the likelihood of a life-threatening error is reduced to zero.

As to obtaining a tube tester, there are still sources for new, renewed, and used. Ham radio "gearfests" and swap meets usually find used civilian and military testers at reasonable prices. Ads in ham radio magazines such as *QST* will offer the units from military surplus and other sources. Tubes can also be tested in some ways "cold" with a VOM (volt-ohm meter) and a copy of a pertinent tube data handbook (such as the RCA Radiotron Designer's Handbook).

2. Keep a complete stock of the tubes used in your gear and change the tubes every six months to a year depending upon your usage. Tubes today are expensive, but if they are drawing clients to your facility, you will well be able to afford stocking replacements. In addition to the preventative maintenance aspect of a tube stock, one can troubleshoot tube gear by replacing one tube for another. Sometimes, even a tube checker will not reveal a noisy or intermittent parasitic in a tube. A swap will.

3. Always unplug tube gear from the AC line before you attempt servicing. Leave the "hot" activity to the test bench of the equipment maker, the dealer who sold the gear, or a service facility skilled in tube electronics. In addition to possibly saving your life, your test equipment will thank you as well. Although today's electronic test gear is much less likely to suffer from sudden voltage changes, there is still some wisdom in working "cold."

4. Work with only one hand in a servicing situation. The theory behind this is the reality that you or someone else might have removed AC from the wrong unit or you may be purposefully attempting to service "live."

With only one hand in use, and assuming decent rubber sole shoes, a so-called heart path of 11 milliamperes or more is a lot less likely to happen. Since vacuum tubes use DC (direct current) at high voltages to power plates and other tube elements (including low-voltage filaments in today's low noise tube audio gear), there is little chance of being thrown off clear of contact to high voltage tube direct current.

Alternating current is switched on and off 60 cycles every second in the U.S. If you contact such AC, you stand a better than 50 percent chance of being hurled free. No such chance with tube DC.

5. Remember that, when unplugged, tube gear can hold a substantial, though not necessarily life-threatening, charge in electrolytic and other capacitors. Any monitor (which, after all, uses a picture "tube") also can hold a charge for some time after disconnection. Tube "old timers" used a clip lead or screwdriver to ground and discharge the potentially offensive elements.

Vacuum tube audio gear has again become a big part of the audio and recording industry. Treat such gear with respect and it will provide safe and acoustically pleasing service for years to come! EQ



World Radio History

## ACROSS THE BOARD

*continued from page 154*

there is the possibility that something changes from time to time. With digital interfacing, the signal remains the same each time you call up a mix.

### WORK FLOW

In the past, when you were mixing on an analog console, you would normally finish a mix and then leave everything set up until the client approved the results. If the client was nearby, it wouldn't take very long and you could print the final master and go on to the next mix. If the client was in a different city, you would have to wait for FedEx and leave the mix up until the approval.

The album I just mixed was of the "client far away" variety. I mixed three tunes, each one stored in memory, and sent a DAT for approval. While I was waiting to hear from the client, I worked on the next few songs. When the client called, there were a few minor changes to make in the first three mixes. It took a total of one hour to recall the mixes, make the changes, and print the new masters. I made the same changes to the next bunch of tunes and continued with the rest of the mixes.

### FINAL WORDS

You have to keep in mind that one of the advantages of digital consoles is that you can perform the task at hand with a minimum of control surface components and hundreds of virtual controls on a computer monitor. This same configuration is looked upon as a disadvantage to some engineers. You don't have to think as much when all of the knobs are laid out in front of you like an analog console. I have had occasions when there was a reverb send left up from a previous mix that I didn't catch right away because the send levels were hidden from view. At various times during a mix I will now cruise unused parameter pages to make sure nothing is sneaking up on me.

Mackie will be shipping their new digital console soon, and Digidesign will have a hardware interface so that Pro Tools mixing will act like a hardware console. Once you get used to the new way of mixing on a digital console, you will get hooked fast. I know that a digital console of some type will definitely be in your future, and as yet there is no 12-step program for addiction to good mixes. EQ

## ROOM WITH A VU

*continued from page 28*

offer our Sony/ATV Music Publishing writers.

