



EQ

THE PROJECT
RECORDING &
SOUND
MAGAZINE

Mega Mic Pre Reviews

How to Burn Your Own CDs

JUNE • 1997

First Look: Alesis ADAT Type II

Sheryl Crow Stage Miking Techniques

Ed Cherney's Studio Tips

Web Maestro

Thomas Dolby Untangles the Net for Project Recordists

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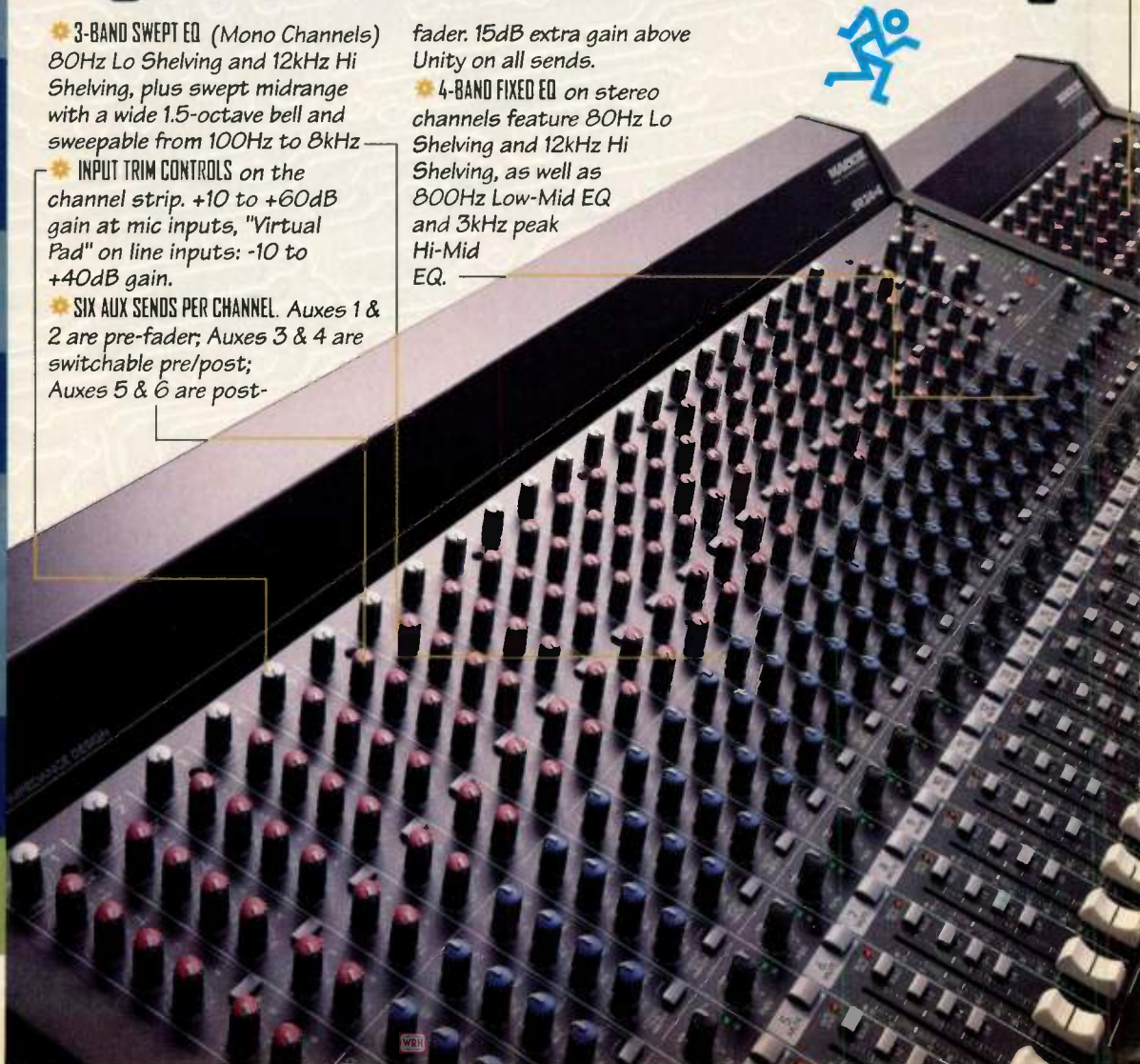
★ **3-BAND SWEPT EQ** (Mono Channels) 80Hz Lo Shelving and 12kHz Hi Shelving, plus swept midrange with a wide 1.5-octave bell and sweepable from 100Hz to 8kHz

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CIRCLE 42 ON FREE INFO CARD



EQ

PROJECT RECORDING
& SOUND TECHNIQUES
VOLUME 8, ISSUE 6
JUNE 1997



FEATURES

THOMAS DOLBY ROBERTSON: WEB MAESTRO *By the FezGuys*.....62
Thomas Dolby Robertson takes EQ's own FezGuys behind the scenes at his company, Headspace, Inc. and reveals how he is using the Internet to distribute audio — and explains how you can, too.

THE EQ MIC PREAMP SHOPPER.....75
In the market for a new mic preamp? Then you're in the right place. In this special section, 13 new and popular preamps are put to the test, including models from Amek, Grace Designs, Rane, ART, Demeter, D.W. Fearn, Giltronics, JOEMEEK, Millennia Media, Peavey, Avalon Design, Whirlwind, and Geoffrey Daking.

CD-R SPECIAL: COASTER BUSTERS.....94
Here are the tools and techniques you need to know to start burning your own CD-Rs. Stories include:

- **CD-R TIPS** *By Roger Nichols*.....94
- **MASTERING YOUR WORLD** *By David Miles Huber*.....96
- **REVIEW: SONIC FOUNDRY ARCHITECT PLUG-IN** *By David Miles Huber*.....100
- **REVIEW: RIMAGE PERFECT IMAGE CD PRINTER** *By Roger Nichols*.....104
- **REVIEW: FARGO ELECTRONICS SIGNATURE COLOR CD PRINTER** *By Roger Nichols*.....108

EQ LIVE

SHERYL CROW MIKING TECHNIQUES *By Gregory A. DeTogne*.....114
CLUB PROFILE: THE BOULDER THEATER *By Glenn Webb*.....120
NEW GEAR FOR YOUR NEXT GIG.....124
ROAD TEST: CRANE SONG STC-8 COMPRESSOR/LIMITER *By Eddie Ciletti*.....126

TECHNIQUES / WORKSHOPS

APHEX TWIN: TWIN SPEAKS *By Steve La Cerra*.....52
BEETHOVEN'S TIPS FOR WRITING HITS *By Simon Amarasungham*.....58

COLUMNS / DEPARTMENTS

MI INSIDER: RECORDING ELECTRONIC DRUMS *By Craig Anderton*.....40
KOOPER'S KOUCH: BATTLE OF THE BIG BANDS *By Al Kooper*.....44
BONZAI BEAT: ED CHERNEY *By Mr. Bonzai*.....46
THE FEZGUYS: THE PROFIT MOTIVE *By Jon Luini & Allen Whitman*.....130
MAINTENANCE: ASK DR. DIGITAL *By Eddie Ciletti*.....134
FAST FORWARD: THE PROJECT STUDIO "SOUND" *By Martin Polon*.....151
ACROSS THE BOARD: CAPRICORN-UCOPIA *By Roger Nichols*.....154

EDITORIAL.....8	ROOM WITH A VU: PRIVATE STUDIOS.....28
LETTERS TO EQ.....10	MICROPHILE: TELEFUNKEN ELA M 251.....30
EQ&A.....12	FIRST LOOK: NEW PERSONAL MONITORS.....32
PRODUCT VIEWS.....18	FIRST LOOK: ALESIS TYPE II.....36
STUDIOWARE.....22	AD INDEX.....123



ON THE COVER:

Thomas Dolby Robertson at Headspace headquarters. Photo by Steve Jennings. Border © Netscape Communications Corp. 1997.

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in Miller Freeman
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The Revolution Will be Downloaded

First came the project studio revolution. And it was good. Musicians, for the first time, were empowered by new technologies to record their own music in their own project studios, without the need to watch the clock and pay by the hour in some overpriced commercial studio suite. The result was more experimentation and increased creativity; more musicians began classifying themselves as music producers and recordists; independent record labels proliferated; a new age of recording was born.

Now, thanks to the Internet, the next obstacle to creative freedom is being circumvented — the record company. Millions of independent records are being pressed each year but, without the distribution clout of the major record labels, they sit gathering dust on the studio shelves. Now, with the Internet, any project studio owner can distribute and sell the music he or she creates to the more than 57 million Internet users worldwide — and get near-instantaneous feedback from the audience. Couple this with the falling costs of recordable CD machines, which can take the downloaded files and easily transfer them to compact disc, and you have the makings of a completely unbiased music delivery system.

It is this freedom that prompted this issue's cover story, Thomas Dolby Robertson, to create his new company, Headspace Entertainment. Its flagship product, Beatnik, makes it easier to create and listen to music for the Web. And Dolby is not the only serious audio professional to add a modem to his rack. Phil Ramone has helped form N2K Enhanced Music, a record label that is aggressively using the Internet to market and distribute its titles. Todd Rundgren has initiated a subscription service whereby surfers can order and obtain his new recordings directly from his Web site. The list goes on and on. And even some of the smarter record companies are getting involved. Virgin Records recently debuted the much-anticipated new release from The Chemical Brothers on the Liquid Audio Web site. The entire album, *Dig Your Own Hole*, was able to be downloaded one day prior to its national retail release.

Sound reinforcement is also getting into the act, using the Internet to simultaneously reach the worldwide audience while playing to a packed club. Webcasting live concerts adds real-time video to the mix, opening a whole new realm of possibilities. In fact, once again, more than 400 acts will participate in this year's Global Internet Gathering (GIG). GIG takes over New York City in the middle of July and includes Webcasts from some of the city's hottest clubs, including CBGB's, Irving Plaza, Tramps, and the Bottom Line.

Internet audio delivery is the next phase of the project recording revolution that *EQ* first identified. As a result, we'll keep you posted every issue about ways to take those tapes and get someone to listen to what you've created.

Now if we could get rid of that damn busy signal...

—Anthony Savona, Managing Editor

Imagine a digital mixer
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Photo: Jay Dwyer

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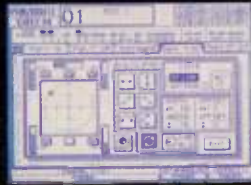
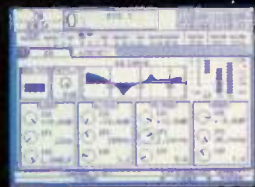


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CIRCLE 81 ON FREE INFO CARD

DIGITAL VIDEO DISCUSSIONS

Thanks go to George Massenburg for his insightful musings about the future of digital recording and the DVD. I think George speaks for most of us audio professionals in the record business who envision the DVD as the savior of digital audio vis-a-vis the current 44.1/16-bit consumer CD. However, with the current slump in the U.S. record business forcing downsized profit expectations, the concomitant trend toward lower music budgets, alternative record distribution channels, and all the new entertainment/online sources competing for CD dollars, I think we, as audio professionals, should focus on how we can make what we do more compelling than ever before.

It is inspirational to read Massenburg's short treatise and to dream about 10-channel sound in 24-bit, 96 kHz digital resolution, but unfortunately the DVD's stunning storage capabilities are deemed to the home video theater. With most of the "hit" back catalogs pumped dry by the CD-reissue mania, lackluster sales, and a dearth of truly original artists, it might be the wrong time for record companies to tell the music buyer that DVDs are "better." The best chance DVD has to get a "jump start" as an audio-only consumer format will be with HDTV when a statistically significant number of households will already have existing surround theaters.

Barry Rudolph
North Hollywood, CA

AUDIO'S FUTURE

I was recently given the George Massenburg article from the April issue of *EQ*. I found the article to be quite marvelous. For once, someone was not losing themselves in the argument of which is better (analog or digital). So many times a story gets bogged down with "analog is better because..." or "digital is better because..." and, believe me, I love this argument as much as the next engineer. But in this case, George (if I may call him George) realizes that digital, for better or worse, is the present and future of audio, and we need to find ways to make it the best it can possibly be. With DVD, a whole new realm of possibilities opens up for every aspect of audio — music, film, television, video games, multimedia, etc.

All areas where audio engineering is involved now will have a new platform

to work on. Therefore, it is paramount that this be developed correctly with the input of the people who are going to be putting their hard work on them. With George Massenburg leading the fight, I'm sure sound engineers and, most importantly, the consumer will be pleased with what is developed. I know this one will be. Thanks George.

Bryan Hensley
IPA, The Editing House
Chicago, IL

MAC BACKER

While I enjoy every issue of your magazine, I question the current relevance of focusing solely on PC recording and spending very little time on the Mac platform. I think if you do your homework, you will find a large percentage of us "EQoids" are still using our Mac OS and would love to see more articles on Mac OS-based recording. I realize that Wintel appears to be the future at this time, but how about equal time on both platforms? After all, several of the top DAWs are still only available on Mac OS.

Cory DeAngelo
Carlisle, PA

BUFFALO BOB

I enjoyed reading Bonzai's interview with Robert Moog (April '97).

I was at the University of Buffalo in the late 1960s and early '70s when Bob Moog had his company in the Buffalo area. He was one of the most generous people I ever met, always willing to help faculty, staff, and students alike. He was never too busy nor too important to provide an interview at the campus radio station or help a music major design synthesizer circuits. I've even seen him pitch in as a keyboard performer at faculty and student concerts.

Bonzai's interview captured Moog's great sense of humor. The article was a pleasant reminder of what joy it was to learn from this most interesting mentor. Many thanks.

Walter Gajewski
California State University
Long Beach, CA

KINDRED SPIRIT

Al Kooper's recent article on producing a commercial was great. I was de-



pressed over a similar incident that had happened to me, so it was reassuring and hilarious to hear his story!

Daniel Clawson
Larkspur, CO

WELCOME ABOARD

I'm new to the Internet and new to the project studio field. *EQ* magazine has been invaluable to me in not wasting my hard-earned money, and without your editorials and product reviews I would not have purchased my Mackie SR24•4, Roland VS-880, Event 20/20 Bas, and Rode NT-2 mic. Your pages keep my dreams alive and add a few more to think about. This has been the fastest year of my life, and I'm proud that for once in my life I'm learning the field I've always loved. Thanks for helping me do it right.

Gregory P. Booker
Beachwood, NJ

CORRECTION

In last issue's Studioware section, the incorrect address for Soundscape was published. The correct address is 4478 Market St., Ventura, CA 93003. Tel: 805-658-7375.

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CIRCLE 45 ON FREE INFO CARD

SCHEMATICS R US

Q I enjoy Eddie Ciletti's column and building audio projects. Please include project schematics as often as possible!

With regard to the schematic in fig. 3 (January '97 EQ): Shouldn't there be a coupling capacitor (say .02 uf/250 V) between the plate of V1 and the grid of V2? Without one, you'd have 100 VDC on the grid of the output stage, which implies gross nonlinearity to my mind. Again, thanks for a great column!

Mike Worrall
via the Internet

A Glad you enjoyed the Altec project. As for your question concerning a coupling capacitor between the 2nd plate of V1 and the grids of V2, notice that V2 is a cathode follower stage and that its cathode is at 105 volts while its grid (via the preceding plate stage) is at 100 volts (a negative 5 volts). There is no plate resistor, so the grid is sitting pretty "high" in the positive sense and needs no coupling cap.

Glad you enjoy the column. I always try to include schematics.

Eddie Ciletti
Contributing Editor
EQ magazine

CARD CARRIER

Q I have tried to locate information on the multieffect processor for the Akai S2000 "EB-16," called the "Sample Verb" card. Do you have any info about this card? I believe it is made by Lexicon, but I cannot find a Lexicon home page and they [Lexicon] do not list it with any other of its effect processors.

Jason Benis
Houston, TX

A Greg Hogan in Lexicon's Customer Service area says that we at one time, maybe 10

years ago or longer, produced a card, the Lexiscope 2000 (we referred to it as the 2K) for a video-monitoring device used in dispatch services for hospitals, etc. This was not a small plug-in card as you see readily available today, but a very large circuit board. The product you are referring to is something altogether different [and is not available from Lexicon].

Gregg Perry
Marketing Communications
Manager
Lexicon, Inc.

[Note: The Sample Verb you refer to is a 4-bus assignable multieffects processor board for use with the Akai S2000 sampler. Contact Akai directly for more information on availability, cost (about \$399) and local dealers at: Akai, P.O. Box 2344, Fort Worth, TX 76113. Tel: 800-433-5627 or 817-336-5114. (Also, check the Akai and Lexicon products via EQ's Web site Buyer's Guide at www.eq-mag.com.)

—Hector G. La Torre

SAW THING

Q I work at a radio station that uses Pentiums and the Innovative Quality Software SAW 4-track multitrack recording system. We've only had the systems for a short time, so this technology is still new to us. We've had a bit of trouble lately.

When playing back recorded tracks, the audio will "glitch" in a way that it sounds like a compact disc skipping forward. It happens once, for about every 3-4 minutes of audio to the point I've given up recording longer form material. Our engineers have worked on the systems and have managed to improve things, but the problem does still occasionally pop up. Have you heard of such a thing? If so, have you heard of any "fixes" people have come up with?

A friend of mine recommended purchasing a 486 and the older version of SAW, which he swears by. I'm no computer expert, so all this has me a bit confused. Having read your magazine for a couple of years now, I know I can trust the advice given.

Mike Pritchard
via the Internet

A Skipping effects in playback of digital audio is generally attributed to disk caching and the Virtual Memory settings of the operating system. With Microsoft Windows 3.1, this could be defeated by disabling the SMARTDRV.EXE driver for the drive from which audio is recorded and played back and by disabling the Virtual Memory by going into the Control Panel and clicking on the 386 Enhanced icon and making the appropriate settings. Windows 95 complicates matters by using dynamic disk caching.



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THE WIZARD FINALIZER:

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Hugh Robbins, Sound On Sound, December 1996

Editors Pick 1996

Musician Magazine, December 1996

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Roger Nichols, EQ, December 1996

"- the Finalizer offers a tweaker's paradise"

Ty Ford, Pro Audio Review, February 1997

"Very few products have thrilled me like the Finalizer"

Florian Richter, MusikMagazin, February 1997

"Resistance is useless"

Fritz Fay, StudioMagazin, Oktober 1996

THE WIZARD M2000:

Editor's Choice 1997

Electronic Musician, January 1997

Editor's Pick 1996

Musician Magazine, December 1996

"- the Wizard stands up to the comparison with a machine costing more than twice as much"

Mark Fink, MDX, October 1996

"- The M2000 will put you just about any place you can think of, and a few you probably haven't"

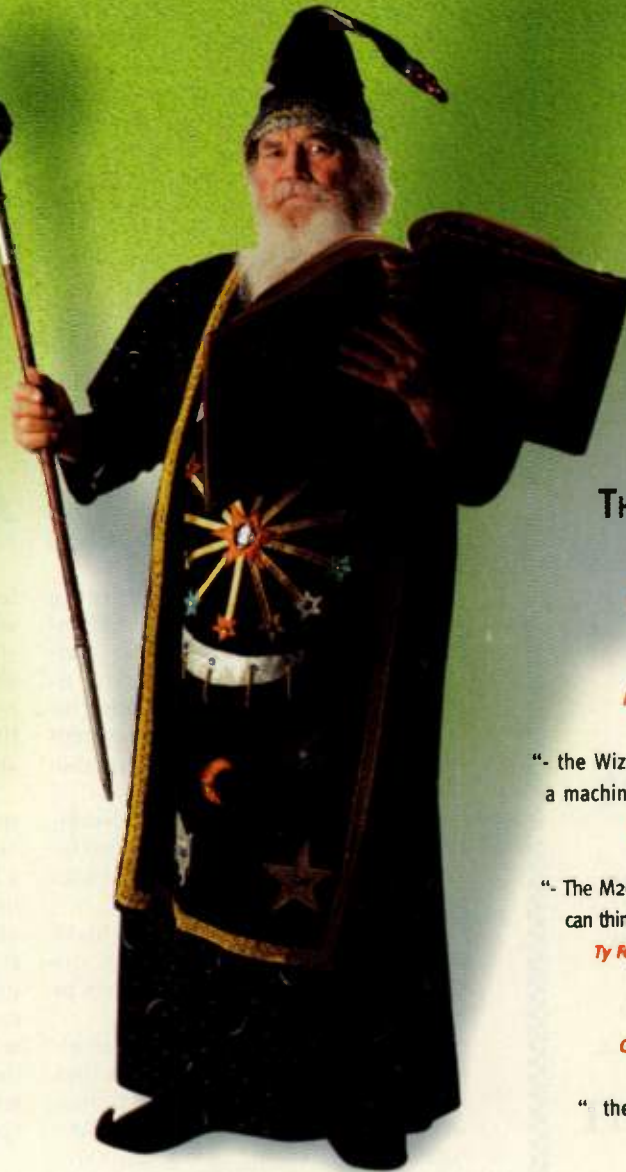
Ty Ford, Pro Audio Review, July/August 1996

"TC scores big again!"

Carl Coryell, Bass Player, August 1996

" the overall impression was 5 Stars"

Roger Nichols, EQ, April 1996



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CIRCLE 76 ON FREE INFO CARD

The following modifications to Windows 95 have been shown to solve the problems of skipping audio:

In SYSTEM.INI, after the [386ENH] section, add one for [VCACHE]. In it, enter MaxFileCache=xxxx where xxxx is the number of kilobytes. A suggested setting is 4096. This keeps VCACHE from growing beyond that point. Example: From the Start Menu, select Run and type in SYSEDIT. Select the SYSTEM.INI window and apply the following changes: [VCACHE] MaxFileCache=4096.

Modify the Virtual Memory Swap-File size by going to the Control Panel/System/Properties/Performance/Virtual Memory and set the max and min to the same value to prevent repeated reusing of the swapfile; 16 MB is a good value.

Disable write behind caching by going to the Control Panel/System/Performance/File System/Troubleshooting and click on disable write behind caching for all drives.

Disable the "wave audio device" in "media control devices" in Control Panel/Multimedia/Advanced/Media control devices. The "wave audio device" allocates a certain amount of memory to buffer between 2- and 9-seconds worth of audio, which introduces a double buffering situation.

Disable the Auto Insertion Notification in Control Panel/System/Device Manager/CD-ROM to avoid clicks and pops during playback.

Press CTRL-ALT-Delete and make sure nothing else is running in the background such as virus checkers or video panels.

Reduce Graphics hardware acceleration to None. This is under Control Panel/System/Performance/Graphics. (A good number of VGA card manufacturers are squeezing out a few extra points on their winbench scores by locking up the PCI bus. This is fine for graphics and most systems on the PC (hard disks and such) don't even notice the problem. Unfortunately, this can hurt the audio system in a big way. More information is available at <http://www.zefiro.com/>)

In the Control/Panel/System/Performance/FileSystem/Read Ahead Optimization set the value to OFF (move slider all the way to the left).

Additional information that is general to all hard-disk recording software can be found on the Innovative Quality

Software Web site at <http://www.iqsoft.com/>.

Francis Stycyk
tech@iqsoft.com
Innovative Quality Software

SEPARATION ANXIETY

Q *I'm currently tracking guitar on an album. I don't feel that doubling is appropriate for all of the tracks, so I've been recording with two amps simultaneously in stereo. The results have been outstanding. The only thing I'm missing is that extreme stereo separation you get from doubling and panning hard left and hard right. Any suggestions on how to widen the existing tracks?*

*Anonymous
(No, not the author of
Primary Colors)*

A There are many options, but here are two of my favorites.

The gear-head solution: If you have a computer, use QSound's QTools software to widen the stereo image. (Refer to the November 1996 review in EQ for more detail.) This can take a regular stereo signal and make it sound like it's coming from beyond the speakers.

The simple-but-be-careful solution: Add just a tiny bit of delay to one of the channels (around 5–12 ms; adding a little modulation, à la chorusing, can be cool too). This will give the benefits of doubling without the drawbacks. However, combining these signals in mono can create cancellations. As you mix, pan the two signals to center and adjust the delay in the 5–12 ms range for the best possible tone quality. Then pan left and right to open up the stereo spread.

Hope this helps!

Craig Anderton
Technology Editor and Resident
Target of Guitarist Jokes
EQ magazine

ASK US

Send your questions to:
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Fax: 516-767-1745
E-mail: EQMagazine@aol.com
Web: www.eqmag.com

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).



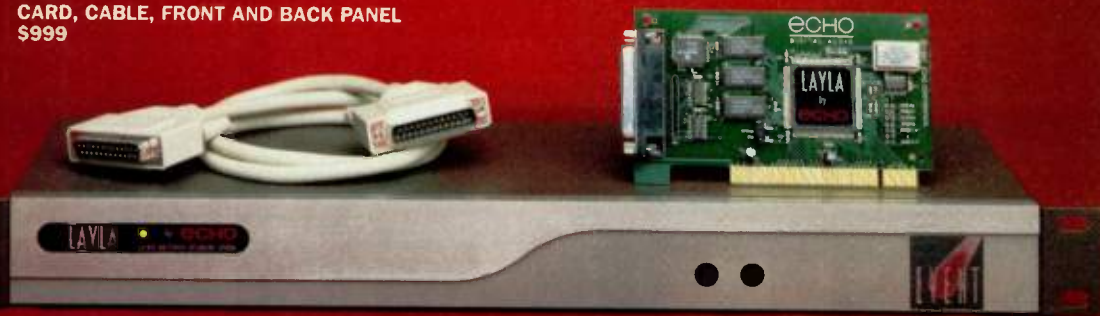
We founded Event on the principal that “the customer is precious.” That means we make only those products that our customers want, need, and can afford. Products that provide access to new levels of musical expression. Products that put high-end, professional tools in the hands of us mere mortals. (That's 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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LAYLA:
CARD, CABLE, FRONT AND BACK PANEL
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GINA
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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 multitrack 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*TM 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

But 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-1TM 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?

TRIA VLF BACK PANEL



TRIA SYSTEM \$849



20/20*p* BACK PANEL



20/20*p* SYSTEM \$599



NT1 \$499



EMP-1 \$299



EMP-1 Microphone Preamp

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-1TM Microphone Preamp** 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.)



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.

EQ PRODUCT VIEWS

YOU CAN SEE CLEARLY NOW

For the latest in Dual Concentric studio monitoring, check out Tannoy's System 1000 and 1200. Each system offers landscape cabinet architecture that provides a clear line over the console, and features a specially designed non-slip rubber isolation edging for protection and ease of mounting. The System 1000 and System 1200 possess high sensitivity (94 dB and 96 dB @ 1 m, respectively) and power handling (250 W+), and respective frequency responses of 45 Hz–25 kHz and 40 Hz–25 kHz (± 3 dB). Tannoy has also incorporated a newly designed all-hard-wired crossover that offers steeper filter slopes and high-end components that help to improve detail and tonal balance. For more details, contact Tannoy/T.G.I. North America Inc., 300 Gage Ave., #1, Kitchner, On Canada N2M 2C8. Tel: 519-745-1158. Circle EQ free lit. #101.



DOES FRANK BLACK PLAY?

The new Millennium guitar amplifier from Johnson Amplification (a division of DigiTech) offers a new level of amplification by combining a 150-watt stereo amplifier (75 watts per side), two 12-inch Celestion "Vintage 30" speakers, and an on-board programmable multi-effects processor. The amplifier's front end features both "Normal" and "Bright" inputs and two 12AX7 tubes. With six different possible amplifier voicings — American Stack, British Stack, American Combo, British Combo, "Johnson," and Custom Distortion — the Millennium has the ability to simulate most amplifiers on the market today, while creating its own unique tones as well. The Millennium's effects section is based on the DSP operating system of DigiTech's 2112 Studio Guitar System and features tube and solid-state distortions, as well as digitally-controlled Analog Wah, EQ, Noise Gates, Reverbs, Choruses, Flangers, Intelligent and Smooth Pitch Shifters, Detuners, Smooth Whammy, Phasers, Tremolos, Auto Panners, Rotary Speaker Emulation, Cabinet Emulation, and more. Traditional amplifier controls are provided, and rear connections include a mono effects send and return, speaker outputs (4), Cabinet Emulation outputs (2) and



MIDI In, Out/Thru. The Millennium will be available with a suggested retail price of \$1595. For more details, contact DigiTech, 8760 South Sandy Parkway, Sandy, UT 84070. Tel: 801-566-8800. Web: www.digitech.com. Circle EQ free lit. #102.

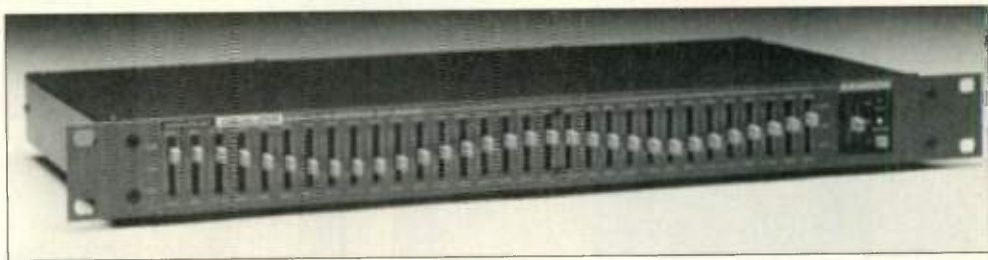
WINDOW OF OPPORTUNITY

With the introduction of the 562E Windowing Expander/Gate, Symetrix has created several features that will significantly enhance a user's gating and expander control. AutoWindowing is a processing technique that allows the user to maintain better control of the gate envelope parameters. This feature utilizes a dynamic smoothing process to eliminate "pops" produced by the processing, as well as ultra-clean math rails to isolate the control path, eliminating distortion and other unwanted artifacts of VCA control voltage modulation. Window Advance is a sidechain feature that moves the statistical energy center of the gated signal forward in time, allowing the user to delay the signal energy and center it within the envelope. The 562E carries a suggested retail price of \$579. For more information, contact Symetrix, 14926 35th Avenue West, Lynnwood, WA 98037. Tel: 425-787-3222. Web: www.symetrixaudio.com. Circle EQ free lit #103.



BOOST AND CUT

In addition to balanced XLR and TRS inputs and outputs, the new E31 1/3-octave 31-band equalizer from Samson offers ± 15 dB of gain; a master level control with 6 dB of boost and cut to infinity with a 0 dB detent; as well as low noise circuitry and a parallel filter design for minimum phase distortion. As an extra safety precaution, Samson has incorporated buffered power on/off circuitry into the E31 to prevent speaker "thumps" when the unit is powered up or down, as well as an automatic hard-wired bypass in case of power loss. The suggested retail price of the E31 is \$239. For more information, contact Samson Technologies, P.O. Box 9031, Syosset, NY 11791-9031. Tel: 516-364-2244. Circle EQ free lit. #104.



CRAVING A CARVIN?

Carvin's newest line of heavy-duty power amplifiers, the DCM (Direct Current Millennium) Series, is available in 1500- and 2000-watt models. Each amplifier is housed in a rugged three-space, rackmountable, 16-gauge galvanized steel chassis and weighs in at 28 and 33 pounds, respectively. The amplifiers utilize custom-wound, lightweight, low-noise "Toroid" transformers to deliver continuous 2 ohm stereo output loading. Each channel features XLR and 1/4-inch inputs and 1/4-inch, Speakon connector, and binding post outputs. The amplifiers also utilize a unique "opto-isolator" system in the limiting circuit to prevent loudspeaker damage

commonly caused by distortion peaks. The DCM1500 is priced at \$559, and the DCM2000 at \$699 plus \$19 direct from Carvin. For more information, contact Carvin, 12340 World Trade Dr., San Diego, CA. 92128. Tel: 1-800-854-2235. Web: www.carvin.com. Circle EQ free lit. #105.

DYNAMIC DAT DUO

The first of its kind, TASCAM's DA-302 Dual DAT Recorder offers external control I/O capability for multiple unit operation, high-speed and append dubbing capability, independent S/PDIF digital I/O for each deck, digital output format selection supporting both S/PDIF and AES/EBU protocols, continuous record capability between decks 1 and 2, simultaneous record capability, and an optional LA-D302 balanced analog I/O kit. With a standard 120 DAT tape in each well and the DA-302's Long Play record capability, you can achieve eight full hours of uninterrupted stereo record time. The DA-302 carries a suggested retail price of \$1999. For more information, contact TASCAM, 7733 Telegraph Road, Montebello, CA 90640. Tel: 213-726-0303. Circle EQ free lit. #106.



EQ PRODUCT VIEWS

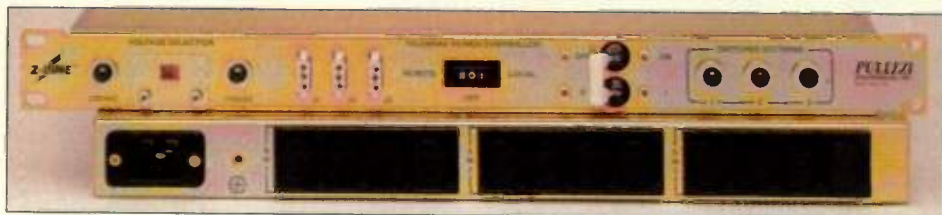


MIC-OF-ALL TRADES

With five switchable polar patterns—omni, wide cardioid, cardioid, hyper-cardioid, and figure 8—the Microtech Gefell UMT 800 large-format condenser microphone has been designed for voice overs and high-quality sound applications. The UMT 800 sports an M7 pickup capsule and a solid-state transformerless amplifier that uses standard 48-volt phantom powering. To reduce proximity effect when close miking, the UMT 800's sensitivity can be reduced by a 10 dB switch mounted on the body of the mic. The mic is available in a black matte or satin nickel finish for a suggested retail price of \$2250 (which includes the MH 80 swivel and a 25-foot cable). For further details, contact G Prime Limited, 1790 Broadway, 4th floor, New York, NY 10019. Tel: 212-765-3415. Web: www.gprime.com/mtg. Circle EQ free lit. #107.

GO WITH THE FLOW

The TPC 2364/MTD power distribution and management system from Pulizzi Engineering is CE Mark Certified to the EMC Directive 89/336/EEC and the Low Voltage Directive 73/23/EEC, as well as safety agency tested to UL/cUL and TUV EN60950. The 1.75-inch high, 19-inch rack-mount system includes voltage selection for either 90–135 VAC or 180–250 VAC single phase input/output 47–63 Hz. The maximum amperage is 20 AMPs at 120 VAC or 16 AMPs at 240 VAC. There are 12 switched IEC 320 outlets and four grouped outlets per switched section. The TCP 2364/MTD carries a suggested retail price of \$498. For more details, contact Pulizzi Engineering, 3260 S. Susan Street, Santa Ana, CA 92704-6865. Tel: 714-540-4229. Circle EQ free lit. #108.



Sound better than you ever imagined...



104 Aphex Aural Exciter® with Big Bottom® - 2 channel



106 Aphex Easyrider® Compressor - 4 Channel



108 Aphex Easyrider® Compressor - 2 Channel

TUBESSENCE®



12AT7 - Used in 107 and 109
Contact Aphex for the full technical scoop.

104: Bigger, deeper, fuller bass. Extended, natural highs and greater presence. Get more sound from your system without increasing peaks. Individual tracks or an entire mix will 'jump' from the speakers.

105: The Logic Assist makes this gate the most accurate and easiest to use in the world - no false triggering, clicking or chattering. The proprietary Aphex VCA 1001 ensures total audio transparency.

106: Invisible. This automatic compressor is so transparent that some people think it isn't working! Effortlessly maintain perfect levels without having to constantly adjust ratio, attack, release and threshold.

107: The award winning, #1 selling Tubessence mic preamp is the perfect marriage of solid state and vacuum tube circuitry. Upgrade the sound of all your mics with uncolored detail, presence and warmth.

These products are covered by one or more of the following U.S. Patent numbers: 4150253, 5359665, 5334947, 5450034, 5424488, 5483600.

GET THE POINT

Building on the popularity of their Monitor One and Monitor Two reference monitors, Alesis's Point Seven system is a fully-shielded two-way reference monitor designed for audio mixing as well as multimedia audio creation and playback. The Point Seven's shielding scheme allows users to place the units directly next to a computer or video monitor without causing interference to the display system. A new proprietary-designed high-frequency driver offers high power handling and a soft silk dome while a low-frequency driver, made up of a unique non-woven carbon fiber, offers an enhanced bass transient response and enhanced durability. A front panel dual-ported venting system allows the Point Seven to deliver strong audio transients in the lowest octave while being placed flush against a wall. The Point Seven offers a frequency response of 85 Hz-22 kHz, and can handle 50 watts RMS and 100 watts peak. Retail price is \$299/pair. For further details, contact Alesis, 3630 Holdrege Avenue, Los Angeles, CA 90016. Tel: 800-5-ALESIS. Circle EQ free lit. #109.



USE THE FORCE

Thanks to the newly developed TC DARC 3-chip, The G-Force guitar multieffects processor from TC Electronic is capable of running up to eight different effects simultaneously in any combination and order. The G-Force is equipped with Hi-Z unbalanced inputs and Low-Z balanced outputs, as well as a user-friendly interface that boasts a large illuminated display and an integrated guitar tuner. Available effects include: delay algorithms, which build on the TC 2290 tradition; chorus inspired by the TC 1210; reverb derived from the M2000; intelligent 2-octave pitch-shifting designed by Wave Mechanics; filter; compression; pan/tremolo; and drive. The unit offers real 24-bit resolution A/D (In) and D/A (Out) converters, and supports a 44.1 kHz sample rate. The G-Force will be available with an MSRP of \$1795. For further information, contact TC Electronic, 790-H Hampshire Ave., Westlake Village, CA 91361. Tel: 805-373-1828. Circle EQ free lit. #110.



...at a price you won't believe

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NOW
\$449



107 Apex Tubessence Mic PreAmp - 2 channel



Is there really a tube in there?

When Tubessence[®] was first introduced with the Model 107, some people had trouble believing that it was a real tube gain stage. Skeptics say, 'It's a tube simulator', or 'It's a starved-plate amplifier', or 'The tube's not in the audio path'.

The "Reflected Plate Amplifier" (US Patent #5450034) is a true vacuum tube circuit which has the desired characteristics without the heat, weight, fragility, sonic variability, short life and high frequency roll-off of conventional tube designs.

~~\$495~~
NOW
\$449



109 Apex Tubessence Parametric Equalizer



NOW
\$449



105 Apex Logic Assist™ - 4 Channel Gate

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CIRCLE 06 ON FREE INFO CARD

108: The Wave Dependent Compressor simultaneously controls average and peak levels for the hottest tracks possible without the artifacts of other compressors. Finally, an 'auto' compressor that sounds better.

109: Got enough EQ? Two channels of fully parametric, two band, tube EQ, great for mastering or touch up. Track needs major work? Hit a switch and it's a mono four band. Unparalleled sound and flexibility.

Foreign patents issued or pending. Apex, Aural Exciter, Big Bottom, Logic Assist and Tubessence are trademarks of Apex Systems Ltd.

EQ STUDIO WARE

IT'S IN THE CARDS

E-mu's EMU8710 Audio PCMCIA Card is a compact PC-Card that provides the ability to produce CD-quality digital audio and wavetable music on a standard Windows 95 Pentium-based computer. Utilizing Windows 95 compatible



software, the EMU8710 will support the playback and recording of digital audio and MIDI music files. The EMU8710 PC Card features professional quality, 16 bit/44 kHz stereo audio capabilities and a 32 voice, 2 MB General MIDI wavetable synthesizer. The card also offers multiple reverb and chorus effects and can be loaded with up to 512 kB (RAM) of new sounds utilizing SoundFont Technology, compatible with Sound Blaster AWE64. The EMU8710 comes standard with Control Panel Software, Windows 95 Drivers, several SoundFont Banks, example files, and a stereo audio playback cable. For more information, contact E-mu Systems, Inc., 1600 Green Hills Road, Suite 101, Scotts Valley, CA 95067-0015. Tel: 408-438-1921. Web: www.emu.com. Circle EQ free lit. #113.



WHAT'S YOUR MO?

Boasting burst rates of 10 MB/s and sustained throughput of 4 MB/s and a 2.6 GB capacity, Plasmon Data Inc.'s new DW260 magneto optical drive is now available. The DW260 offers both LIM-

DOW (Light Intensity Modulation Direct Overwrite) technology capability or the ability to function as a traditional MO drive. The drive is bundled with two software utility programs, Data Saver Back-up Utility, and either DOS Mounter Lite (Mac), or Formatter One Pro (PC/Windows), all from Software Architects. LIMDOW technology enables users to write and erase data in one step, which increases the recording speed dramatically. The DW260 is available at a suggested retail price of \$1995 for an external drive and \$1895 for an internal drive. For more information, contact Plasmon Data, Inc., 9625 West 76th St. Eden Prairie, MN 55344. Tel: 800-451-6845. Web: www.plasmon.com. Circle EQ free lit. #111.

HAPPINESS IN SLAVERY

A high-quality, multipurpose synchronization device designed for use with Digidesign audio systems, the Digidesign Universal Slave Driver can achieve fast, near sample-accurate lock to timecode while maintaining maximum audio fidelity via its low jitter clock. The Universal Slave driver supports all major industry-standard clocks and can also act as a stand-alone timecode reader/generator, with a front panel that features LED status indicators, function switcher, and a large timecode display. Combining the capabilities of both the Digidesign SMPTE Slave Driver and the Video Slave Driver, the Universal Slave Drive also features a VITC Reader/Generator with timecode window burn, Bi-Phase support, and more. For further information, contact Digidesign, A Division of Avid Technology, 3401-A Hillview Avenue, Palo Alto, CA 94304. Tel: 800-333-2137. Web: www.digidesign.com. Circle EQ free lit. #112.



CHAIRMAN OF THE BOARD

With direct digital audio recording from DOS, Windows 3.1, Windows 95, and Windows NT4.0, the 24-bit DSP based Zefiro Acoustics ZA2 can simultaneously record and play back to any digital audio device using coaxial S/PDIF, fiber optic S/PDIF, or XLR AES/EBU. The ZA2 also offers analog outputs and a 24-bit DSP chip for real-time sample-rate conversion, 20-bit recording and other digital processing. Zefiro has also included software to back up hard disk files to an audio DAT deck, decode MPEG audio files, and to generate subcode information for CD mastering. In addition to real-time sample-rate conversion and MPEG audio decoding, the ZA2's DSP chip also contains a completely software programmable clock source that enables the card to not only support the traditional 32 kHz, 44.1 kHz, and 48 kHz sampling rates, but also special rates such as 44.056 kHz for video. The suggested retail price for the ZA2 is \$495. For more details, contact Zefiro Acoustics, P.O. Box 50021, Irvine, CA 92619-0021. Tel: 714-551-5833. Web: www.zefiro.com. Circle EQ free lit. #114.



The Logic System:



Logic Audio 3.0* – The Pro's choice. Feature rich 960ppq real-time Sequencer. Professional scoring and printing. Unlimited virtual mixers with full automation. Up to 24 tracks of digital audio with intense offline and real-time DSP editing.



Logic Audio Discovery 2.0* – Entry level price with a professional feature set. 960ppq real-time sequencer with surprising scoring and printing. Simplified MIDI environment with virtual mixers and automation. Even real-time DSP.



Audiowerk8 – Complete Digital Audio Recording Solution. 2 in, 8 out, S/P-DIF I/O, PCI busmaster digital audio card & VMR control surface software for MAC or PC.



Unitor8* – 8 x 8, single rack space, cross platform MIDI interface. Stack up to 8 for a maximum of 1024 MIDI Channels. Read/write SMPTE for LTC/VITC.



Logic – The MIDI Masterpiece. The most integrated 960ppq real-time sequencer to date. Professional scoring and printing and a totally user definable interface. Unlimited virtual mixers and editors. Full automation, full SYSEX support and more.



MicroLogic – The Beginners Dream. The Perfect introduction into the world of real-time 960ppq MIDI sequencing with surprising scoring and printing. Full GM and GS support included with full automation. A great value.