**EQUIPMENT NOTES:** Garrett continues: To fit into our space and budget, I've chosen a small amount of great gear. The centerpiece would have to be the 02R. The automation and recall are very helpful when working with many different artists. The PCM-800's handle beautifully, and they digitally interface with the 02R. The vintage and tube gear give me a warm signal path to digital tape. We just added the Genelec 1031A's, and I am very pleased with them.

**PRODUCTION NOTES:** Garrett states: We have to be flexible, because every song is a totally different production. With some artists, we start from scratch using MIDI and live instruments to create the track. Other artists bring in finished tracks and we add vocals and mix. We'll record our old upright piano or record drums in the hallway if need be. It's a bit like the old days when they recorded Aretha in a stairwell to get the reverb. Whatever it takes to get what the song needs. EQ

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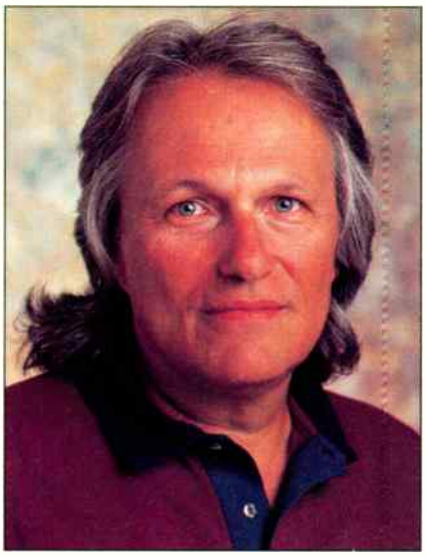


**BY ROGER NICHOLS**

Remember last month when I mixed on the Sony Oxford? Well, I only mixed the tunes that were slated to be on the album. A few days later I found out that I needed to mix one more song. There wasn't much to it; just a basic rhythm section, a couple of overdubs, and a vocal. Why not mix it at home on my Yamaha 02R? I did. I had the tune transferred from Sony 3348 48-track digital to TASCAM DA-88's. I used the same reverbs, monitor speakers, and outboard gear that I used with the Oxford. The only difference was the 02R. The mix matched up perfectly. The vocals sound identical. You cannot tell which tunes were mixed where.

A friend of mine named Cynthia is a producer for a small record company near Los Angeles. She has been working on an album project sporadically for over a year. The material was recorded in a nice-sounding studio with good musicians and good miking techniques. The recording was done on a Pro Tools 24 track system through a Yamaha 02R console. Cynthia sent me a DAT of rough mixes and asked me if I would mix the final product. I asked her if I could mix it on my 02R at my mastering room, and she said it didn't matter, as long as it came out good (no pressure).

I received each song on an Iomega Jaz removable hard disk cartridge. The plan was to load the material onto my Pro Tools drives and mix. The problem was that my 24-track Pro Tools system was busy and I would have to wait until it was available, or suffer the embarrassment of a custody battle. Time for plan "B."

I have another Pro Tools 442 system that I have available for just such emergencies, but you can't get 24 tracks out digitally from a 4-track system. I did have three ADATs, a BRC, and an AI-1 AES/ ADAT digital interface that would solve the impending dilemma.

I loaded each tune into the Pro Tools 442 system and then transferred the music two tracks at a time over to the ADATs. I had the BRC set to spit out SMPTE that was then read by the Digidesign SMPTE Slave Driver. Pro Tools chased this timecode reference on each pass and provided sample-accurate synchronization. The ADAT outputs were connected to the 02R via Alesis optical data cables. I could monitor the progress of the transfers and work on EQ and basic levels on each pass so there was no wasted time during the transfer process.

*The sound of the audio that flows through the expensive and inexpensive consoles is, for all intents and purposes, virtually pretty much exactly identical. (You can quote me on that.)*

### DAVID VS. GOLIATH

Don't get me wrong here, there is a big difference between the $900,000 digital consoles in the big studios and the under-$10,000 Yamaha 02R. But most of the difference is in the interface with the user and the nearly limitless permutations in routing and configuration. The sound of the audio that flows through the consoles is, for all intents and purposes, virtually pretty much exactly identical. (You can quote me on that.)