SoundDiver – The Ultimate in Synthesis Patch Management. Universal Editor/Librarian for Mac or Windows 95.

* Available Third Quarter 1997

Logic Audio Discovery: Digital Audio and MIDI made easy!

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



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

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

- 960 ppq MIDI Sequencer
- Virtually Unlimited MIDI Tracks and basic Scoring
- Virtual Mixing and a Sample Editor built in
- Time Machine for audio pitch shift and time compression
- Non-destructive Real-Time Editing of MIDI/Digital Audio
- Support for Digidesign™ DAE and Apple® SoundManager
- Support for any Windows 95™ compatible sound card

Whether you're a seasoned musical technologist or just getting your feet wet, Logic Audio Discovery offers an affordable integrated solution that allows you to concentrate on your music. Available at fine music and computer stores worldwide.

Emagic Web Site
<http://www.emagic.de>

Emagic Inc
Tel. +916. 477 1051
Fax +916. 477 1052

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emagic
Technology with Soul.

CIRCLE 28 ON FREE INFO CARD

the Missing Link?



How can you edit your **adat** recordings? If you have a PC & STUDI/O, it's easy.

Pick any of a number of programs: Sound Forge, SAW++, Samplitude, Cubase Audio, Wavelab, CoolEdit, GoldWave, etc. It's amazing what you can do with a computer these days! But... how do you get those 16-mic drum parts into the computer in the first place? Or, once you've stacked and fattened those vocal harmonies, how do you get them out?



we've Found it.

With the STUDI/O multichannel sound card you get two sets of optical in/out: that's two adats!

16-channels, phase-locked and in sync. No ground loops, no noise. Switch to SPDIF format and digitally record from a sampler CD. Bring it in at 48KHz on the fly, using the onboard sample rate converter. Transfer to and from your DAT machine. Convert to 44.1 KHz on the way. Use your ADATs in pass-thru mode to go direct to disk. Or, connect STUDI/O directly to your favorite digital mixing console.

STUDI/O.



GET it!

Get 16-channel, 24-bit record and playback. Get 18-bit stereo analog monitor mix. (Steerable to digital outs too!) Get top-quality stereo sample rate conversion. Get full compatibility with Windows® Sound System.

...Get STUDI/O!

SONORUS

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CIRCLE 87 ON FREE INFO CARD

EQ STUDIO WARE

RADAR LOVE

Otari has announced that a 48-track configuration of the RADAR hard-disk recording system is now available. With the release of RADAR Version 1.4 software, two RADAR units can be linked together with a single cable to provide sample accurate 48-track recording and editing from a single RE-8 session controller via RADAR Link. An additional feature of the RADAR system is Machine Control, which allows RADAR to slave to Sony P2 extended protocol. For more details, contact Otari Corporation, 378 Vintage Park Drive, Foster City, CA 94404. Tel: 415-341-5900. Web: www.otari.com. Circle EQ free lit. #115.

AUDIOACTIVE ON THE INTERNET



Telos Systems' Audioactive Internet Audio Suite is a professional hardware and software system that makes it easy to provide both real-time and stored audio streams over the Internet. The unit uses enhanced MPEG Layer 3 coding technology to compress the audio to less than ten percent of its original size. The system offers everything needed for a complete Internet Audio broadcast chain, including encoding systems, a "transmitter" or audio server, and easy-to-obtain receivers or players. Audioactive requires PC sound card and Power Macintosh-equipped users to download a free Audioactive player in order to listen to live Webcasts. The unit supports NetShow 2.0, and is fully compatible with Macromedia's Shockwave plug-in. For further details, contact Telos Systems, 2101 Superior Avenue, Cleveland, OH 44114. Tel: 216-241-7225. Web: www.zephyr.com. Circle EQ free lit. #116.

OH, OH, OH, IT'S MAGIC

Emagic's Unitor8 is a 19-inch, single rack-space, synchronizer and MIDI interface for MacOS or Windows computers. Each unit offers eight MIDI inputs and eight independently addressable MIDI outputs. The Unitor8 has the ability to write SMPTE as LTC and VITC and can read LTC from 1/4 to 4x normal speed. The SVHS I/O allows users to insert a timecode display on the video screen, and a built-in click input allows any percussive input to be used as a sync reference. Up to 8 units can be stacked, allowing a maximum of 1024 separate MIDI channels. The included control software provides stand alone operation by allowing MIDI input/output routing. The Unitor8 ships with a Windows 95 compatible MIDI-driver and supports OMS via MTP emulation and MacOS systems. Unitor8 will carry a suggested retail price of \$799. For further details, contact Emagic Inc., 13348 Grass Valley Avenue, Building C, Suite 100, Grass Valley, CA 95945. Tel: 916-477-1051. Web: www.emagic.de. Circle EQ free lit. #117.



**Good-looking
and loaded.
No wonder it's
so popular.**



With its sleek front panel and jog shuttle, the new PCM-R500 DAT Recorder certainly catches your eye. But it's not just another pretty face.

It's packed with professional features not usually found in this price range. Like four direct-drive motors, which give you better tracking, a lower error rate, longer motor and tape life, and precision high-speed cueing and shuttling.

It has a software set-up menu for easy,

customized operation. And then there's Super Bit Mapping,[®] the technology that delivers superior, near 20-bit resolution sound without sacrificing compatibility with the industry standard 16-bit format.

Call 1-800-635-SONY, ext. R500 right now to learn more about the PCM-R500 DAT recorder. You'll love it because it's loaded. But hey, being good-looking never hurt.

— The PCM-R500 Professional DAT Recorder —

SONY

- 4 Direct-Drive Motors

- Variable Shuttle/Cueing Wheel

- AES/EBU and SPDIF Digital I/O

- New High Resolution Pulse A/D

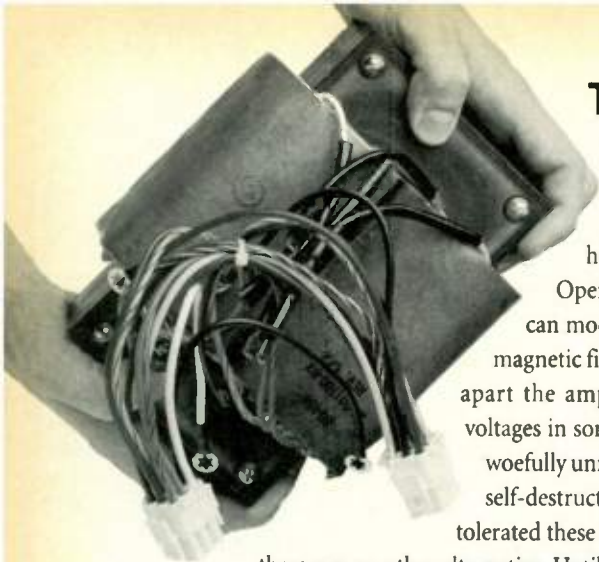
- SBM (Super Bit Mapping) Filter in Conversion Circuitry

- A/D and D/A Monitoring Modes

- Balanced XLR Analog I/O

- User Set-up Menu



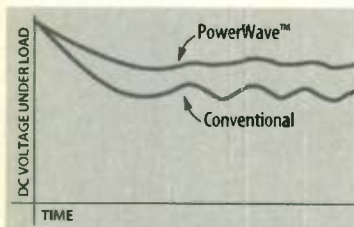


THE PAST...

High power amplifiers with old fashioned iron core transformers are dinosaurs. While effective at delivering raw power, these big, heavy, and slow devices have weaknesses. Operating at AC line frequency, the supply voltage can modulate the audio signal under clipping. Strong magnetic fields induce AC hum. Big transformers can tear apart the amp and racks on the road. Poorly regulated voltages in some popular high end brands cause them to be woefully unreliable and inclined to self-destruct. Audio engineers have tolerated these shortcomings because there was no other alternative. Until now...

...AND THE FUTURE

PowerLight™ amplifiers use patented PowerWave™ power supplies, the most efficient power supply available in audio. Operating at 114kHz, a one pound PowerWave™ transformer has more current capacity than



PowerWave sags less under load and has less AC ripple

a 50 pound conventional 60Hz transformer. Primary capacitors operating at a higher voltages more than double their energy storage. The result—a stiffer supply with more power and more energy storage for gut-wrenching bass. AC magnetic fields never enter amplifier circuitry—reducing hum to inaudible levels and increasing dynamic range. Reliability is increased because light weight prevents transit damage while the robust design and Intelligent Amplifier Protection™ keep the things working under conditions that would kill a conventional amp.

Output Power in Watts per Channel			
MODEL	8Ω*	4Ω*	2Ω**
PowerLight 1.0	200	325	500
PowerLight 1.4	300	500	700
PowerLight 1.8	400	650	900
PowerLight 2.0™	650	1000	N/A
PowerLight 3.4	725	1150	1700
PowerLight 4.0	900	1400	2000

*100VU, 20KHz, 0.707V, 10% THD **100VU, 20KHz, 0.707V, 10% THD



The new PL 2.0™ 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

ALL POWERLIGHT AMPS FEATURE:

- PowerWave™ Switching Technology
- Clip Limiter (user defeatable)
- Remote AC Power Control
- Data Port for Computer Control
- Variable Speed Fan(s)
- DC, Sub Audio, & Thermal Overload Protection
- Advanced Thermal Protection
- Patented Output Averaging™ Short Circuit Protection

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 performance. 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 information...better yet, come by for a visit!

QSC AUDIO PRODUCTS, INC.

1675 MacArthur Blvd., Costa Mesa, California, 92626 USA

Ph 714/754-6175 Fax 714/754-6174

Email info@qscaudio.com Web www.qscaudio.com

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QSC's PowerLight Project Team

(clockwise from left): Darrell Austin, Technical Services Manager; Pat Quiter, Chief Technical Officer; Robert Becker, Design Engineer; Greg McLagan, Market Manager (Live Sound); Doug Teulie, Industrial Designer



"Zero defects, 450 shows"

Mike Southard
Southard Audio (Mt. Crawford, VA)

"I bought one ton of PowerLights and replaced 3 tons of conventional amps...you do the trucking math!"

Dave Cousins
Sound Arts (Winnipeg, Canada)

"...we feel that the best of all worlds has been created...light weight, sonic excellence."

Tom Smith
LD Systems (Houston, TX)

"Best sounding, most reliable amps on the road...hands down"

Dave Shadoan
Sound Image (Escondido, CA)

"...my choice for a long, long time..."

Jeff Lilly
Jason Sound (Vancouver, Canada)

This one pound PowerWave™ switching power transformer can help you improve your audio system, reduce operating headaches, and deliver...



More Bass, Less Noise and Fewer Problems

PowerLight amplifiers are the first lightweight amps to surpass conventional technology in both audio performance and reliability. Advanced PowerWave™ technology eliminates the bulky, heavy power transformers and their problems while improving audio. Large sound systems powered by PowerLight amplifiers are better sounding, more compact, lighter and more reliable than systems using the traditional solutions.



With thousands of shows logged all over the world, the PowerLight Series has built a tremendous following among demanding professionals. Now PowerLight amplifiers have been improved—with new models and increased 2 ohm power, the addition of defeatable Clip Limiters and a HD15 Dataport connector for QSCControl compatibility. Check out PowerLights for yourself. Contact us for complete information—better yet, talk to someone who owns them. References gladly provided.

QSC
AUDIO

Hear the Power of Technology™

CIRCLE 54 ON FREE INFO CARD

Private Viewing

Located in downstate Illinois, this private facility is drawing top-notch talent

STUDIO NAME: Private Studios

LOCATION: Urbana, IL

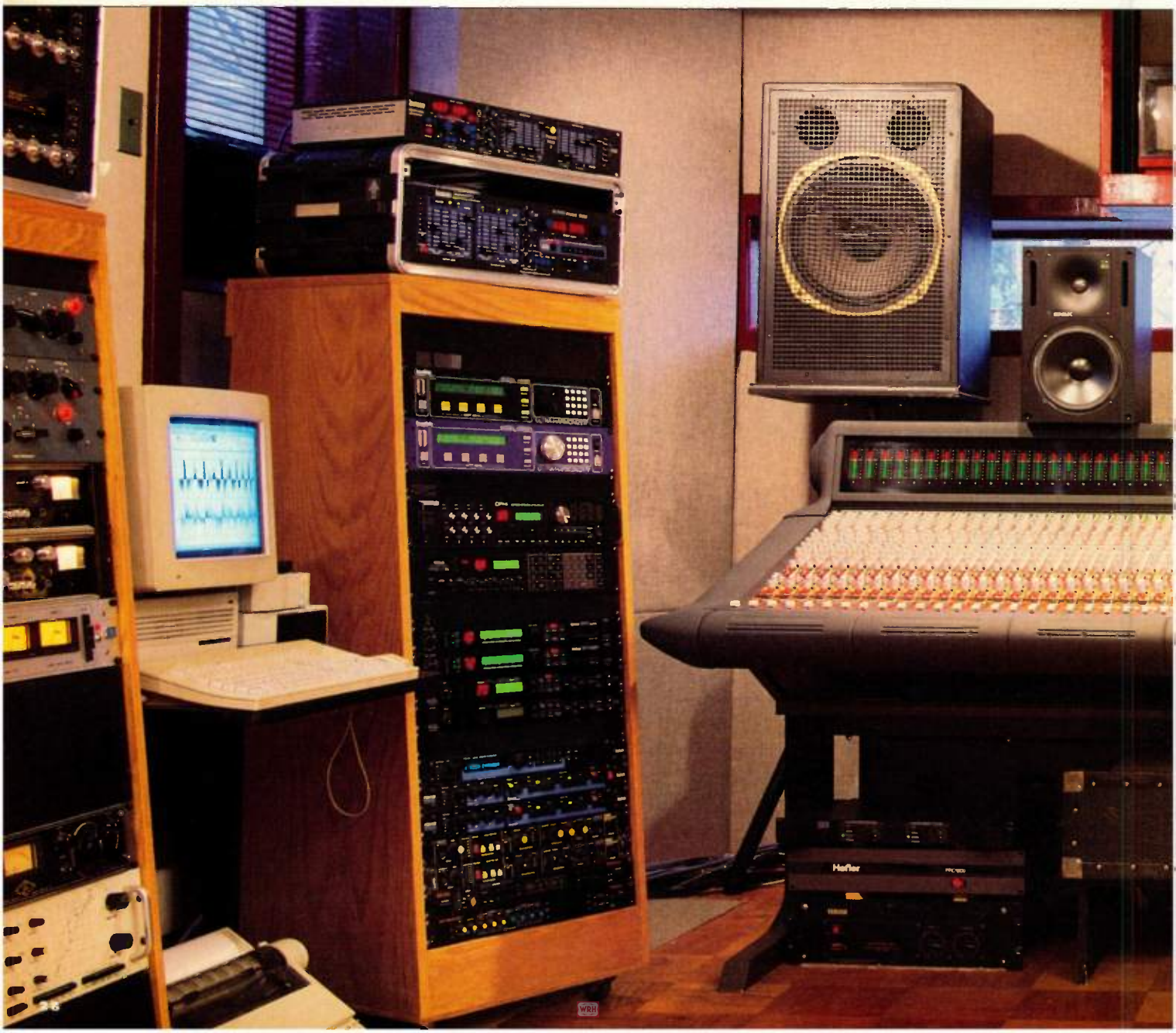
KEY CREW: Jonathan Pines [Owner/Chief Engineer], Brendan Gamble [Engineer], Adam Schmitt [Producer/Engineer], Richard Scholwin [Chief Assistant Engineer]

CREDITS: Producers and engineers who have recently enjoyed Private Studios include Trina Shoemaker (Sheryl Crow, Midnight Oil, Emmylou Harris, etc.); Jay Bennett of Wilco has been doing additional recording and mixdown of the

Wilco side project "Courtesy Move" and brought in new Australian artist Sherry Rich for mixing and mastering on Rubber/BMG; and Adam Schmitt just finished mixing new artist Robynn Ragland for Paladin/Giant records.

CONSOLE: 72-input AMEK Galileo fully automated console with Recall & Virtual Dynamics and 12 Rembrant Modules; Neve BCM 12 10x2 submixer with 1073 Class A modules

TAPE MACHINES: Custom Sony JH-24 2-



inch tape machine; 32 tracks of ADAT-XT with BRC; Studer 1/2-track; TASCAM 122 [2] and 112 [2] cassette machines
DAT MACHINES: TASCAM DA30 MkI and II DAT Machines [4]

MONITORING SYSTEM: Custom Tannoy 15-inch monitors with Bryston 4Bs; Genelec 1031A; Sony CF-1030 boombox; Hafler Trans-Nova 9303 and PRO1200 headphone amplifiers

MICROPHONES: AKG C12 [2], C12A Nuvistor [2], C24, 460 B-ULS [2], 451EB [2], C414 P48 B-ULS, and D112 [4]; Neumann U47, SM23c, KM56 [3], and KM64; Sony C37a [2], ECM 51 [2], ECM 9, and ECM22P; Beyer ribbons; Altec Tubes; RCA BK-5a; Sennheiser 421 [6] and 441; Shure

SM7 [2], SM56 [2], SM57 [10], SM58 [6], SM94 [2], Beta 57 [2], Beta 87 [4], SM62, SM59, Beta 52, and 330/315 [5]; Octavia

MIC PREAMPS: Demeter vacuum tube mic preamps/DIs [4]; RCA custom tube preamps/DI [4]; Hardy M1 mic preamps [2]; Rupert Neve 1073 Class A mic preamps/equalizers [2]; AMEK/Rupert Neve 9098 mic preamps/equalizers [2]; API mic preamps [8]; Valley QLZ [4]; 4-channel custom Simon Systems DI

EQUALIZATION AND COMPRESSION: George Massenburg Labs stereo equalizer; Sontec stereo parametric equalizer; EMT PDM156 stereo compressor/limiter; Heilos RE24 stereo EQ; API 550 [8], 560A [5], and 554 [2] equalizers; Aengus and B&B EQs; Pultec

EQP-10S [2], EQP-1A, and EQP-1AS tube equalizers; Lang PEQ1 tube equalizers [3]; UREI 175B [2], 176 [4], 177, and 1178; Collins tube equalizer; RCA BA6A tube compressor; Drawmer 1960A tube compressors and ADR F-769x-R Vocal Stressors [2]; Eventide Omnipressor; SSL Stereo Limiter; B&B CX-1 [6]; Valley Audio 610 and Gain Brain II's [5]; Kepex II's [2]; Commander, Levelar, and Dynamite compressors; dbx 165, 165a, 160XT [2], and 166 [4]; Drawmer DS201 noise gates

TIME-BASED EFFECTS: Lexicon PCM 60 and 70 [2], various Lexicon Primetime, Primetime II, and Super Primetime Delays [M92, M93, M95, M97, 102s, etc.];

continued on page 132



PHOTO BY CHRIS BROWN

Telefunken ELA M 251

A look at this
AKG OEM'd mic from
Telefunken's past

MICROPHONE NAME: Telefunken ELA M 251
FROM THE COLLECTION OF: Klay Anderson/Klay Anderson Audio
YEAR RELEASED: Circa 1958
CURRENT MARKET VALUE: \$7500 to \$10,000, depending on condition
TYPE OF MIC: Vacuum tube condenser
POLAR PATTERN: Omni, cardioid, and figure-eight (see notes)
TUBE: AC701 (see notes)
FREQUENCY RESPONSE: 40 to 13,000 Hz, ± 3 dB (actual frequency range: 40 to 15,000 Hz)
SENSITIVITY: Approximately 0.9 millivolts per dyne/square centimeter (in omnidirectional pattern)
RATED SOURCE IMPEDANCE: 200 or 50 ohms (can be changed internally)
DISTORTION: Less than 0.5% at 100 dynes/square centimeter @ 1000 Hz
RESIDUAL NOISE: Less than 20 phons (measured to DIN 5045)
POWER REQUIREMENTS: Telefunken ELA M 950 outboard power supply
DIMENSIONS: 8 3/8 inches length x 2 inches (maximum diameter)
WEIGHT: 34 ounces

MIC NOTES: The Telefunken ELA M 251 was actually OEM'd by AKG and employs the legendary CK12 capsule used in AKG's C12 (rumor has it that the mic also appeared as the Siemens SM203). Telefunken also offered the ELA M 250, which was a two-pattern version of the mic: cardioid and omnidirectional. Versions with an "E" suffix used the identical capsule and similar electronics, but employed a 6072 tube in the amplification circuit. The same power supply was used for both the M 251 and the M 250; an "E" suffix on the power supply unit (i.e., the ELA M 950 E) indicated a power supply intended for use with a mic that had the 6072. While the 6072 tube was socketed, the AC701 was soldered into the circuit. According to the Telefunken literature, the "E" version was intended mainly for export. It is interesting to note that the AC701 was a standard in the German broadcast industry, so many manufacturers used that tube in their designs to conform to the standard. It is estimated that the number of ELA M 251's and M 250's manufactured was under



PHOTO BY EDWARD COLVER

2000 (which explains the high market value).
USER TIPS: Anyone lucky enough to own one of these mics would be well-advised to keep a close eye on the cable used to attach the mic to the power supply. Typically, PVC was used

for the conductor insulation, and after about 25 years the insulation can deteriorate and crumble, resulting in a short.

Technical data courtesy of Jerry Graham at G Prime Ltd



The Compressor

The tradition · The pedigree

System 9098

Dual Compressor/Limiter

by Rupert Neve the Designer



The addition of a new Compressor/Limiter to my SYSTEM 9098 product family is justified by the continuing popularity of the famous old 2254 devices I designed in the late 1960s. More than 25 years later, their performance undeniably still brings benefits to engineers and producers seeking inconspicuous control over the dynamic range of microphone signals. Just as importantly, they are used today in digital recording to manage critical levels, to preclude the effects of hard, unforgiving clipping and to impart warmth.

In those days, the Compressor/Limiter had to be almost all things to all men. Controls had to be accurately calibrated for the broadcaster and have the right subjective 'feel' for the music engineer. Attack and decay times, the rate of change of slope, the order of harmonics generated by the non-linear transfer characteristic etc. were arrived at empirically after a lot of listening with golden-eared people. The result was a Compressor/Limiter, the 2254 and its later derivatives, which sounded right and over the years achieved an amazing reputation.

The same principles have been applied to the new SYSTEM 9098 Compressor-Limiter. Considerable advances have been made in technology and I am now able to provide a much more flexible device which retains all of the character and musicality of the original design while incorporating some exciting new features.

Ratio, Threshold, Attack and Release are familiar controls with recognisable ancestry but an important new feature called Ambience has been introduced.

Operating the Ambience switch does not affect signals above the threshold but reduces or mutes signals below the threshold level. The effect is rather like a Gate but is much more subtle. Not only steady background noise but fluctuating ambience and apparent reverberation time can be reduced at will with the Gain control. For example unwanted environmental sound can be re-balanced, or even eliminated, from speech recorded out of doors. The Ambience control will also regulate reverberation - for example, a large reverberant studio can be made to sound like a small speech booth.

The 9098 Compressor-Limiter has a totally analogue signal path which employs transformers at both the input and the output. For the highest possible performance, input and output interfaces must be insensitive to anything other than the signal we want to receive - or there is little point in striving for excellence in the unit itself.

The heart of a Limiter or Compressor is the gain controlling device. The original 2254 used a diode bridge in a classic balanced ring modulator configuration. A very similar technique is used in the 9098 Compressor/Limiter except that semiconductor devices and amplifiers have greatly improved in the last 30 years. For example the original 2254 design had a noise floor of about -55 dBu. Noise performance of the 9098 unit is 35 to 40 dB better.

I believe that the new SYSTEM 9098 Compressor-Limiter continues the rich heritage of earlier designs and its flexibility and extremely high standard of performance will find many satisfied owners in all areas of audio production, whether recording, post-production, mastering or live performance.



AMEK Head Office UK:
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Tel: 818 508 9788
Fax: 818 508 8619

AMEK US Nashville:
Tel: 615 662 8939
Fax: 615 662 8782

AMEK Germany
Mega Audio:
Tel: 06721 2636

AMEK Asia:
Tel: 65 251 1629
Fax: 65 251 1297

New Personal Stereo Monitors

Two sound-reinforcement staples enter the personal monitor market

BY STEVE LA CERRA

It was only a few years ago that the personal monitor market was dominated by only one or two manufacturers. But with more and more performers using personal monitors, that market has expanded, and so has the number of companies manufacturing these systems. Shure and Sennheiser have each introduced their first personal monitor systems.

SHURE PSM600

Shure's PSM600 system was designed (as are most personal monitors) for on-stage use and is available in two versions: UHF wireless and hard wired. Both systems are stereo and come with body packs that provide the user with control over volume, left-to-right balance and

Shure's exclusive MixMode™ feature (more on that later). Audio is delivered to the ear through Shure's E1 earpieces, which are provided with the system.

Input to the wired system is via a small cable harness that has two female XLRs at one end and a serious-looking 5-pin LEMO connector at the other. Audio from the monitor console is patched directly to the XLRs and the LEMO end of this cable attaches to the audio input at the bodypack. In the wireless version, audio from the monitor console is patched into a half-rack mount UHF transmitter, the P6T, which broadcasts the stereo signal to a receiver version of the bodypack (this wireless bodypack has a small, detachable whip antenna). In addition to the aforementioned controls, both bodypacks also have a defeatable limiter.

Connection from the bodypacks to the E1 is via a gold-plated, 1/8-inch (3.5mm) stereo mini plug. Two different ear "plugs" are available for the E1 monitors. The PA755's are a tapered, flanged rubbery plug, while the PA750's are a more familiar-looking round foam plug. Both types have a hollow center through which the E1 transducers are in-

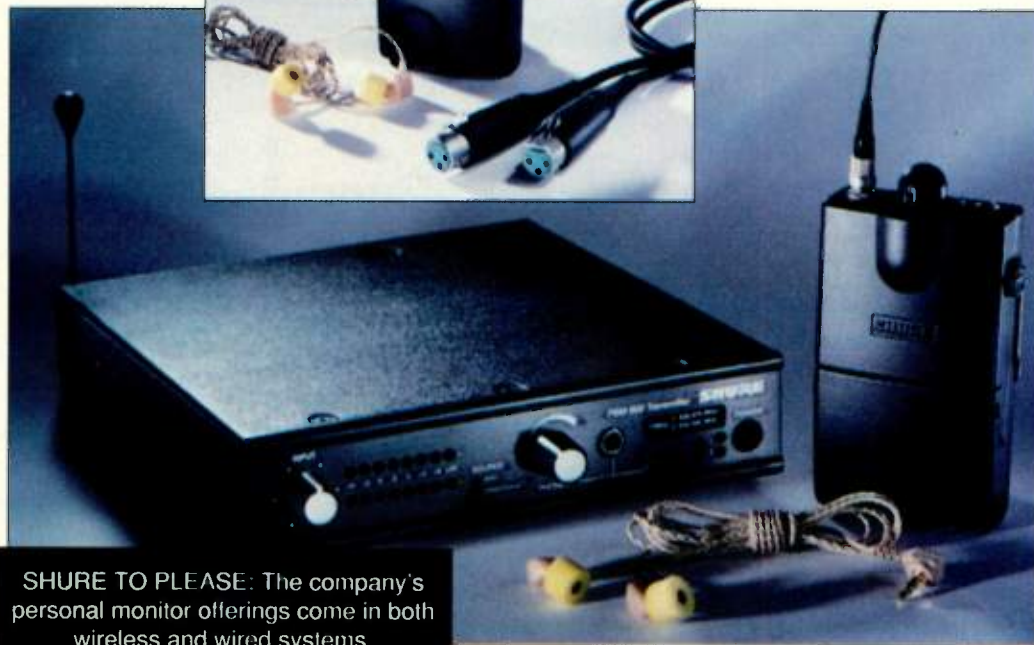
serted for delivery of sound to the ear. Impedance of the E1 is 24 ohms; a 113 dB SPL can be delivered with 1 milliwatt of input.

Wireless operation of the P6T is in the UHF band, specifically within the 626 to 662 MHz range. Ten different frequencies are available, all of which are designed to be able to work simultaneously with all of Shure's other VHF and UHF systems without interference. Operating range is specified as 300 feet, which obviously will be dependent on surrounding conditions. Each P6T and wireless bodypack can be user-switched to one of two frequencies, providing an option in areas where interference could be a problem.

Front-panel controls for the P6T include input level with stereo LED meter, stereo headphone jacks (both 1/4-inch and 1/8-inch) with volume control, frequency select, MixMode/stereo source select, and power on/off. Monitor engineers will appreciate the headphone jacks: they can quickly plug in and monitor a specific mix being transmitted with their own earpieces.

On the rear panel, the P6T features a pair of Neutrik Combo connectors for signal input from either balanced or unbalanced sources. An input pad switches between +4 dB and -10 dB operation. There's also a pair of 1/4-inch "loop out" jacks that are a parallel tap of the input signals, allowing the mix to be fed to another device. Frequency response of the P6T is stated to be 50 Hz to 15 kHz (+0, -3 dB re: 1 kHz, earpiece dependent). Channel separation is spec'd at 35 dB and THD at 0.8 percent. A BNC connector serves as the antenna output.

For those who are running multiple PSM600 systems simultaneously, Shure also offers the PA760 Wireless Antenna Combiner. This half-rack unit combines the RF output from up to four separate transmitters and delivers those signals to a single antenna output. One obvious advantage is that it cuts down the number of antennas on stage, but, more importantly, the PA760 reduces the amount of inter-modulation distortion be-



SHURE TO PLEASE: The company's personal monitor offerings come in both wireless and wired systems.

AKAI professional

the new
MPC

The latest generation of the legendary MPC family, featuring:

- 32-voice, 16-bit Akai stereo sampling engine
- 2MB RAM expandable to 32MB with SIMMs
- 16MB Flash ROM capacity
- 64-track sequencer with 100,000 note capacity
- New easy-to-use graphic interface
- Large 248x60 LCD featuring graphic waveform editing
- Standard SCSI interface
- Polyphonic and monophonic playback modes
- Beat Loop function for perfectly sync'd rhythm loops
- 16 velocity- and pressure-sensitive drum pads
- MIDI clock/MTC/MMC
- Compatible with E-mu and Roland sample libraries*
- Note Variation slider for control of level, pitch, attack, decay or filter

Options

- Multi-8/Dm expander increases outputs from 2 to 10, plus S/PDIF digital I/O \$299
- SampleVerb 4-bus effects processor* \$399
- SMPTE reader/generator* \$299

\$1499 MSRP

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CIRCLE 7 ON FREE INFO CARD

tween systems, thus enhancing RF performance.

Probably the coolest feature of the Shure PSM600 system is Shure's MixMode. In "stereo" mode, the belt packs deliver a standard stereo signal to the earpieces, deriving the mix from whatever the monitor console is outputting. When MixMode is engaged, the stereo system becomes a sort of "dual mono" system and the former balance control on the belt pack now adjusts the relative level between the two inputs. The purpose of this is to allow the performer's belt pack to re-

ceive two discrete signals — specifically a mix-minus-one in the first channel and the performer's own signal in the second channel. By adjusting the balance control, the per-

former has control of their own instrument (or vocal) level relative to the level of the rest of the band.

The PSM600 series is now available. Suggested list price for the wireless P6TRE1 system (complete) is \$1590; suggested list for the P6HWE1 is \$840.

SENNHEISER 3050

Sennheiser has introduced the 3050 Series, which consists of the SR3054-U and SR3056-U transmitters (single and dual channel, respectively) and the EK3052 receiver. Both transmitters operate as stereo UHF systems in the 450 to 960 MHz range and feature Sennheiser's Hi-Dyn plus® companion for a signal-to-noise ratio of 110 dBA. Operating range is stated to be from 500 to 1000 feet, depending on surrounding conditions.

Housed in a one-rack-space metal chassis, the systems have front-panel controls for power, frequency set, mono/stereo, and headphone level. A 1/4-inch jack is provided for monitoring purposes, and the unit can drive up to 3 volts at the headphone output. An LCD shows the current operating frequency; these transmitters may be switched to one of 16 different frequencies within the operating range. Audio input is via rear-panel XLR jacks (+4 dBu, adjustable), while audio frequency response is said to be 40 Hz to 15,000 Hz. RF output is terminated with a BNC socket for accessory antenna.

Transmitted signals are received by the EK3052 belt pack, which is also capable of being switched to one of 16 transmitter-compatible UHF channels. The EK3052 runs for more than eight continuous hours on a pair of AA batteries and features an LED for "low battery" indication.

Sennheiser expects to begin delivery of the 3050 Series at the end of this summer. List pricing is expected to be around \$4000 per channel.

*For more information contact:
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CIRCLE 53 ON FREE INFO CARD

Alesis ADAT Type II

Alesis debuts a high-end ADAT that includes many of the features users have been clamoring for

BY STEVE LA CERRA

Meet Alesis ADAT Type II — basically an ADAT machine on steroids, not a replacement for XT. This machine runs 20-bit recording in a new format — eight tracks of audio on the same S-VHS tape that the original ADAT uses. You don't need any kind of external processor or converters to get 20-bit resolution to tape; the high-resolution A/D and D/A's are built in, and, no, there's no data compression, thank you very much. If you're wondering, "Why bother with a different bit rate?" it's because the increased word length results in better audio quality at low levels. Those of you who already own ADAT or ADAT-XT machines will be happy to know that the Type II machine automatically detects whether a tape has been formatted for the original or new format, and will be

able to play the original 16-bit (Type I) tapes. Type II machines also have a 16-bit mode; tapes recorded in this mode can be played on ADAT and XT machines as well (but 20-bit tapes will not play on ADAT and XT machines).

Built into the Type II machine are a lot of features that make it a serious tool for use where timecode synchronization is needed. Unlike past ADAT machines, the Type II has an on-board chase-lock synchronizer, as well as inputs for SMPTE code, MIDI, word clock, and video reference — no need to purchase additional equipment when you want to chase code. On the rear panel is an ADAT sync jack that enables this machine to be integrated into an existing ADAT system; Type II's, ADATs, and ADAT-XTs can be linked using the same 9-pin sync cables that are already in use. Additionally, the Type II can receive MIDI Machine Control commands from an external controller without need for any kind of translator box. A built-in timecode reader/generator accommodates any frame rate (drop or non-drop frame) and can synchronize to 48 kHz or 44.1 kHz sample rates (plus pull-up or pull-down rates).

On the inside of the Type II deck is an "IQ" tape transport that has paid its dues in high-end pro VTRs. A front-panel jog/shuttle wheel and direct-drive capstan allow for a variable-speed shuttle mode and tape-scrubbing functions.

Reel motors are direct drive, so you won't have to worry about brake calibrations or periodically changing the idler. Alesis has also included an automatic head cleaning mechanism that will help to further reduce your maintenance chores.

Besides the now-familiar 56-pin Elco connector for balanced I/O, the Type II also has eight channels of balanced I/O on XLR connectors. An expansion card slot can accept an optional AES/EBU interface that contains four I/Os, each porting two channels in and out in the digital domain. Recordings can be made simultaneously via digital input to one track and an analog input to another.

With the introduction of the Type II machine, it appears that Alesis has addressed the "wish" lists from existing ADAT users. One hundred locate points are available and can be written to and read from the data section at the head of a tape without use of an external autolocator. The expanded front panel (now four spaces tall) includes individual input selectors for each track, pitch adjustment from -200 cents to +100 cents, 10-key pad for entering information, and an eight-character alphanumeric display for function status and titling the aforementioned locate points. A "fine" mode for the input meters shows signal level with accuracy of 0.2 dB.

continued on page 132



JUST YOUR TYPE: The newest ADAT recorder offers timecode synchronization, as well as many other high-end features.



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Automation	Yes ^{1/2} Mid	Yes
Stereo FX	2	2
S/PDIF Out	Yes	Yes
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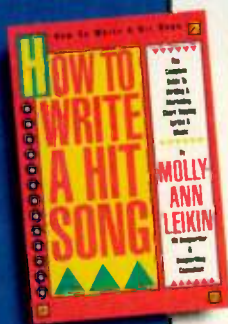
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When you do a side-by-side comparison between our 168RC and Yamaha's O3D, you'll wonder why theirs costs so much more.

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Recording Electronic Drums

Making those faux drums sound as real as they possibly can



BY CRAIG ANDERTON

Although electronic drums are instruments in their own right, for better or worse they are often compared to the real thing — and usually don't come out ahead. Some genres of music demand mechanical sounds (industrial, dance, etc.), but this doesn't mean the parts have to be stiff or boring. Many of the techniques used by real drummers apply to electronic drums as well; in fact, you can seldom go wrong using real drums as a point of reference. Let's look at some tips that will not only improve your recorded sound, but may improve the quality of the part as well.

I'VE LOST MY VOICE!

Most drum machines have limited polyphony: if you try to play too many sounds at once, voices may be "stolen" (i.e., newer sounds will cut off the sustains of existing sounds).

One solution with multitracks is to sync the drums to a sync track, and record a few drums per track (mute the other drum sounds) on each pass. Or record some drums in your multitrack recorder, sync the drum machine to

MIDI (or drive a drum tone module with a MIDI sequencer), and play the remaining sounds as virtual tracks. But be careful: nondrummers frequently overplay parts, and have too many sounds going on at once. If you're running out of voices, that could be one of the seven deadly warning signs of a bad arrangement.

The main voice-stealing problem is cymbals being cut off, as these have long sustains. If possible, overdub real cymbals and forget about using the electronic versions, which generally sound inferior anyway. In fact, you can often fool people into thinking you're using real drums just by overdubbing real cymbals.

SEPARATE OUTPUTS

In addition to stereo outputs, most drum modules have individual outputs, to which you can assign various drums. These outs are excellent for pulling the kick and snare out of the main mix and feeding them separately into the console. Typically, these two sounds are the foundation of a drum mix, and often benefit from custom EQ or other processing. It's also easier to change their levels by moving a mixer fader than jumping into a menu in the drum module. Just remember to take these drums out of the main mix if you're pulling them out by themselves.

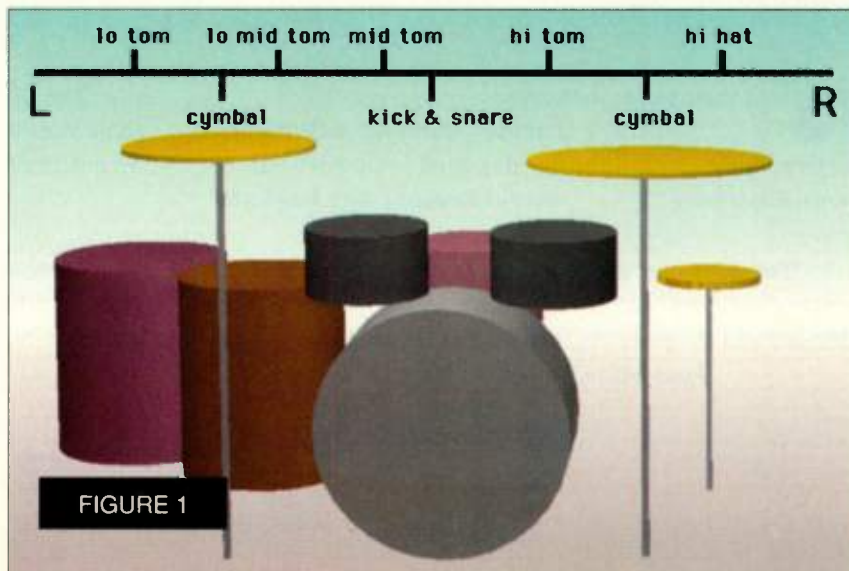
Decide if the listener is behind the

drums or in the audience, as this influences where you position the hihats and toms in the stereo field. I prefer the audience viewpoint, where toms are on the left and hihat on the right. Fig. 1 shows a typical drum setup and where you might pan individual drums in the left/right stereo field; keep your hypothetical setup in mind as you set the panning.

I seldom pan drums full right and left, but close them in a little bit toward the center. This leaves some room for percussion instruments, which tend to go more to the extremes. Arrange the panning so that drums don't fight with respect to frequency response, but complement each other. For example, with hihats on the right, place tambourines and shakers — which also have a lot of high frequencies — toward the left. Since toms are on the left, pan bongos, dumbeks, timbales, and other pitched drums to the right.

THE PROBLEM WITH PROCESSING

Be careful when processing drums. Most manufacturers already add EQ, treble enhancement, compression, etc., to make their drums as wonderful-sounding as possible. However, many times those "5 million drum sounds" are actually one million sounds with four million processing variations. It's often better to seek out the dry drum sounds, and work with those so you can add your own processing.



Part of this processing involves creating an ambient space (real or totally whacked). I've never been a fan of having something like a different reverb on each drum; it seems to diminish the power of the part. Instead, a combination of reverberation with short delays seems to work well.

SEQUENCING WITH ELECTRONIC DRUMS

This could be an article in itself, so we'll stick to a few important tips here.

Change Tempo: Real drummers speed up and slow down to add expressiveness to a song. These changes are often subtle, but have a huge effect on the emotional impact of the music. Your sequencer will have some option for varying the tempo — use it!

Alternating Pitches: No two drum hits are exactly alike, but they are in the world of electronic drums. To get around that problem, try assigning the same drum sound to two different notes, and detune one very slightly compared to the other. Then use a "logical edit" function to move every other note to the alternate drum

sound. This is particularly helpful with drum rolls.

Track Shifting: Drummers often push or lag individual notes to create a particular "feel." For example, pushing the ride cymbal a bit ahead of the beat is a common jazz technique, whereas rock drummers often lag a little on the snare to create a "bigger" sound (subjectively, we naturally associate delay with distance). Sequencers generally include a track shift function that can move entire tracks forward or backward a certain number of MIDI clocks, which is ideal for this application. Others provide "groove templates," which can quantize drums to patterns other than traditional quantization templates. For example, these patterns might have been played by a real drummer or follow a particular type of rhythm (e.g., Salsa or Brazilian), thus imparting some of the feel that only a human drummer can truly provide.

Timing: Drum machines usually respond faster to MIDI data than do synths (particularly "workstation" types running in a polytimbral mode). To

bring all sounds "into the pocket," consider shifting the drum track a few clocks later to compensate.

Velocity vs. Controller 7: To change drum levels when sequencing, you have two choices — alter velocity or (with some drum machines) feed MIDI controller 7 messages into the drum module. Controller 7 usually sets the overall volume, whereas velocity affects individual drums. With multisampled drums, velocity changes may also affect the timbre. To change individual drum levels without altering timbre, do so at the machine itself, using the available drum level mix option.

Before signing off, here's one final tip about electronic drum parts: when in doubt, keep it simple. I've never heard anyone say a drum part had too few notes!

*Craig Anderton's latest book, the revised version of the classic text **Home Recording for Musicians** (published by AMSCO), is now available at music and book stores. Also check out his AOL site at keyword SSS.*

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CIRCLE 55 ON FREE INFO CARD

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

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A: Oh, about a gazillion things.

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.

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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

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.

—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.

EDIT IT Work with total freedom. Edit your music with the precision and flexibility that only random-access disk-based recording can provide. Layla is compatible with any audio recording/editing application that uses standard Microsoft Windows 95 calls—which means Layla works with virtually all of today's most popular programs, including Cakewalk's Cakewalk Pro Audio™, Steinberg's Cubase Audio™, Emagic's Logic Audio™ and Sonic Foundry's Sound Forge™ (to name just a few). You also get support for software plugins from respected manufacturers like Waves and Arboretum Systems. Don't yet own recording software? Not to worry: Layla comes complete with a custom version of Syntrillium Software's Cool Edit Pro™—a powerful multitrack audio recording and editing environment—so you can enjoy a no-hassle musical experience right out of the box. (Our Macintosh software package, which provides compatibility with a host of professional audio applications, is scheduled for release in Summer '97.)