On the big consoles you can just touch a fader to start writing automation moves. On the 02R you have to press a button that tells the console that you want to write new fader moves, and then press the button again when you are finished. On the big consoles, there is a section with all of the EQ knobs spread out so that every parameter of every band is there for the grabbing. On the 02R you have to select a page to deal with and adjust the parameters for that page. If you want to grab a knob that is not active, you have to call up the appropriate screen before any changes can take place. On the big console you can have hundreds of inputs and outputs configured as busses or auxes. The 02R is limited to 32 tracks of digital input and eight digital outputs with analog I/O for the auxes.

The motions may be different, but the outcome is the same. You rout the signal where you want, insert some EQ or some dynamics, send some of the signal to an effect generator, balance that signal with other signals on other channels, and *bingo*, you have a mix.

### FRATERNAL TWINS

Totally resettable digital consoles have one advantage. All of the parameters for doing anything on the console can be saved and completely restored at the touch of a button. Analog consoles with total-reset can come close, but you still have to align the analog tape machine and hope that the A/D converters are the same ones you used last time. At each of the digital/analog boundaries

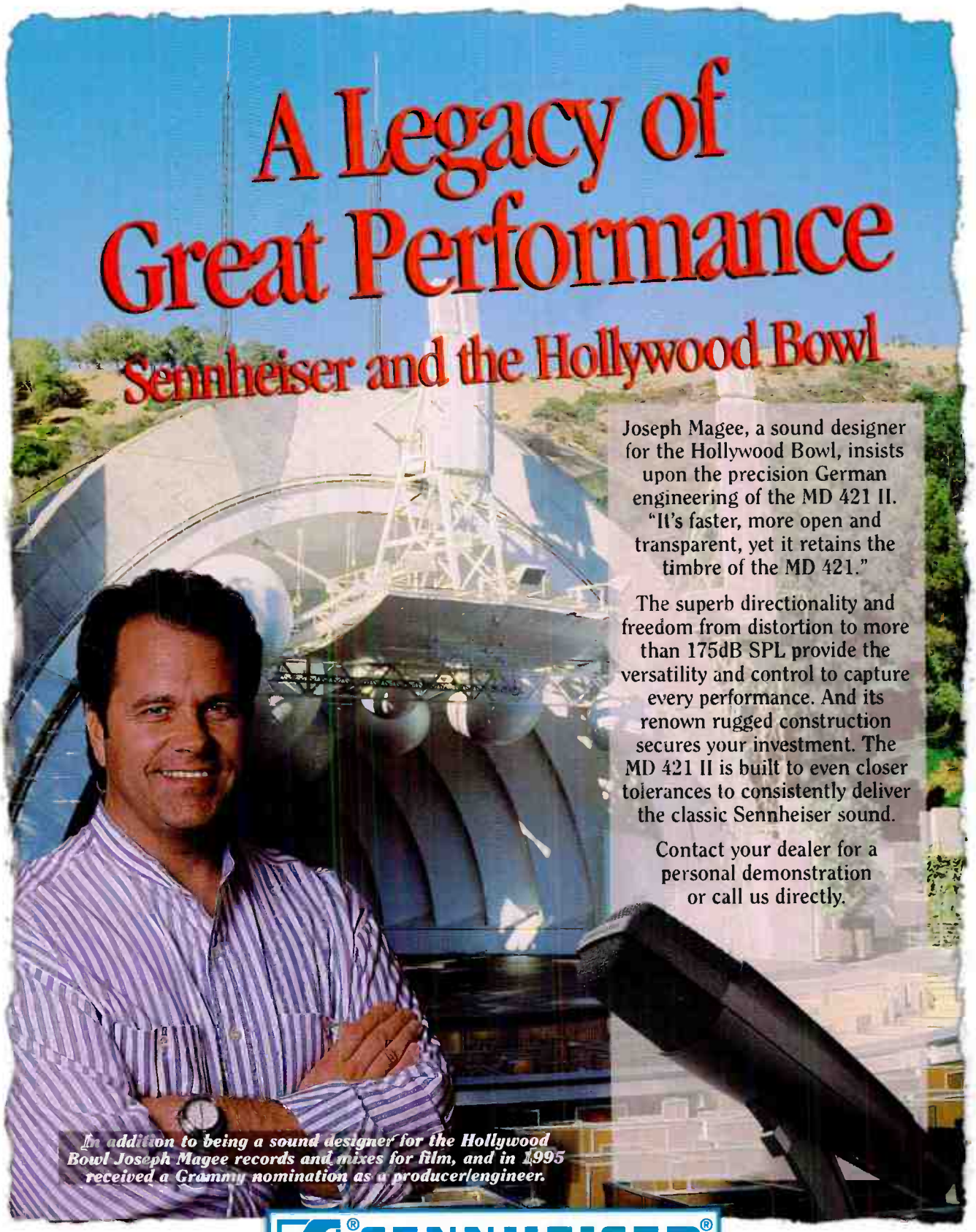
*continued on page 152*



World Radio History

# A Legacy of Great Performance

## Sennheiser and the Hollywood Bowl



Joseph Magee, a sound designer for the Hollywood Bowl, insists upon the precision German engineering of the MD 421 II. "It's faster, more open and transparent, yet it retains the timbre of the MD 421."

The superb directionality and freedom from distortion to more than 175dB SPL provide the versatility and control to capture every performance. And its renown rugged construction secures your investment. The MD 421 II is built to even closer tolerances to consistently deliver the classic Sennheiser sound.

Contact your dealer for a personal demonstration or call us directly.

*In addition to being a sound designer for the Hollywood Bowl Joseph Magee records and mixes for film, and in 1995 received a Grammy nomination as a producer/engineer.*

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# The JBL 6208 Bi-Amplified Reference Monitor

For the power hungry with an appetite for PERFECTION.