PROCESS IT That big black square sitting in the middle of the Layla PCI interface is Motorola's latest generation DSP—the 56301, a 24 bit chip running at an astounding 80 million instructions per second. In addition to being a giant chunk of raw processing power, it's the PCI bus master, meaning that it handles all the routing of data in and around your system. That leaves your computer's CPU free to do things like drawing screens really fast. The 301 also handles audio timing information, so you get dead-on synchronization accuracy and—here's one for the engineers out there—zero-latency sample-positioning (in other words, it always knows what audio is supposed to play when and where).

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.

Specifications and features are subject to change.

MSRP

EVENT
ELECTRONICS INC

CIRCLE 15 ON FREE INFO CARD

Battle of the Big Bands



PHOTO BY JIM HERRINGTON

All those years of touring, and these are the pranks I get (and give)

BY AL KOOPER

This article can't possibly be what you think it's about. If you were thinking Benny Goodman or Artie Shaw, fogged-dabowdit. These are all true stories about what happens to musicians' minds during long tours.

In the summer of 1991, Joe Walsh called and invited me to join his band for a "shed tour." This is a tour of outdoor venues nicknamed sheds because they *are* sheds; albeit huge 20,000-seat ones. You know the ones I mean: Jones Beach in NY, Pine Knob in Detroit, Chastain Park in Atlanta, etc. Joe's summer hit was "Ordinary Average Guy," and we were opening for The Doobie Brothers all summer. The two bands were good friends, and it was pleasant to spend the summer with friends.

The first signs of trouble took place about two weeks into the tour. The Walsh band had two drummers. In one of the closing songs in the set, there was

a drum solo and toward the end of it, the two drummers would throw their sticks at each other and catch each others sticks without missing a beat. I had never seen anything like this before and thought it added a little pizzazz to the show. So one night, some Doobie Brothers hid behind the drumsets and when the sticks started flying, they added rubber chickens, tampon boxes, and candy bars to the sticks that were already in the air. For an inside joke, it was pretty damn funny. We all thought it was hilarious. However, the escalation had begun.

The next night, in the middle of The Doobie's closer, "Listen To The Music," a woman of dubious character came out on stage in a trench-coat, with nary a stitch on under it, and with her back to the 20,000, flashed the Doobies.

Two days later, we were playing a Sunday afternoon show and were deep into "Life In The Fast Lane." As the guitar solo began, three male strippers in trench-coats hit the stage, and were down to g-strings before the song's end. This time, however, Joe was embarrassed and the battle had now begun in earnest (Earnest, Ohio, I think it was).

When we arrived in the next town, Joe went down and made a large cash contribution to the local zoo. In return for his contribution, a dispatch of zoo residents were delivered backstage to that night's show just in time for "Jesus Is Just Alright With Me" by the Doobies. Our band — all dressed in sheets, Arab style — walked out on-stage with a llama and many exotic birds in the middle of their song. It was so

good, it actually looked like part of the show. This was considered untoppable, and ended the one-upsmanship joust for the duration.

I have seen other incredible things done in the name of tour madness. One promoter had his room completely emptied while he stepped out for a few hours. A large road crew removed the bathroom fixtures including the toilet and sink, the bed and furniture, the drapes, the carpet, and the phones, until it resembled a bunker from WWII when he returned.

I once put a live lobster in Bobby Hatfield's (Righteous Brothers) room while he was downstairs having dinner. He never mentioned it the next day.

In the '60s, we used to share rooms to save money, and often one of the beds in the room had a built-in-pay-for-use vibrating massager in it called "Magic Fingers." When I was in The Blues Project, Steve Katz, another band member I was rooming with, would always dash in the room and claim the vibrating bed for his own. One night, while he was at dinner, I put \$30 in quarters into the slot in his bed, and the massager went non-stop all night until a week after we checked out I think. He couldn't unplug it either, cause I Krazy-glued the plug into the wall as well. He didn't dash so fast next time.

Well, that's all for now. I just wanted to illustrate how intellectually stimulating it is to be out there in America during and between shows. See ya next month...

P.S.: I left the really bad stuff out like sneaking into someone's room and urinating into their shampoo bottle and sneaking out again, cause I thought people would find it distasteful, OK?

I once put a live lobster in Bobby Hatfield's (Righteous Brothers) room while he was downstairs having dinner. He never mentioned it the next day.

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Ed Cherney



PHOTO BY ED FREEMAN

Find out what's really going on inside the Grammy-winner's head

BY MR. BONZAI

Mr. Bonzai: So how's it going with the Stones?

Ed Cherney: I had the great privilege to spend four weeks at Ocean Way recording rhythm tracks. Keith playing guitar, Charlie playing drums, and Mick. Sitting there for a month with the three of them in front of you is as cool as it gets. Then I had to take off to mix the 25th anniversary Manhattan Transfer album, and I'm halfway through producing

Jann Arden's new record.

What other producing have you been doing?

I produced Anne Murray's new album, and I'm getting calls to produce other artists, but I like to choose the projects carefully and take my time with the responsibility and concentration that comes with producing. Lately I've been getting a lot of great engineering and mixing gigs.

Which came first, music or the musician?

The melody and rhythm flow through the musician. Without that there's no music.

Did you ever lose anything?

Where are my keys? Have you seen my dog?

What's wrong with the music industry?

Everybody else — no, just kidding. Cer-

SUSPECT: Ed Cherney

PROFESSION: Engineer/Producer

SPOUSE: Rose of The Record Plant

PET: Tina the Wonder Dog

RESIDENCE: Venice, California

RECENT CREDITS: Rolling Stones, Richie Sambora, Johnny Lange, Manhattan Transfer, Jaguares (coproducer with Don Was), Anne Murray, and Jann Arden (producer).

HOBBIES: Golf, Sailing, Bockey Ball (played with a basketball and a baseball bat) — "No one has ever scored a full Bockey."

FAVORITE FOOD: Vienna hot dogs from Chicago, with mustard, relish, onion, tomato, hot pepper, slice of Kosher dill; "Steamed buns and boiled dogs — none of this grilled stuff."

VEHICLE: Jeep Cherokee with holographic equalization.

NOTES: Born in Chicago, Cherney rose up through the traditional ranks as an assistant engineer under Bruce Swedien before embarking on a career that has resulted in some of the most respected albums of the past decade. A creative partnership with producer Don Was has given us a series of Grammy-winning albums from Bonnie Raitt. Cherney's special touch is heard in memorable recordings by Elton John, Eric Clapton, Roy Orbison, Ry Cooder, Bob Dylan, Bob Seger, Ringo Starr, George Harrison, and Jackson Browne. Cherney won the 1994 Grammy for best engineered nonclassical album (Bonnie Raitt's *Longing In Their Hearts*) and also the Mix Foundation TEC Award as Engineer of the Year. In the past two years he has recorded and mixed Bonnie Raitt's *Road Tested*, mixed Bob Dylan's *MTV Unplugged*, and recorded The Rolling Stones's *Stripped*. Cherney's gifts as an engineer are enhanced by his artfulness as a producer, most notably with Canada's Jann Arden, 1994 Juno Award Winner for Best New Artist.

certainly the corporatization of the music industry may not be the best thing for artists and people who make music. Time will tell.

What is the first music you remember hearing?

I remember an LP that was big at my house: Sammy Davis, Jr.'s *Live in Las Vegas*. The first rock 'n' roll record I remember hearing was "Choo-Choo-Cha Boogie" by Bill Haley and the Comets, which was first a hit in the '40s by Louis Jordan.

If you could go back in time before recording, what would you like to hear?

I would like to hear the first bongos. Actually, I wouldn't mind going back

in time to beat on some logs in Africa with the rest of the tribe.



PHOTOS BY MR. BONZAI

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Who got you started as an engineer?

Bruce Swedien helped me get my first job as an apprentice in Chicago, and I worked for him as an assistant on a buttload of great albums. If I'm any good now, it has a great deal to do with the time I got to sit behind him.

What are your most important recording tools?

Ultimately, songs and great musicians — I believe you can record a great performance through a tin cup with a

piece of string and it'll still move you.

If you're talking about equipment, I do have a pretty good rack of gear that I take with me just about everywhere I go. It includes some Neve 1073 mic preamps, Mastering Lab tube mic pres, a pair of B&K 4011 microphones, and some Audio-Technica 40-series condenser mics, my old Eventide SP-2016 reverb — it has a stereo room program that I can't get any-way else. Some LA-2 compressors, NTI EQ, SSL compressor, the Infernal Ma-

chine. And Spatializer is an essential tool for my mixing.

Is there anyone in the world you would like to record?

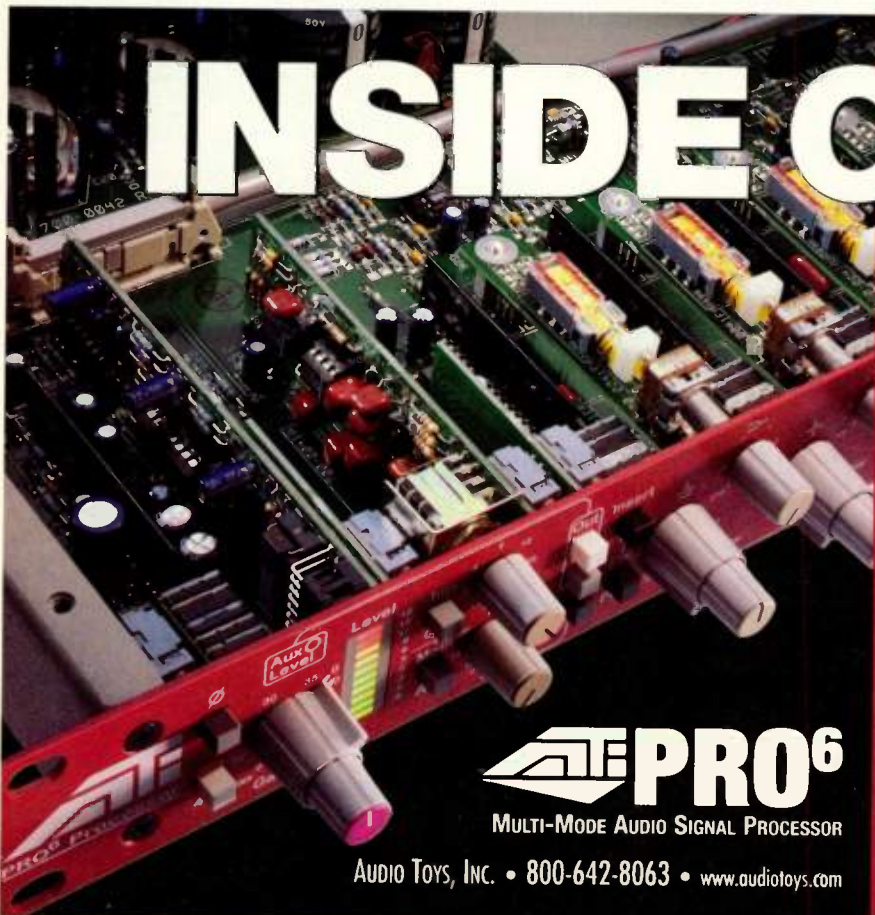
The Pope. He's an acoustic guy.

What is your strangest characteristic as a human being?

My tail.

Do you know any interesting business tips?

Find a way to make money. Like Reverend Ike said, "The best thing you can do for



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poor people is not be one of them."

What was your most ridiculous experience in a recording studio?

Well, all in the pursuit of fine recording, it had to do with a very small microphone and a percussionist tapping out rhythm on his abdomen.

Who do you think you were in past lives?

This is my first time through.

What old saying do you really like?

"Never resist the obvious." Or is it, "Always resist the obvious." I'm a little confused on this one.

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

I've been lucky to work with some really good ones, but just working with the Rolling Stones — Mick Jagger just kills me. He goes and sings a song, and it's sexy, it's on the money, he sells the emotion. When he gets in front of a microphone, strange magic certainly happens.

Who was the most difficult to record?

Ry Cooder is the personification of someone whose ideas and panoramas are so big that I'm not sure electronics can en-

compass the emotion and feeling that this guy can play with.

What's your philosophy as a producer? Get out the way.

Have you ever witnessed a miracle?

You mean like loaves of bread falling from the heavens? I think the fact that music can come up a wire is a miracle.

What is the biggest mistake of your life?

Not continuing with my piano lessons.

Any advice for those thinking about a life in the music business?

Think about it again.

What's this I hear about a Producer's Guild you're involved with?

Well, I've been helping to recruit the troops, get the word out, and put together a steering committee to look at some issues that are important to a lot of us. Right now we're calling it the Producers Guild of America, which includes Canada and Latin America. You might say it was inspired by the Re-Pro organization in England. A big emphasis is on education, and we hope to establish internships, a scholarship fund, and health insurance, as well as do in-school workshops and public service programs. We're looking at participation in fees paid for airplay and we'd like quality standardization in reissues, meaning the right tapes and sources should be used. We're planning on having a booth at AES this fall, so come by and learn more.

What would you like Santa to bring you this year?

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Mr. Bonzai has a 1965 Vespa Super Sport. If you'd like to see him riding it, point your browser at <http://www.hitokuchizaka.co.jp/Mr.Bonzai>.



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Twin Speaks

Techno/ambient artist
Aphex Twin discusses
the tools and tricks of
his trade

BY STEVE LA CERRA

Warp/Sire recording artist Richard D. James is probably better known to techno fans as Aphex Twin. As a leader in the computer-generated music field, his 1995 I Care Because I Do (Elektra) reached number one indie status. His most recent release, Richard D. James, is certainly unlike anything else you have ever heard. Here, Aphex Twin discusses some of his computer production techniques with EQ.

Your music is extremely computer-oriented. What kind of computers are you using?

I only use Macs for the moment — I have three— but I am just about to get a Silicon Graphics machine.

Will you be able to run more of the popular sequencing software on the Silicon Graphics machine?

I'm not sure, but I don't think I want to. I plan to use it for hardcore-sort of computational purposes — things that a Mac has trouble doing.

What programs do you use?

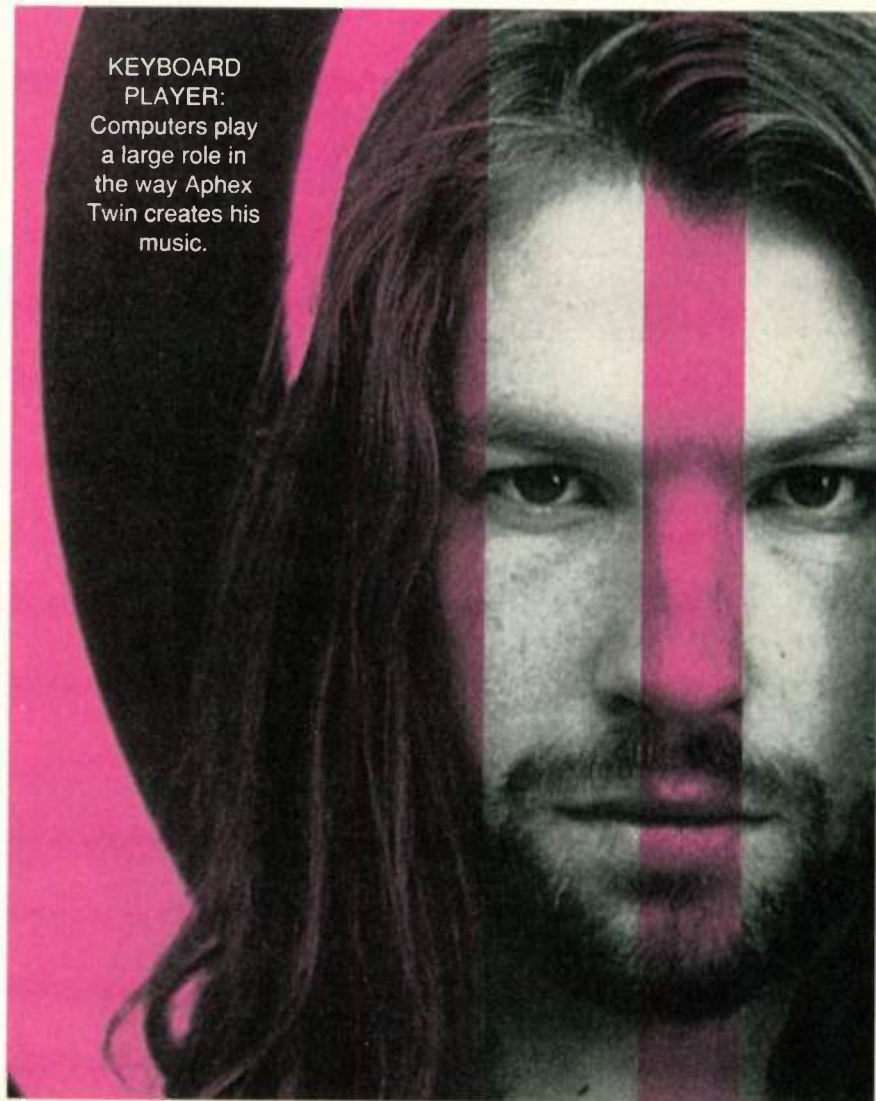
At the moment I am using software developed at IRCAM. This is a French institute of sound that has been going since the 1950s or 1960s and they are really awesome. They are totally into their own sounds. They're a big part of the "music concrete" sort of thing and they invented some of their own computers in the 1960s because at the time there weren't ones powerful enough. I just got back from Paris where I went to one of their conventions and it was full of scientists and totally intense people that are really serious about music. I was there for a day and a half, and they gave me a CD-ROM of their new software updates so I loaded it into my computer on the train and started playing with it through the channel tunnel.

They write loads of different types of software that can do a range of things. The only sequencer-type of program that they do is algorithmic-generation type. The computer generates these different algorithms. There isn't anything in the commercial world that comes near. Any of the software they do is just so thought out that I can't name a program that would be as good. The one thing that they are terrible at, though, is user-friendliness — the stuff is hard to use because it is so complicated. But they have been making a lot of changes, like they only used to write for Silicon Graphics or mainframe computers. At the end of last year they

moved over to Macs, and that is when I really got into it. So they are moving towards getting more people involved because up until now it has been such a secret society using IRCAM's software.

Was IRCAM software used to create some of the sounds on the *Richard D. James* album?

There's some old EMS synths in there, but mainly it's software synthesis running on the Macs. I'm running a Power Mac 3400 and an old Powerbook that has been souped up and is really fast. I have a six-month-old desktop Power Mac, but the old Powerbook is faster than the desktop one because I had the bus speed increased.



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PHOTOS BY WOLFGANG MUSTAIN

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I found out that for musical applications, a lot of the computer speeds are really rubbish. They don't make any difference. You can get a 120 MHz Mac — and this probably goes for PCs as well — and it'll be slower than a 80 MHz machine. It's just how different computers were configured. They are fast for certain things and slow on others. A lot of the tests for computers are for graphic-sort of programs. For MIDI sequencing, I thought that the timing was terrible on a Mac. I much prefer an analog circuit, which loses time a lot more gracefully. They fluctuate and you don't hear the digital artifacts. On 100 MHz-plus processors, the timing is not as good as that on my old digital drum machine, which is terrible because so many people use computers for MIDI. I don't know if many people notice, and if they do they are not inclined to do anything about it. But it really bugs me that we're at this stage and we've gone backwards. The timing is rubbish.

Is there anything that a technically inclined person can do to their Mac to help it process MIDI software more efficiently?

Yes. There are simple things that you can do without even taking them apart, and that's basically to streamline all the system commands. Get rid of all the customized folder icons and desktop pictures and that sort of rubbish. Streamline the system down to the bare minimum and that will ensure that your computer is running faster. A lot of people have all these little folder icons — even that will slow down the finder on a Mac. I don't know about PC, but I am sure there's equivalent pitfalls as well.

What are you using to sample these days?

I sample directly into the Mac with the IRCAM software.

On the *Richard D. James* album there are some interesting drum sounds. What are we hearing?

It's all synthesized in the IRCAM software and generated in the computer.

Is this command or graphic programming? It's command-type. The arranging and sequencing is all done algorithmically so I give the computer loads of instructions in command language.

So it's not sequencing in the tradi-



tional sense where you are sitting at a keyboard and

entering notes.

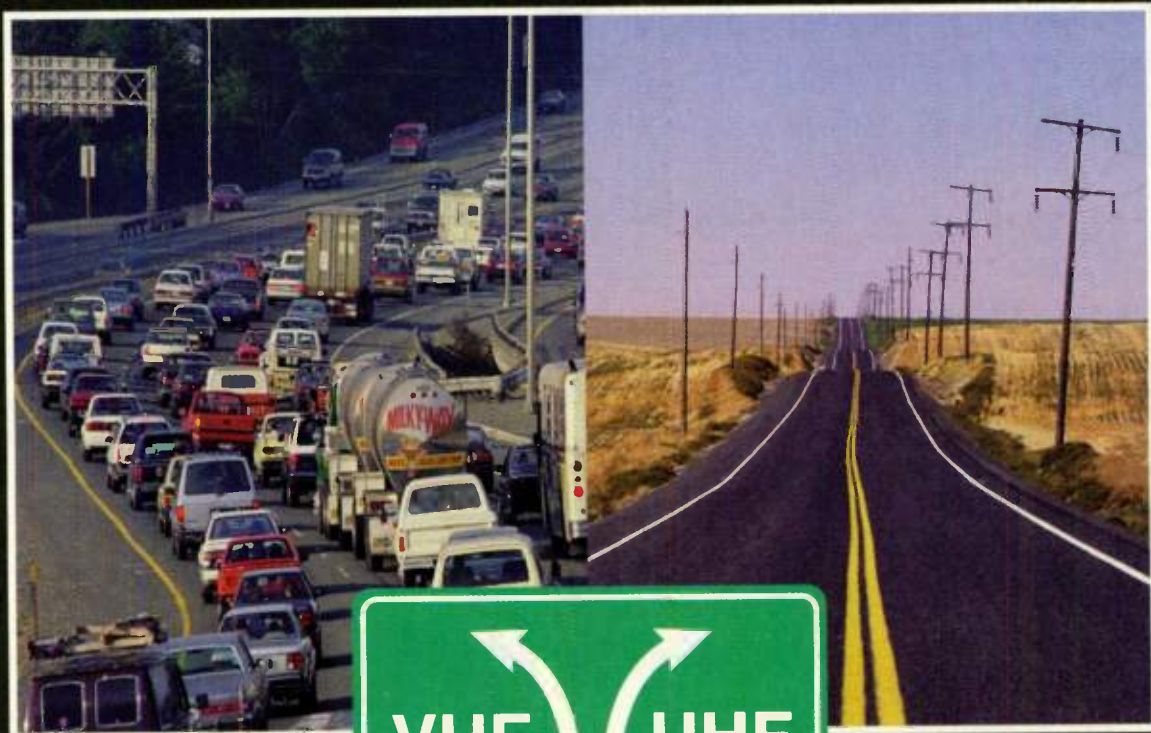
I got bored doing that. The point came about two years ago when I was in a pub in London and overheard these three boys that were football fans. They were half drunk, had shirts and ties on, and they were talking about Cubase. I heard their conversation and I thought, "What the fuck is going on?" When I started using Cubase no one had even heard of it. Now I was standing next to these people and it did my head in. I thought, "I'll never use that again!"