## The Best System Starts with the Best Parts.

JBL has more experience in designing and building transducers for professional studio monitors than any other company in the industry. We not only use the latest engineering and design equipment, but also the most important test device of all, the human ear. We believe in physics, not fads, so while other companies pick parts off somebody else's shelf, we create our components from scratch. And by utilizing more than 50 years of experience in transducer design, we create the perfect transducer for each system.

## Multi-Radial Design - An Ideal Solution to a Complex Problem.

Combining individual transducers into a system is a delicate balance of acoustics, electronics and architecture. Our exclusive Multi-Radial baffle is contoured to bring the drivers into perfect alignment, so the high and low frequencies reach your ears simultaneously. This reduces time smear for a smooth transition between the low and high frequency drivers. In addition, the gently rounded edges of the 6208 provide controlled dispersion and balanced power response. That means even off-axis, you will hear an accurate representation with wide stereo seporation and an immense depth of field.

## Gold/Titanium Hybrid Dome.

By mating the materials to a large magnetic structure, the 6208 can produce extremely flat frequency response and low distortion for hours of fatigue-free listening. JBL pioneered the use of the light but rigid gold/titanium hybrid construction to provide a transient response that is quick and precise for pinpoint accuracy.

## Shielded Drivers for Flexible Placement.

JBL shields all of the drivers so you can place the 6208 right next to your audio workstations without interaction. Gone are the days of compromised monitor placement in your production environment.

## Why Bi-Amplification?

It's a simple fact, a separate amp for each speaker produces the most accurate sound. Each of the 6208's two amplifiers is designed to reproduce the assigned frequencies. And by combining the amplifiers inside the cabinet, you improve the amplifier's ability to control the speaker it's driving for controlled low end punch.

> "We played just about every type of instrument through these speakers and they reproduced it with flying colors."
>
> - *Bobby Owsinski*
> EQ Magazine

## Active Crossovers Provide Accurate Response Tailoring.

By carefully tailoring each amplifier's performance to the response characteristics of the drivers, you get the most faithful reproduction possible. By using active crossovers, power is not robbed by passive components like inductors and resistors. The result is clear, accurate sound at the highest levels.

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