And that pointed you towards IRCAM? Eventually. I envisioned other ways of doing music that I had touched upon in the past. But I had just been too lazy, so it was basically a matter of self-discipline. A lot of the programs I have written myself and learning about the language was interesting, until I knew all the commands and I got bored, so I stopped. Then I started looking at the IRCAM stuff, which is really complicated. I like things that you can get your head around because that's when you start writing your best stuff with technology. When you get really good at something — a program or instrument or keyboard — is when you really start controlling it. Then you can make it do what you want instead of being a slave to it. Unfortunately, I get bored when I get too good at doing things. I need to find something else that's a challenge to keep my brain in order.

So the fact that this is an unusual means of synthesis and sequencing just serves your purpose all the better.

Yes. One half of me says "this is a nightmare," but the other half remembers when I first used my computer. I used an

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Atari to sequence and I thought it was shit. I had been using a hardware sequencer before that and now I had to load in a program and wait, and it kept crashing — whereas my little hardware sequencer was ready to go two seconds after I turned it on. But then I saw the different things I could do with a computer. If I hadn't got into the computer in those days, then I would not have moved forward and discovered all these new things.

Does the IRCAM sync to Pro Tools?

The only time I really sync Pro Tools is to do an advert, and I'll sync to video tape. Otherwise I use Pro Tools as a tape recorder. I mix to both DAT and analog tape and at some point I'll use anything else we can record on. I'm actually looking for a wax cylinder recorder. I have a lot of tape machines and all sorts of things just to get certain sounds. I really like analog tape, but my big problem is what happens to the signal over time. So therefore, if you just record to analog and then straight back to DAT, it's quite nice.

I always try to do things that other people aren't doing. That's where I get my biggest buzz, really. There's more and more people making music now, but it's the same thing that makes the gap for me even bigger. I feel really hyped up at the moment because people aren't doing good enough stuff and that inspires me. When I hear my friends doing really brilliant things, I don't know what to do.
Is it true that your studio is in your bedroom?

Yes. I always do tracks in my pants, and I would never do that in a normal studio. That's the most important aspect. I couldn't do it if it was a job, and, basically, having it in another studio would be a job. I can't treat it as work and I can't even have it in another room. I'd rather have it in my bedroom or the room I sleep in so I can get up and do tracks whenever I feel like it.

I've just moved into a big bank and I am in the process of setting up my studio in this huge walk-in vault. Just sort of designing it into a proper studio with proper acoustics and everything for the first time ever. The whole room is cast concrete, which is great. I pissed everyone off where I used to live until they basically kicked me out for making too much noise with my friends. That's why I got this place. I thought, "With a bank, you can't really piss anyone off because they can't hear you." And I'll be sleeping in there as well.

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Beethoven's Tips For Writing Hits

That Ludwig knew a thing or two (or four) about songwriting...

BY SIMON AMARASINGHAM

If you're a creative project musician writing music for multimedia — corporate presentations, video, the Internet, video games, etc. — you want to avoid having your audience hear the same musical motif statically repeating itself ad nauseum. (Jingles, on the other hand, because of their short format, seem to thrive on repetition.) This pitfall is especially true for video games where, often, music and sounds endlessly repeat from one segment to another. It produces an uncomfortable paradox for your audience to get deeper into successive levels of a game while having to hear the same music phrases over and over. Don't blame your root musical hook, though, because the answer may be in how you arrange that hook once you've created it. You can keep the same ideas fresh for an entire musical project, if you keep them moving. And who better to teach us that lesson than Mr. Rock 'n' Roll — Ludwig van Beethoven? —HGL

Have you ever wondered why the first four notes of Beethoven's 5th Symphony are so famous? What's the big deal? (See fig. 1)

Well, those four notes by themselves might not be so impressive, but what Beethoven did with them is, and that makes them important. Let's have a look at measures 6 to 13 — you'll see that these notes get repeated over and over: (See fig. 2)

Even if you don't read the little black dots on the page, you should be able to see graphically that the original four-note theme is being repeated six times within these eight measures. Admittedly, they're not exactly the same four notes — they have been moved up and down — but the rhythm has stayed the same, and so by repeating one aspect (the rhythm) and changing another (the pitch), Beethoven manages to plug his "hook" without sounding painfully repetitive. If you listen to the rest of the piece, you will hear these four notes again and again, contorted in all kinds of ways. Seven minutes of music all based on that opening theme.

That's all well and good, but sym-

phonies don't do so well on the charts these days, so let's see how the above concept can be applied to writing a song. We're going to look at "Unforgettable," which has been a big hit in two different decades, but doesn't have a chorus where an obvious hook line gets repeated several times — in fact, the hook runs throughout the whole song, showing up in several different places at various pitches.

The five-note hook first appears in the introduction (See fig. 3)...and then repeats it another 5 times at different pitches — pretty much the same kind of thing as the beginning of the 5th Symphony — the rhythm stays the same while the pitch changes. (See fig. 4)

Each one of these repetitions, by the way, has a chord change that goes along with it, suggesting that the melody and the chord

changes were written together, rather than being a chord progression that had a melody put over it.

When the vocals come in, the hook is rhythmically stretched out, so that the first four notes take up almost a whole measure, instead of half a measure. The notes themselves, however, are the same as the opening of the song, (except that they are sung an octave lower), so this time the pitch is the same, but the rhythm is changed: (See fig. 5)

There are three different notes in this phrase, which are, in order of appearance, C, D, and E. The second phrase uses all of these notes, in the same order, but inserts an F between the D and the E. It also has a different rhythm to the 1st phrase, so the pitches are kept (almost) the same

1

2

3

4

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6

7

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8

Musical notation for the first two phrases of "Every Breath You Take". The first phrase is "Ev - 'ry breath you take" with a G9 chord. The second phrase is "ev - 'ry move you make" with an Em9 chord.

9

Musical notation for the last two phrases of "Every Breath You Take". The third phrase is "ev - 'ry bond you break" with an Em9 chord. The fourth phrase is "ev - 'ry step you take" with a C chord. The fifth phrase is "I'll be watch - ing you" with a Dsus chord.

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and the rhythm is varied: (See fig. 6)

Having done this, the next two phrases are a repeat of the first two, but shifted up a fourth (i.e., rhythm the same, but pitch changed): (See fig. 7)

By now you should be able to see that the underlying idea is to repeat some elements and change others. These elements can be any facet of the music including pitch, rhythm, harmony (i.e., the chords under a melody), and don't forget the lyrics themselves. We've already seen examples of the pitch and rhythm changing, so let's look at the Police song "Every Breath You Take" to see a melody that stays the same while the harmony underneath changes: (See fig. 8)

These first two phrases have exactly the same pitches (B, C, A, and G) and rhythm, so the only difference between them is the chord changing from G9 to Em9. The next two keep the same rhythm, the same pitches—but in a different order—and change the chord: (See fig. 9)

...and as you can see in that last phrase the rhythm changed (a little), as well as the chord, while the pitches were still from that same group of B, C, A, and G.

After all this analysis, the real test is with your ears — when you listen to music ask yourself which elements are getting repeated and which are staying the same. Not all songs use this thematic approach, of course, but you will tend to hear it more in songs that have earned the title of "classics." In songs that do, it is especially easy to pick out themes in the vocals, guitar solos, and other main melody lines, but it need not only apply to these — all parts of the arrangement can be based on the same theme. This is not so common in contemporary songs, but in classical music it is, and once again a prime example is Beethoven's 5th, where every instrument in the orchestra is playing something based on those famous opening four notes.

It is not, however, dependent on the musical style. Once you can hear the themes in other people's music, it is only a small step to be able to use them in your own writing. Chances are that you have too much material in any given song, so the trick is to try to choose one or two themes, and base the entire melody on these. You should find that a lot of possibilities are opened up.

Simon Amarasingham is the staff composer, sound FX designer, and audio engineer for the computer-game company Blue Water Entertainment. He also works with producer Tony Saunders on producing pop and R&B artists, and was project manager for the hard-disk recording program Digital Wings for Audio at Metalithic Systems.

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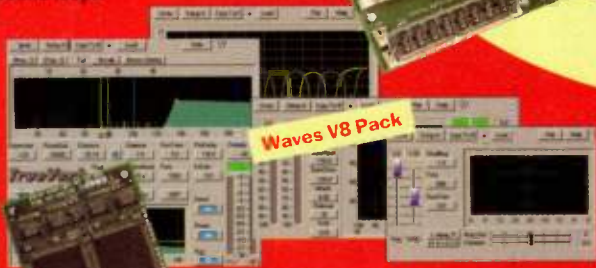
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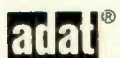


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Since the V8 runs entirely on third party software, you already know how to drive it! Why shackle yourself to a proprietary software interface when you can choose your own from among a growing list of Audio Gearhead Partners? And don't worry about 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 CardPlus's. Now that's hip, Daddy!



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HEAD

EQ's FezGuys Talk to Thomas Dolby

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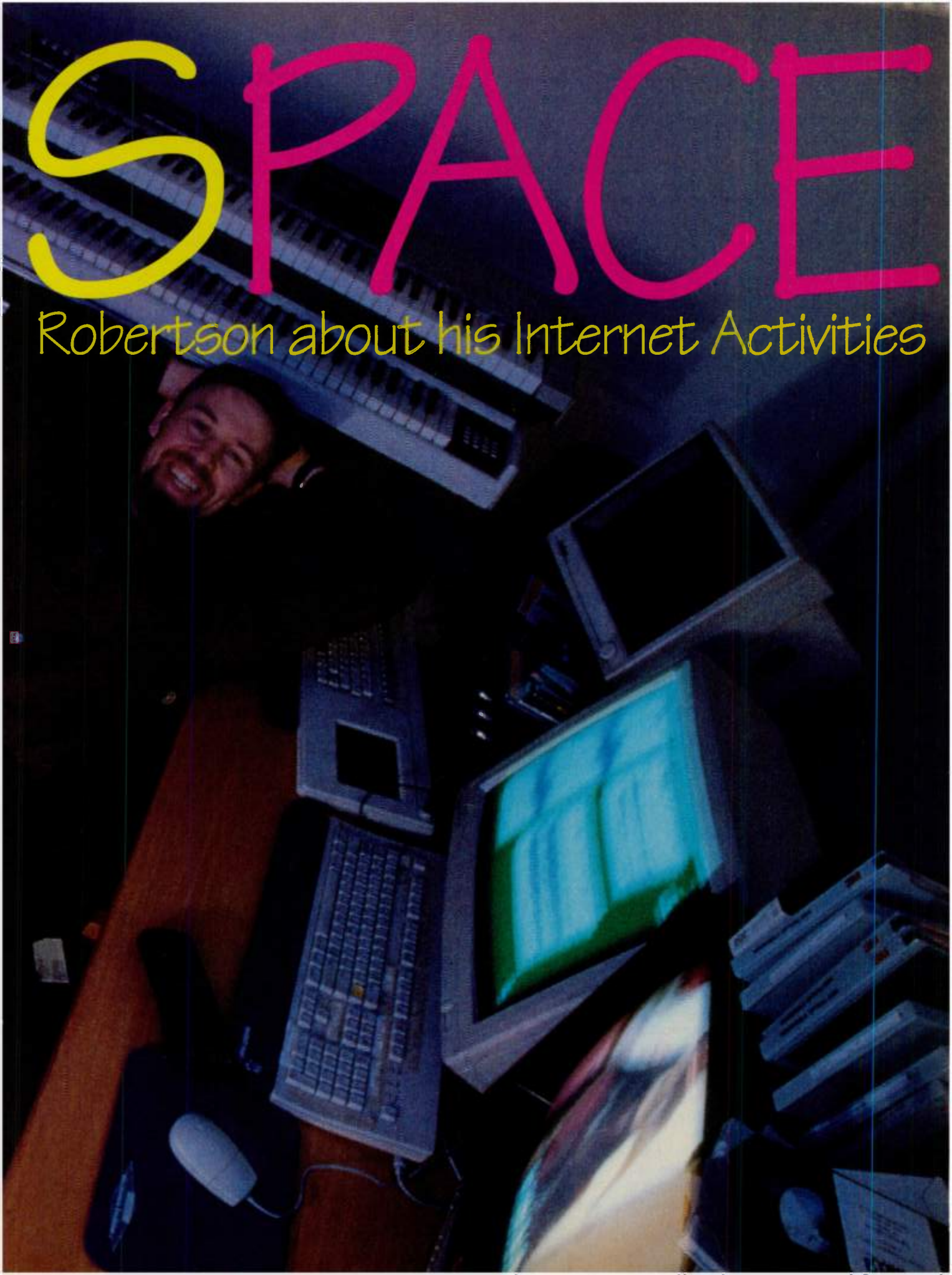
e'd never done anything like this before; it made our foray into in
terview journalism somewhat chancy, but capable of relevance.

Arriving at the San Mateo, CA, offices of Headspace, Inc., 30 minutes late didn't add any swagger to our stride, either. We were nervous. We entered through a nondescript glass door at street level. After a few false starts, we finally found the door marked: "Headspace — Please Knock." We knocked. A nice woman with blue fingernails and the black rubber antennae of a cell phone poking out of one black blazer pocket ushered us into a small office wherein sat Thomas Dolby Robertson. Musician, performer, producer, Dad, wind-surfer, and now, co-founder (along with partner Mary Coller) and chief executive officer of Headspace, the company that purports to bring you the first "pure Internet music system."

He is cordial, and brushes off a fumbled apology for our tardiness. He has been in bands, after all. The nice woman with blue fingernails takes us on a quick tour of a couple of the offices, actually private composing rooms, each with a powerful Mac or clone equivalent, several racks of

SPACE

Robertson about his Internet Activities



HEADSPACE

audio gear, at least one keyboard, and the ubiquitous Mackie mixer. This is where the Dream Job is: in a brick room, alone, with yummy audio toys, daylight from a large window and the nearby train tracks, can be found the inspiration for MIDI ditties to be licensed to (among others) online advertisers (including 7-Up and Yahoo) and game designers (the SimCity series, Carmen Sandiego series, and many others). These are the providers for the content site of Headspace, where music is made to suit your every need. We then spend a couple of minutes in the pleasant company of technology veep Chris Muir (a 5th generation California native) with explanations and a demonstration of

several aspects of the company's core technology — the Headspace Audio Engine, including the Beatnik Editor, a piece of software to manipulate audio-oriented information on the Internet.

We are allowed to hover in the geek grotto, where the hunchbacks of Headspace huddle under dirty ceilings stained from heavy winter rains. This is a classic start-up, near Silicon Valley. Too soon we are back in the clean and slightly cramped central office, emotionally preparing for lunch. The blue-fingernailed woman tries to bribe us with t-shirts. We see right through her ploy and tuck them into a secret pocket in our bags.

Thomas Dolby Robertson leads us across the street and into a nearby, empty restaurant. We have the place to ourselves. He becomes our guide through the surprisingly subtle art of the interview. He is skilled at it. Born Oct 14th, 1958, in London, he is charming and cautious in his relationship with us. He explains himself in a patient and methodical way, speaking quietly and displaying a remarkable talent for relocating the essential thread of the conversation after we have dragged it into the darkest jungles of hyperbole.

For those who may have missed his numerous accomplishments as "Thomas Dolby," he is the author of five albums of innovative, compelling, and melodic music in



THE 'NET'S GINSBERG?: Dolby's Beatnik software makes it easier to create audio files for the Internet.

the pop/rock vein, beginning with: *The Flat Earth* and *The Golden Age Of The Wireless*, moving into a pop/funk mixture with *Aliens Ate My Buick*, onwards to *Astronauts & Heretics*, featuring a unique pairing with Eddie Van Halen, and his last full LP: the ambient work of *The Gate To The Mind's Eye* (the pairing up with Italian astrophysicist Dr. Fiorella Terenzi is not to be missed).

His video appearances during the early MTV era slapped somnambulant viewers awake with the infectious machine funk of "She Blinded Me With Science" and the boiling aural assault of "Hyperactive." Musicians spent hours trying to disentangle the skeins of his musical threads. And he sold lots of albums. He also did time on the Los Angeles entertainment oligarchy's firing line, producing albums for Joni Mitchell, Robin Williams, and others while also acting as musical director for Large Studio movies.

Now, reinvented in Northern California as a geek family man with a past, Thomas Dolby Robertson (Headspace's reigning ping-pong champion) explains to the FezGuys the point (or points) of his current work.

FezGuys: Let's say I am a person who holds down a regular 9-to-5 day job and plays casual pickup gigs. At home I have a 28.8 modem, a Web site, and some space on a server, and I want to use this technology to

increase my geographical reach...

Thomas Dolby Robertson: That's absolutely a fundamental objective of Headspace, yes.

So what's the point of Beatnik for me?

Beatnik is the first, pure, Internet music system. Anything else that you can point to was designed to do something different and has been adapted to do what it's doing now. There are hundreds of thousands of people who are making music on their computers [which] are fundamentally the same computers as end-user Web servers are on. And now they're all connected by the Internet. [There are] computationally intensive parts of making music on a computer [and] computationally nonintensive parts. To transpose a melody up a minor third is not computationally

very intensive, so most of what the composer is doing in the composition stage doesn't require a lot of computer power to do. What requires a lot of computer power, though, is when you hit a site where you're downloading or streaming audio — to actually pull this rich digital recording over a telephone line — and replay it on a user's machine. So, it seemed to me that if everyone in my audience had Studio Vision and a sampler on their computer, then it would be great — all I would have to send was the recipe instead of the whole damn wedding cake.

What good would that do them? Why would I want your recipe?

They would hear [the music] instantaneously with no quality loss over the way I was hearing it. They'd hear it with fidelity. I would have some guarantee that what they were hearing was what I intended. And if I wanted to add in a layer of interactivity, that would be quite possible. I might want to do that either because I wanted to allow them to play around with the music and come up with something new or because the desired activity was not music in itself; this is the 7-Up web page where people are checking out the new soft drink. And music is an enhancement to the whole thing. **Would you say that Headspace products are directed at musicians who are looking for a deep level of interactivity or people**

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DON'T PAY THE PIPER: The Beatnik Player is free for Web users, allowing songs to be heard by a wide audience.

who want to use the technology to simply reach more end-users?

You look at the Beatnik Gallery...you're playing back linear files that people have created and one of the aims of RMF (Rich Music Format — see sidebar) is to give the composer, if he or she has a set way that they want the public to hear the music, [a guarantee that] it will, indeed, sound that way. And I think that either with general MIDI or with streaming audio there's just too many variables. I hate the idea that I spend all this time perfecting a piece and I put it out there on the assumption that people will be hearing the piece that I actually recorded, but if I actually go into somebody's living room and hear the way they're listening to it — I run a mile.

You're talking about the frequency response; the way they've got the EQ curve set up, the positioning of the speakers, or the actual tones of the music?

I'm talking about either, in the instance of general MIDI, where you can't account for what sound card they have or how that's going to sound or for streaming audio where there are just so many factors, like the available bandwidth, the amount of server activity, and there seems to be very little quality control involved in what kind of loss you get. You get glitches, you get dropouts, you get complete stops where you have to restart it, and I hate the idea of people listening to my music in that light. So, what I built for myself and for others was a way that I can create and, if it plays at all, it'll come out sounding pretty much the way that I intended it.

How do you see Headspace as benefiting the musician in the real world?

I think music and technology have always complemented each other. And I think it's very important to recognize that during the 20th century we've gotten really good at making a recording of a performance and then broadcasting it to a large number of people. In previous centuries you didn't have that wide an audience — just as many people as were in earshot of you — but on the plus side, every performance was a little bit different. You had some

A TECHNICAL EXPLANATION OF THE HEADSPACE AUDIO ENGINE

Upon hearing it referred to as their "core technology" by Headspace VP of Technology Chris Muir, you'll likely wonder to yourself "What exactly is this strange beast called the Headspace Audio Engine lurking at the heart of this company?" Well, we FezGuys think like you, and we've done the research so you don't have to. Here's our quick take on the Headspace Audio Engine!

The One Sentence Summary: The Headspace Audio Engine is software that enables a computer to play high-quality sound effects, voices, and music from digital audio, RMF (Rich Music Format — see below) or MIDI sources.

A Bit More: Because it's software, pure and simple, there are no complex wires and high-voltage connections to be afraid of. It conveniently slips into your existing computer setup (yes, both Windows and Mac) and outputs through your computer's familiar speaker or line output. What makes it cooler than all that other stuff? In addition to standard MIDI, it supports custom sound samples, which means instead of that cheesy general MIDI guitar patch that sounds like a Playskool toy, you can experience a composer's top-of-the-line tweaked-out classic Eddie Van Halen "brown sound" clone sample.

Its Past Life: No, it doesn't think it's Shirley Maclaine, but the Headspace Audio Engine was formerly known as Igor Labs' SoundMusicSys (before Igor Labs was acquired by Headspace in the fall of 1996). As such, it has a more impressive resume than you might believe, from games like Descent, Lemmings, SimCity, and Wing Commander to QuickTime Music from Apple and screen savers like After Dark, Simpsons, Disney, and Star Trek: The Next Generation.

Geek Out: To be specific, the Headspace Audio Engine is a software MIDI synthesizer, a sample playback device, and a 32-voice, 16-bit stereo mixer all done in software. Its wavetable synthesis engine is capable of mixing 32 stereo voices at any playback rate. It interprets MIDI files directly and plays sampled instruments of any design. It supports all General MIDI controllers as of version 1.0. It includes features like reverb, LFO (for controlling sweeping filters or stereo placement) and ADSR volume envelopes (for shaping samples as they are played).

Rich Music Format: Rich Music Format (RMF) is a multi-use compression protocol that can, in a single file, stream MIDI, digital audio, and a 40-bit data-encryption algorithm (for adding copyright information to that file) simultaneously. It can crunch large files down to manageable (almost tiny) sizes the way MPEG does, but with the added function of performing several duties at once, all within the same file.

Bonus! The Headspace Audio Engine technology is licensed to Sun Microsystems and they are building that technology into an API (application programming interface) called Java Sound, which will be included in the Java operating system. The technology is also included in the BeOS and the Web Browser from WebTV Networks.

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real-time feedback between the performer and the audience. There was no ultimate version of your hit song. There was one version you'd play in the market square and another version you'd play for the king and his courtiers. And if you did good, they'd pelt you with coins, and if you did bad, they'd pelt you with rotten vegetables. Or worse.

Or worse. But then technology came along in this century that allows you to capture a

single performance and get it out there to a huge number of people but in a totally one-way manner. The audience would just let it wash over them.

Other technologies, like film, did the same thing. You went from theater to film, where now you put your actors in front of a film camera and print these reels and you send 'em off round to all these cinemas. And so a huge number of people see them, but it's a totally one-way experience. So the appeal to me of the new technology is that you get the best of both worlds. You get the potential for a very wide audience but you don't sacrifice anything in terms of the instant nature of it.

You have raised hair on the backs of many necks with "Mulu" (an eerie song about aboriginal "dreamtime" from the album *The Flat Earth*.)

That sounds like a typical entry on this newslist (about Thomas Dolby's music on the Internet). People will share their experiences (in the newslist) relating to that stuff.

There's a couple of things that are fascinating about that. Number one is when I picked a sound or certain chord change in "Mulu" — I'm sitting at a piano somewhere, and I have a sense that, out there, there is an audience where I'm gonna raise the hair on the backs of their necks, because I did it to myself.

So it's intentional?

Well, when I found that chord change or that sound, it happened to me. I didn't sit down to make it happen. It happened to me

and, in the back of my mind, I'm thinking: "Out there, there are people who are going to get the same thing from this that I did." But, when I make a record and I've got that record out, what feedback do I get? I see radio play, I see royalty statements, even if I go to a gig people are screaming and hollering, but I don't really see the hair on the backs of their necks. So, the kind of feedback that I get is in these very abstract terms. Now, conversely, if I go into a newslist and ten

people are discussing and sharing the fact that they all got that [feeling] off that particular song, then I succeeded. And how would I ever have known that ten years ago? So, in a weird kind of way, it puts me a lot closer to my audience.

Do you like the way the Web simplifies the artist/listener connection?

Yes. Albeit, I may have sold half a million copies of that album and there's only 500 people on that list. The numbers are staggeringly different and yet the gratification that I get from knowing that I've connected with 500 people is, in some ways, much larger than knowing that I've sold 500,000 albums. Project a few years into the future: if I write that song and instantaneously upload it onto the 'Net and get that kind of feedback by morning, now your getting close to real-time (feedback).

Do you feel that there's any cause for concern over losing the musicians' vision in too much interactivity?

I don't think that interactivity necessarily has to be confined to letting the

public noodle with your music. The interactivity I'm talking about is the fact that in a live performance, with a loose structure to the performance, the audience is a part of the event. If a band goes on the road and it does indeed vary from night to night — and evolve — then the audience has something to do with that. So there's a feedback loop that goes on between the audience and the performer in a live situation. And that has really played second-fiddle for most of this century to the other way,

*I hate the idea
that I spend all this
time perfecting a
piece and I put it
out there on the as-
sumption that peo-
ple will be hearing
the piece that I ac-
tually recorded,
but if I actually
hear the way
they're listening to
it — I run a mile.*

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CIRCLE 89 ON FREE INFO CARD

HEADSPACE

which is that you create this one gleaming artifact and then you go tour to promote it.

I've grown up with that discipline of, "I work really hard at tweaking this immaculate artifact, but by the time it comes out I'm on an island somewhere." Now it's up to the public to decide if they like it or not. When I first made my Web site, it was the same thing. I started off small and it got bigger and bigger and broader and it turned into this gleaming artifact, and we finally went online with it and I'm sitting back going: "There! D'ya like it?"

Little did I know that's when the work's just beginning. The bigger and broader and richer it is, the harder it is to maintain and have any sort of freshness to it. And the real trick is being able to respond to feedback to keep the thing alive. keep it fresh, and also make it apparent to the users that when they hit your page they have some input.

What kind of input do they have on your page, besides telling you what they think?

I'm sorry to say not very much, because it's really much too big a building for me to maintain on my own. On the other hand, my overall perspective on how I felt as an artist in the Internet era is that it's been tremendously beneficial.

What sort of copyright security does the Beatnik editor offer?

We currently do watermarking. If you put an RMF file on your Web site, it is watermarked to date and it will fail if it's tampered with.

Do you plan to extend the abilities of the watermarking systems?

We have all sorts of plans about how to extend the reach of the security measures a bit further. I don't want it to ever feel like "big brother is watching." It shouldn't feel like music comes with a police escort.

At what point is the file watermarked?

When you save an RMF file from the Beatnik editor. And that can be anything; from a sample through a general

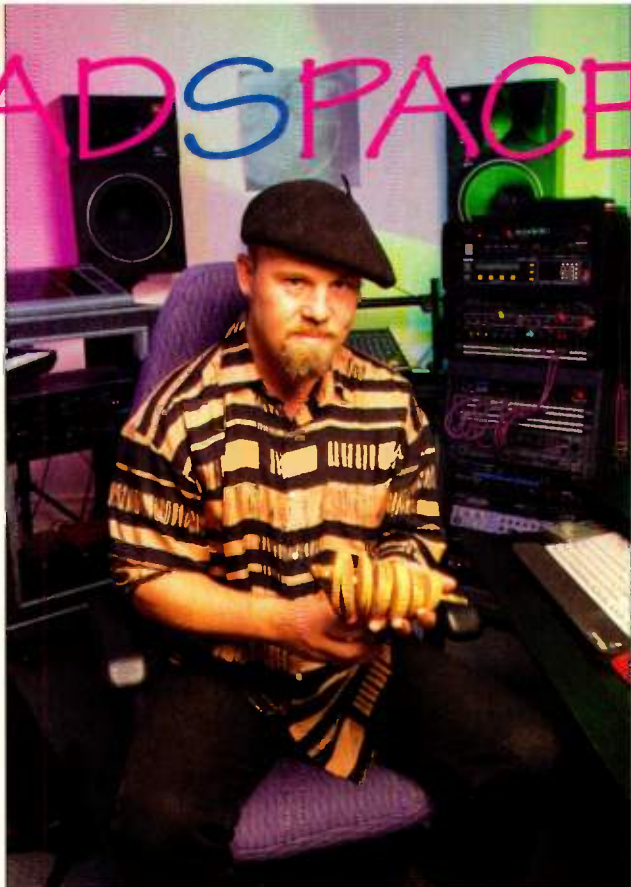


PHOTO BY STEVE JENNINGS

HERE AND NOW: Dolby Robertson prefers the instant reaction he gets from his Internet audience.

MIDI file with encapsulated samples. So it's very scaleable from linear to totally nonlinear, and you can watermark all or any of that. The neat thing is you can do this with a free piece of software today. Some of the other solutions out there involve very expensive server software and encoders, and that's something that I don't think musicians should be forced to pay for.

How does Beatnik differ from other Internet music software companies?

We have a rather different business model [then other companies] in terms of transactions. As far as I can tell, [other companies are] assuming that they're providing a service to the same record labels and/or owners of digital recordings, as, let's say, a mastering house would provide. The intention is that the transaction is going to be between the owner of that recording and the end-user. Same way as it is today. The end-user buys a CD for about fifteen bucks, and some of that money makes its way back to the record label [laughs]. We have a slightly different model in that we don't really want musicians or the public to pay for any of this stuff.

Headspace's sense is that sites that are making money on the Internet from being, effectively, broadcasters of content should be the ones paying for this.



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CIRCLE 89 ON FREE INFO CARD

So, it's much closer to a broadcast model where, if you think about cable, you've got HBO, and they'll go get the rights to an old James Bond movie and they put it on and they're charging subscribers for the fact that HBO's got lots of great old movies on it, but the payments are making their way back to the studio that owns them. So, we're a lot closer to that model.

Our sense is that, with our music, you might have a license between a publisher, let's say Warner-Chappell Music, and a Web site, let's say, HotWired.com. And HotWired.com wants to use some music that Warner-Chappell owns the publishing on. So they will do a license and that license is actually burnt into the RMF file. That information is visible any time the file plays on the 'Net, and there'd be a plug-in to show copyright info you can display if you pull down a window.

How do individual composers use this system for point-to-point sales or licensing of their material to individual users?

Composers would make an RMF file, and then they would get some real estate on the Beatnik area of the Headspace Web site in the gallery, where they could put half a dozen of their own files, a picture of themselves, and a little blurb about themselves. This would be a place that would get a lot of traffic through it.

How does Headspace benefit from that?

We benefit from it because we make our money from licensing our technology. We have our own Headspace content and a lot of people that come to the site, not musicians, don't know a musician, they just wanna do something snazzy for their page, and so they hear Beatnik and they think it sounds great and go: "Whoa. I can buy this collection for just fifty bucks. I'll buy that and I'll put some of these files on my own site."

Do you see that as a core element of what Headspace is?

I think it's an essential component. We want to proliferate the tool and the for-

WHAT'S THE POINT OF BEATNIK?

There are, at least, six reasons why Beatnik is a major step forward.

Number one is fidelity. The assurance that you can author the file once, and it'll sound right on any platform.

Two is ubiquity. We're on about seven platforms today, and when the Java audio engine kicks in at the end of this year, we'll be everywhere where there's a Java Virtual Machine — which is pretty much anywhere.

Three is security. There is a general sense at the moment that you put music online and it's public domain. Something, I think, that we have to reverse very fast in order for the Internet to become a viable alternative way to make a living as musicians.

Number four is interactivity. Because of the nature of RMF music — whereby you're decoupling the samples from the note information — you can stay very flexible



right up to the end; same way as with a page of HTML — you can resize your window and on the fly, it'll go reformat itself.

Let's call number five compact file size. That speaks for itself.

Number six is affordability. It's free to artists today. I don't know how long we can keep that up. I think there'll always be a Beatnik "lite" version that will allow people to get into it.

— Thomas Dolby Robertson

PACE

mat, and the more we get it out there, the more popular it becomes, the more demand there is on technology companies to use us as a sound solution.

Do you own the rights to all your music?

Yep.

Do you drink coffee?

Yes.

How do you take it?

It depends what time of day it is. Usually after a meal I like a black espresso, usually in the morning I like a double cappuccino.

Real milk?

I try not to.

Who are the creative people you've really respected in the music industry?

Musically, Van Morrison, Joni Mitchell, Frank Zappa, George Clinton, David Bowie, Brian Eno. I think in some ways especially Eno, because he manages to juggle art and commerce incredibly well like Leonardo Da Vinci did — Da Vinci invented the drum machine and the helicopter, but also managed to paint the Mona Lisa. Eno managed to create ambient music yet still be at the commercial peak of U2 and Talking Heads, Devo, Bowie, and so many other people.

There are a few producers I admire for what they do. I think Trevor Horn's a great producer. I hated working with him because he's a maniac. He manages to make everybody feel very, very dispensable by virtue of the fact that he's got six studios on the ball at any one time. You might play a part and he would just take a four-bar loop of that part and do a whole remix with it in another room. I didn't like that very much.

At the other end of the spectrum, I think (Jeff) Mutt Lange is a great producer as well. He's quite the opposite — he'll never commit to a single note unless he's convinced it's going to end up in the song. But that can sometimes be frustrating because he'll make you play a 16-note melody all night. So he's a real perfectionist. Fairly obscure to your audience, maybe, but I also really like William Orbit. He's a purist programmer and producer who's done a lot of his own stuff and stuff for other people.

There's a lot of people I respect, but I'm not a generalist; I don't like most music. I like a very small percentage of the music that I hear in any genre. Two percent of classical music

continued on page 136

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IN THE MARKET FOR A NEW

MICROPHONE PREAMP? CHECK OUT THE

FOLLOWING 13 REVIEWS OF TODAY'S

NEWEST AND MOST-POPULAR MIC PRES

Joni Mitchell once sang, "You don't know what you've got 'til it's gone." Ever since the introduction of the compact disc, this simple expression has taken on new meaning. Digital technology has forced us all to learn what guitarists have known for years — everything has a "sound" and the "sound" is everything. The magic of analog tape and vinyl is not gone, but to emulate the "best" of their idiosyncrasies, we do have to work a little harder — and understand more about analog audio technology.

Enter the preamplifier, second only to the microphone itself and now — in many cases — the last stage of analog amplification before conversion to the digital domain. Hence the manufacturing explosion of mic preamps from established corporate giants to esoteric garage gurus. To complicate matters, this diverse selection of preamplifiers has an equally wide range of price tags.

HOW TO CHOOSE?

You must first decide whether accuracy or character is required. From a grunge-pop, hip-hop, or rock perspective, a great-sounding preamp is one that can be overdriven into a magical, super-phat zone that makes vocals, guitars, drum ambience or whatever jump right out of the speakers before adding EQ or compression.

On the more genteel side, classical recordists generally sacrifice certain

convenience features in exchange for that elusive straight-wire-with-gain. That's not to say that all audiophile gear is lab grade. It's not. But the less-is-more philosophy is heavy on the hand-selected, ear-tested, components — a labor-intensive process that re-evaluates every component in the chain. Tube or transistor? Transformer or less?

It's not always about amazing specs, but it is about pleasing that most discerning piece of test equipment: the ear. Mission-critical specification requirements vary with application. For classical, it's wide bandwidth, low noise, plus headroom above and beyond the call of duty. For pop-n-fresh magic, look for Class A circuitry — tube or transistor — plus input and output transformers.

Transformerless circuitry may be more transparent, but it is also more difficult to achieve low noise at high gain settings or a consistent Common-Mode (noise) Rejection Ratio (CMRR) across a broad range of frequencies. Transformers provide 15 dB of noiseless gain and reject noise like nobody's business. Either way, doing it right has its price!

Concerning specifications, no test equipment can fully measure "dynamic response" — the ability of circuitry to recover after the shock of transients. One manufacturer uses bell trees, cymbals, and voices to find either the flaws or

the beauty, a test that is equally suited for analog or digital electronics.

Signal-to-noise specs combine the noise-floor measurement (-66 dBu) with the maximum output before clipping (+24 dBu), but the resulting figure (90 dB) is nowhere near the theoretical maximum (about 130 dB). This fabulous number is tough to duplicate outside of "the lab," but part of the secret requires limiting the bandwidth, via filter, to 20 kHz, which lowers the measured noise within the range of human hearing. Still, the spectral content of the noise will vary from circuit to circuit. At the other end of the spectrum, power-induced noise could be internal (the type of power transformer used and its placement) or external (radiated from other gear).

One final note, changing gain on various preamps does not always yield the same changes in noise. From minimum to maximum gain, a single rotary pot is more likely to exhibit major changes in the noise floor than a circuit using a dual rotary pot. A rotary switch is even better because gain structure can be optimized on an as-needed basis.

Following is an extensive review section featuring preamps of all shapes, prices and sonic colors. We hope the information within will help make your selection process easier.

-Eddie Ciletti

9098

Those who explored the original Rupert-Neve-designed Amek outboard unit, the 9098 EQ, will remember that one of its strongest points was a rather fine mic preamp that could be used in isolation to the device's elaborate equalizer. The



only drawback is that the unit is single channel. So, Rupert Neve has responded with the Dual Mic Amplifier that combines two preamp sections drawn, like the 9098 EQ, from the lineage established by the mother of all analog boards — the 9098 console. However, it includes a couple of extras, most notably in how it approaches stereo mic processing. Additionally, it also includes, for the first time on an Amek unit (to my knowledge), front-panel DI inputs.

Rear panel connectors are balanced XLRs, while the DIs enter on jacks, which, incidentally, can also be run balanced. Each channel has a switched gain pot and a detented ± 6 dB trim pot running a range of -6 dB to $+72$ dB. All switches have associated LEDs and these cover phase invert, phantom power, a 80-Hz high-pass filter (18 dB/octave), plus a Mute switch that, while it kills the channel's output, does not affect the action of an 8-segment bargraph meter that follows output level.

Not content with giving you two channels of preamp, Rupert Neve has gone a little further with the inclusion of grown-up MS (sum and difference) processing, which is frequently used in location and broadcast sound recording. This employs a matrixing process that can process and reconstitute a two-mic feed in a manner that gives the operator control of the mono and "stereo" quotients of the combined signal with variable amounts of mono compatibility. Thus you get input and output MS matrix switches and a switchable and center detented Width pot that ranges from monoing the stereo signal to widening the stereo image — although the latter does introduce extra out-of-phase information. Still, it can be a useful effect as long as you are aware of the potential problems and it can be used on MS or plain LR stereo signals.

The DMA is beautifully finished in 9098 livery, and stinks of quality with expensive feeling pots and long-travel, unmistakable push-buttons. You feel you want to like this box as soon as it powers up.

Mute switches are especially useful for those times when you want to change a mic's pattern or do anything else that you know you

really shouldn't but could do without hearing the thumps.

These are two quality mic preamps — silent, open, airy, and fast — and the channels will push out a ton of level given an obliging transducer and a snare drum hit with a mission. They're versatile; as comfortable with delicate and room-oriented sources as they are with vocals and general miking duties. The fact that there are two of them means you can take in stereo and even play around with MS as an exercise. However, the lack of an output level control will require a little more caution when recording direct to disk or digital 8-track.

I have to admit to feeling a certain skepticism towards the inclusion of DI sockets on this unit. After all, Rupert Neve, the granpappy of the mixing console as we know it, and the electric guitar, the weapon of angst and rebellion, did not sit together comfortably in my own

personal tapestry of audio. But as you can tell, I was pleasantly surprised. Plug it in and you've got instant new strings. There is something beautiful and pure about a good electric guitar going through a good DI that is missed by so many of the whiz-bang boxes that concentrate on tones from hell. If you want to judge a guitar as an instrument, rather than just its pick ups and the gain front-end on your amp, then a decent DI box will reveal all.

The DI section can only add to the versa-

tility and value of the DMA. If you are convinced that you need outboard preamps, perhaps because you don't have a desk of great distinction, don't have a desk at all, or because you just fancy some, then investigate this one. It's a well rounded unit; it's a quality thing.

—Zenon Schoepe

MANUFACTURER: Amek US Operations, Inc., 10815 Burbank Blvd., N. Hollywood, CA 91601. Tel: 818-508-9788. Web: <http://www.amek.com>. East of the Rockies, contact AMEK Nashville, 7051 Highway 70 South, #307, Nashville, TN 37221. Tel: 615-662-8939. PRICE: \$1710. Circle EQ free lit. #120.

MODEL 801

The Grace model 801 microphone preamp is a splendid example of detail, elegance, and precision. Examine any aspect — from the mailing carton and the way the 801 is packed, to the owner's manual, to the chassis and interior design — and one quickly realizes this is one well thought out and designed piece of equipment. It exudes quality.

The 801 consists of eight microphone preamplifiers in one chassis two rack spaces high. It employs a fully balanced transformerless design utilizing transimpedance (current feedback) amplifiers as opposed to voltage feedback op amps. Each mic pre is on its own circuit board, which means easy maintenance and replacement should you need it.

The 801 comes with an external power supply (1U half width) that provides ± 24 V for the audio cards, $+5$ V for LED and relay power, and $+48$ V for phantom. The power supply connects to the preamp via a seven-pin connector. If you require a longer power cable (the supplied



cable is eight feet long), the owner's manual includes a schematic of the cable along with six other schematic drawings. The well-illustrated, clearly written owner's manual provides excellent operational information and useful maintenance procedures.

The 801 keeps dials and whiz-bang features to a minimum. There's a front-panel gain control and three switches (phantom power, phase reverse, and 20-dB attenuation). A peak LED indicator monitors the output signal

(green at -14 dB and red at +16 dB, 12 dB before clipping). Grace also gives you a memo strip for use with wet or dry erase markers. (You'll find that strip very handy when running all eight preamps simultaneously.)

I used the 801 to record many different sources. (The signal path was mic into the 801 and then onto an ADAT track.) No compression or inline equalization was used. I recorded an entire drum kit, and the toms came out thick and fat with a solid boom. The overheads sounded very balanced without being overly strident. The 801 also sounded good on piano (AKG 414 on the high end; Schoeps on the bass strings). Tenor sax via a Sennheiser 421 sounded gritty and rich with that unmistakable tenor growl. Vocals also came out very good, though I experienced some difficulty when I wanted to slightly lower the gain during recording.

The 801 uses a 24-position stepped gain control. On the plus side, a stepped control is super when you require repeatability. You make a note of the mic you used, plus the settings on any gear patched inline, and, finally, how many steps you turned the gain control on the 801. If you need to duplicate the exact setting, you're there, especially if you went mic->preamp->tape. The 801's fixed resistor gain control also provides sonic performance advantages as opposed to using an ordinary potentiometer.

On the down side, there are two considerations you need to be aware of. First, the 801 gain control locks you into 2-dB increments, which might be a bit large for the very small adjustments one often needs to make in order to keep a vocal in check (or whatever your incoming source might be). Two dB is pretty high resolution, and could work in many instances if it weren't for the second concern inherent with this type of stepped gain control — you can't adjust it when you're recording. When there's incoming signal (e.g., the singer is singing) and you decide to lower or raise the volume just a touch, you'll also record a very noticeable popping crackle. If there's no signal present, you won't get the static during the gain change.

grace. This is a solid piece of equipment backed by a five-year warranty. —*Bennet Spielvogel*

MANUFACTURER: Grace Design, P.O. Box 204, Boulder, CO 80306-0204. Tel: 303-443-7454. E-mail: egrace@gracedesign.com; Web: <http://www.gracedesign.com/pre>.
PRICE: \$4495; 2-channel unit: \$1895.
Circle EQ free lit. #121.

DMS 22

The Rane DMS 22 is a dual-mono mic preamp with 3-band equalizer. This single-rack space unit is for down-to-earth jobs that require on-the-spot tweaking, not for symmetry freaks who must have precise control of left and right signals. Power is supplied via Rane's external RS 1, which supplies 18-volts AC. The DMS 22 is supported by a two-year (parts and labor) warranty [three years with returned warranty card].

The EQ section [patented "accelerated slope EQ"] provides bass (50 Hz or 100 Hz) and treble (7 kHz or 12 kHz) shelving with switch-selected frequency options. The midrange sweeps from 95 Hz to 4 kHz; all three sections offer 12 dB of boost and 15 dB of cut. A three-position switch selects one-third, one- or two-octave bandwidth for the mids. I preferred the two-octave setting.

The back panel has XLR mic inputs and two separate output sections labeled "Output" and "Stereo Output." "Output" is a pair of balanced 1/4-inch connectors directly from the preamp. "Stereo Output," via XLR connectors, adds a pair of pan pots so that the stereo image can be manipulated between hard left or right and mono.

Also on the rear panel is a three-position high-pass filter (15 Hz, 50 Hz, 100 Hz) that cannot be bypassed. (Perhaps the lack of front-pan-

imum gain. Input referred noise (IRN) is 130 dB at 60 dB of gain. Response is 15 Hz to 200 kHz +0/-3 dB. Maximum Gain is 60 dB.

The DMS 22 [input] circuitry is "text book transformerless," using the Analog Devices SSM2017 front-end. (Similar topology is used in many recording console preamps, including those costing as much as \$40,000!)

The record tests for this (and a Millennia Media preamp) were made via a 150-foot cable from my site to NYC's First Street Café. Two AKG SE300 mic bodies with CK91 cardioid capsules were positioned at a ninety-degree angle. The preamp output fed a Pioneer 96 kHz DAT deck. The first set was a vocalist playing acoustic guitar accompanied by an electric guitarist. Everything balanced well the first time 'round, so no EQ was used. When compared to another transformerless preamp (the Millennia Media HV-3B), the sound was remarkably similar, albeit less focused at the top and bottom, which is notable, considering the DMS 22 is one-third the price.

Space at the Café was at a premium for the second set (drums, acoustic bass and electric guitar). The compromised mic placement "forced" me to use the unit's EQ to dip out room resonance from the guitar and "ride" the treble depending on what the drummer was doing. The EQ was up to the challenge.

The DMS 22 seems better suited for use as a "dual-mono" (independent) device. "Stereo" operation implies that the same treatment be applied to both channels — a difficulty for the DMS 22 because all of its EQ pots have center detents only. While "gain" can more or less be set by eye (via metering on the record device), getting two independent channels of EQ to match by ear is near impossible.

One example of making a dual-mono product more suitable to stereo applications is the option Rane provides on their dedicated graphic equalizers (the amount of boost and cut is an optional 6 dB or 12 dB). This is a great feature that would be helpful if applied to the DMS 22. A maximum 6 dB in either direction — combined with multiple detents on all pots — would



In a set-and-forget volume situation, the 801 sounded magnificent. It could easily become my preamp of choice. The difficulty of quietly making slight volume adjustments during tracking seems to be something Grace addressed in their model 201 two-channel preamp. They give you all the electronic benefits of a stepped control, but they add a 10-dB trim attenuator.

I enjoyed tracking with this preamp. It captured detail very well and handled mega-volume guitars and kick drums with ease and

el space bumped this useful feature to the back of the bus.) The manual is extremely thorough and covers everything: grounding, wiring options, usage, circuit-board layout, and schematics, plus it offers a mini catalog of other Rane products.

The power supply rails are ±15 volts, which yields a maximum (balanced) output level +24 dBu. (Output amps are not cross coupled.) There is no input pad. The DMS 22 can handle a +6 dBu input signal at minimum gain. The published signal-to-noise ratio is 97 dB at min-

allow more subtle and repeatable tweaks.

Since popular 12- to 14-input mixers command a similar price, the Rane DMS 22 will be an especially valuable product for those who don't have room for, or need, a mixer with built-in mic preamps. This would be the case for voiceover work or if a keyboard line mixer was more than doing the job and a pair a mic preamps would be the most that was ever needed.

Despite its \$595 price tag, the DMS 22 provides features, such as onboard EQ and panning, which result in a versatility not found in

most preamps. The bandwidth switch offers more midrange options than can be had on an average mixer. The DMS 22 makes sonic accuracy affordable.

—Eddie Ciletti

MANUFACTURER: Rane Corporation, 10802 47th Avenue West, Mukilteo, WA 98275-9800. Tel: 206-347-6000. Web: <http://www.rane.com>. PRICE: \$595. Circle EQ free lit. #122.



ART's Tube MP (reviewed Feb. '96) has been very popular not just because of its price (\$149), but also because of the sound quality. To recap, the Tube MP is a single-channel 12AX7-based preamp with solid-state input and output



stages, XLR balanced and 1/4-inch unbalanced I/O, phase switch, phantom power on/off, and Gain switch. The Pro MPA is a stereo, "pro-level" version that builds on these features but adds some important new twists.

Although the Pro MPA costs more than two Tube MPs, it justifies the difference. First, the wall wart is gone — replaced with a captive-type line cord and internal power supply to complement the 2U rack construction. The second obvious difference is metering (separate for each channel). A 10-stage input LED meter shows whether the input signal level produces a clean, warm (slightly distorted), or clipped signal and gives useful visual feedback while adjusting input levels. There's also a vintage-style, lit VU meter for

monitoring the average output signal level. Construction-wise, pushing plugs into the rear panel bends it in slightly; however, this does not flex any circuit boards so I don't think it's a significant problem. Aside from that the construction is solid.

A variable high-pass filter (7 Hz to 150 Hz) helps minimize thumps and other subsonic gremlins, tightens up the low end, and defeats microphone proximity effects. It can't be bypassed, but going down to 7 Hz is close enough. Finally, there's a bit less noise than the Tube MP.

As to applications, the unbalanced input's 840k impedance is sufficiently high to minimize pickup loading when used as a guitar/bass DI box. Also, the stereo capabilities let you "warm

THE SOUND OF MIC PREAMPS

By Mike Sokol

What's the big deal about the "sound" of mic preamps. After all, if you look at the specifications for most of them, they look about the same: flat from a few Hz out to 50 kHz or so, and noise levels approaching the quantum level of molecular movement. So why do mic pres sound so different when they're supposed to act like a straight wire with gain? In an A-B test of two mic pres reviewed in this issue, I thought the EQ on the monitor return had been accidentally engaged. We're not talking a small change, but radical stuff, like someone had twisted an EQ knob a quarter turn.

A Theory: I remember reading long ago how ribbon mics would sound "tinny" if hooked to a transformerless preamp, and decided to talk to Jensen [Transformers, Inc.; 818-374-5857] about the effect. As luck would have it, they had done some research on this and sent me their data.

Bridging Inputs: In order to transfer the maximum voltage between a microphone and preamplifier, the input impedance of the preamp should be 10 times the source impedance of the microphone, a so-called "bridging input." If the input impedance is too low, there will be amplitude loss, adding extra noise to the signal. If too high, the microphone will be underdamped, causing a rising response at high frequencies, transient ringing, and phase distortion resulting in time-smear. According to the graphs sent by Jensen, the frequency response could rise by several decibels, easily noticeable by even the most tonally challenged.

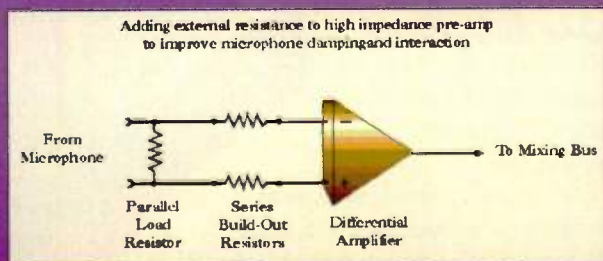
Flat or Flattering? My hypothesis is as follows: Many of the differences we hear between various preamps is due to interactions between the microphones and the mic pres. Since many of the popular transformerless console preamps have a rather high input impedance, they cause underdamping in some microphones, resulting in exaggerated top end and poor phase response. Good preamp designs exploit

this effect to produce a flattering response with a variety of microphones. This may not be the original flat-response design of the microphone, but it does give you different sounds to work with.

Make It Better: By adding "build-out" resistors in series and parallel to the input of a console preamps, it should be possible to optimize this damping factor for various microphones. Thus you could "tune" a particular microphone/preamp combination for best phase and/or amplitude response. With a little tweaking, your existing console preamps could sound a whole lot better.

A New Design: The Pre-Optimizer: I'm designing an external box with an Enable/Disable switch and a place to plug in various resistors. Jensen has agreed to help me with the design, and provide a method for determining the proper resistor values in your own system using simple test equipment. EQ will publish the Pre-Optimizer design in a future issue, along with resistor values for microphones and preamp combinations found in most project studios. Then you can take it from there. Happy listening.

Mike Sokol is an audio engineer, musician, and computer communications designer that loves old microphones. He really wants a 44-DX for his birthday in June.





el mic preamp controls (gain, LF rolloff, phase invert, phantom power and -20 dB pad), the two-channel HM-1 also has a volume control, overload indicator, and 10-segment LED output meter (with "-10 dB"

up" analog stereo mixes when going to DAT. There's no Bypass switch to compare the straight and processed versions, but you can always push some patch cords around.

Sound is subjective, but I'd say the Pro MP has a thicker, less "sparkly" sound than the Aphex Tubessence mic pre, but more definition and "edge" than many tube preamps using transformers. It adds depth to guitar and bass, strengthens weak vocals, and adds punch to sampled sounds.

While the Pro MPA combines a good mix of tube and solid-state technology, useful metering, phase switch, and the ability to use both balanced and unbalanced outs simultaneously, it's not perfect; there's a thump when turned on or off, and there's no Bypass switch for "mastering" applications (e.g., you're using the Pro MPA to "warm up" the sound of program material, and want to compare the processed and straight sound).

Overall, though, this unit is a class act. For

many the Tube MP will still do the job, but if you need to move up one more quantum level, the Pro MPA provides everything that's made the Tube MP a hit — and more. —Craig Anderton

MANUFACTURER: ART (Applied Research & Technology), 215 Tremont St., Rochester, NY 14608. Tel: 716-436-2720. E-mail: artroch@aol.com. PRICE: \$599. Circle EQ free lit. #123.



The Demeter HM-1 mic pre is part of that company's new H-Series of components designed around hybrid circuitry. Input amplification is handled by a 12AX7A tube (supplied with 200 volts), while the output driver employs a solid-state circuit. In addition to the typical front-pan-

switch) for each channel. XLR and 1/4-inch mic inputs and line outputs live on the rear panel; a 1/4-inch TRS phone jack on the front provides a DI at instrument level. Demeter warns that phantom power should, of course, be turned off to protect the HM-1's circuitry when using an unbalanced microphone input. Jensen transformers are used in each input channel.

I used the Demeter HM-1 on a variety of sessions with different microphones. Combined with a Lawson L-47MP tube mic, the HM-1 tracked the dynamic range of both acoustic guitar and lead vocal beautifully and had no problems with high signal levels. The HM-1's low-frequency rolloff came in very handy to reduce pops picked up by the Lawson mic, thus allowing me to avoid having to add an EQ to the signal chain. On kick and snare drums (where the pad was needed), the HM-1 was crisp and clean. On kick drum I preferred the HM-1 to the (\$1800 per channel) Avalon M5, though the M5 did reach down to lower frequencies. I seemed

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to detect a slight rise in the response of the HM-1 at around 4 or 5 kHz (a sort of presence peak) that added some smack to the attack of the kick. Generally, I'd describe the sound of the HM-1 as "clean" rather than "tube-like."

The HM-1's front-panel, 1/4-inch instrument input was quiet and uncolored for guitars and keyboards. Don't, however, expect to get the kind of gentle tube distortion you might get from a guitar amp—this input does not clip gracefully.

The combination of level controls and metering made setting optimum gain on the HM-1 easy. Bring up the gain control until the Overload LED barely lights (if you want to be conservative you can then back down a bit), and set the Volume knob for satisfactory level to tape. Artists doing their own engineering could place the HM-1 out in the studio near a mic stand and adjust level going to tape without running back and forth to the control room. (You could, in fact, even plug a tone generator into the instrument in-

D.W. FEARN VT-2

The VT-2 could be in a '50s science thriller. The heavy-duty switches, black-faced meters, and nicely finished thick aluminum front panel are reminiscent of an era when electronic devices were built to last for decades. The VT-2 takes up three rack spaces and weighs 14 lb.; it's as costly as some mixing boards.

I first used it on a live recording of flute and harp, direct to DAT, using a matched pair of Neumann U64 condenser mics, long my favorites for such recordings. Monitoring was with Garwood personal ear monitors. After some adjustments, I sat down and listened. The sound had both a very realistic bottom for the harp and nice detail for the flute. I at first thought the sound was a little dull, but I soon realized that a complete lack of hiss was fooling my brain into thinking there were too few highs. Plus, there appeared to be some limiting action going on,



D.W. Fearn VT-2

put and then use the volume knob to precisely calibrate the Demeter unit's meter to your tape machine's meter.)

Be aware that the output meter has VU characteristics (as indicated), not peak. While recording a clave using the HM-1 and an Earthworks TC40K, the HM-1's meter showed a max of -10 VU, while our TASCAM DA-88 showed 4 dB below 0—and the HM-1's overload LED never came on. Incidentally, Demeter might consider adding hash marks for the gain and volume controls—they would make recalling settings a bit easier. Also on my wish list: a rear-panel screen that notes which XLR pin is hot!

Traditionally, tube devices tend to be more noisy than solid-state devices for a given amount of gain, but this was not our experience with the HM-1. Tubes or not, the HM-1 is a very high-quality mic pre with bang-for-the-buck and an admirable entry into an already-crowded field.

—Steve La Cerra

MANUFACTURER: Demeter Amplification, 2912 Colorado Avenue, #204, Santa Monica, CA 90404. Tel: 310-829-4383. PRICE: \$1250. Circle EQ free lit. #124.

where the DAT levels wouldn't jump as much as expected. Still, the sound never sounded clipped, even though the needles smacked the wall a few times.

Next was a direct-to-ADAT studio session with one of my favorite female vocalists. A Shure SM7, Electro-Voice RE-20, and Shure Beta 58 were selected as common project studio microphones. My favorite with the VT-2 was the SM7, it was very flattering to her voice, sort of like whipping cream in really good coffee—all the flavors are separate, but somehow commingled. The Beta 58 had some of its peaky top end smoothed out and the RE-20 seemed about the same as it usually does with her voice, a little woolly on the top, but with good bottom.

Finally, I hooked it to the output of my DAT with the external pad for a little remastering work. Bypass switches are included for the meters, allowing you to run at clipping levels without wrecking the movement. I remastered a DAT for a local band named Hot Rod Otis that needed some fattening and the average levels brought up. I had previously tried outboard compressors on the tracks, but the percussion seemed flattened. With the VT-2, I was able to get that

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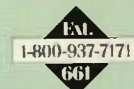
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nice "phat" analog tape sound, with none of the bass/hi interaction you get from single-band compression. There's one change I'd like to see: instead of switching the meters completely out of the circuit, I'd rather have attenuation added to the meters, moving the calibration up to the actual clipping point of the output stage. Then I could see, as well as hear, what I was doing while adding a little "tube" processing.

Since the VT-2 can be used in so many different ways, a very real benefit is that with the addition of this single piece of gear, I raised the

overall caliber of my whole facility. I really liked the VT-2 a lot.
—Mike Sokol

MANUFACTURER: D.W. Fearn, P.O. Box 57, Pocopson, PA 19366. Tel: 610-793-2526. Web: www.dwfeearn.com.
PRICE: \$3500, VT-2 Preamp; \$80, LP-1 line-level pad. Circle EQ free lit. #125.



From Hawaii, the land of slack key tuning, volcanoes, and the hula, it's the Giltronics mic pre-amp. Imagine the design inspiration: palm trees, surf, thongs — whatever it was, John Gilleran and his design team created one superlative yet laid back preamp.

Specifically, the 4TMP is a 4-channel unit that houses six 12AT7WC (Phillips) vacuum tubes and Reichenbach input and output transformers — old technology stuff manufactured with modern quality control. It's two rack spaces high and weighs 13 lb., which makes for easy transport should you want to record live gigs. It runs on an internal shielded power supply.

Front panel controls are simple. There's an output trim pot and switches for: -20 dB Pad, Phantom, -10 Sensitivity, and Phase Reverse. Except for the Sensitivity switch, the controls are straightforward. Reaction among my recording buddies to the Sensitivity switch ran the gamut from, "Are they serious?" to "Way cool."

Giltronics explains that the Sensitivity switch affects the gain structure by changing the negative feedback circuit. Engaged, the preamp is less likely to overreact (distort) to a hot mic, and results in a little more tube compression effect when it's driven hard. You may like this feature as a way to keep snares and cymbals under control. I found that the preamp sounds more open without using the Sensitivity switch.

The output control has about 14 dB of attenuation. For very loud signals, I used the 20-dB pad first and went from there in terms of using or not using the Sensitivity switch. And while we're on the subject of using, there's not much you won't want to use this preamp on. The 4TMP fits on everything.

If you record digitally, you've no doubt experienced how difficult getting a good violin or fiddle sound can be. Especially if the player and fiddle have a troublesome tone to begin with. The Giltronics shined when faced with a rather harsh fiddle.

This preamp has an unusually fine top end without emphasizing the midrange or sounding excessively creamy. Mellow, but with an edge. It behaves the way you want tubes to react. The Giltronics circuit can be somewhat forgiving when it comes to fitting discordant sounds onto a track. It gets that harmonic tube magic mojo creeping onto the music. Yet, somehow, the Giltronics remains true to the original sound, empha-

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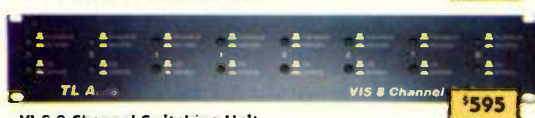
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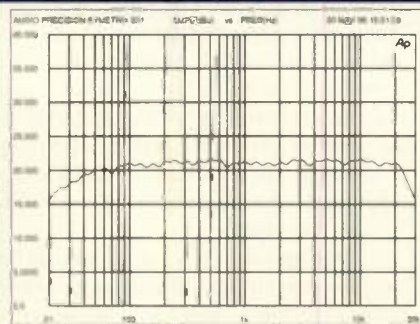
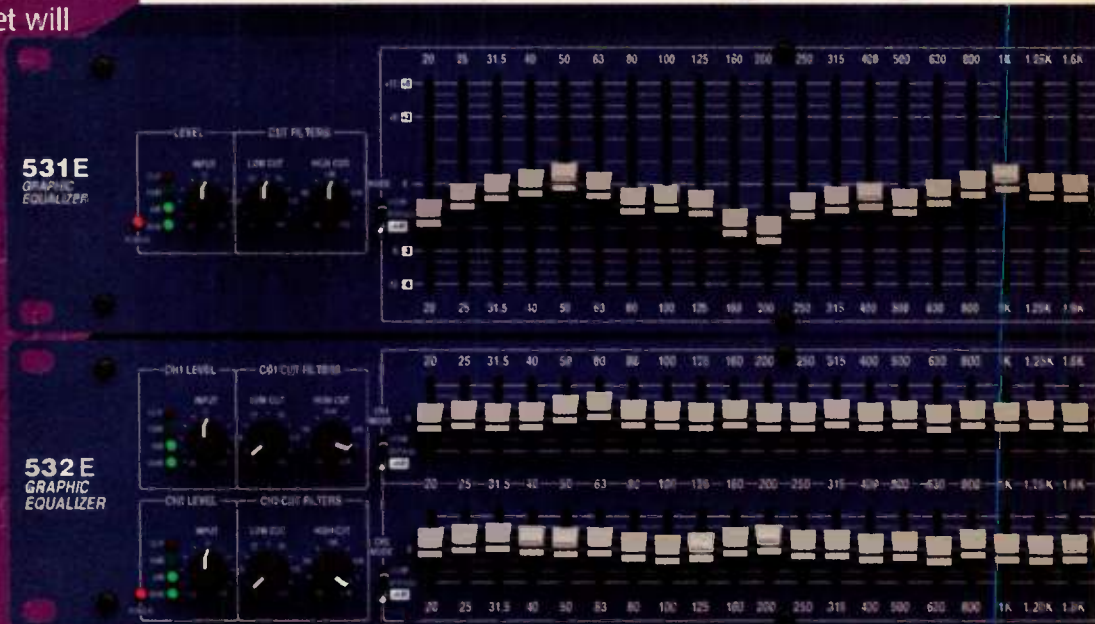
Symetrix is making a couple of new concert sound quality graphics that will blow the blanket off your PA! The details:

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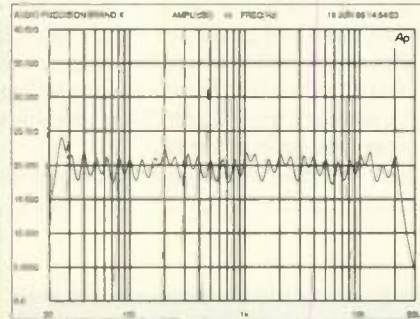
The graphs to the right were made with all faders at maximum boost, not a typical setting, but a test that can immediately pinpoint an equalizer's problems. The ripple from the well known brand X is not hard to hear! The Symetrix graphics not only look better on paper, they sound significantly better!

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

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Specs can tell you a lot, but the sound is everything. Give our 531E or 532E a try and we're sure you'll agree that these EQ's can indeed **blow the blanket off your PA!**

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CIRCLE 62 ON FREE INFO CARD

sizing the good and minimizing the bad.

In my situation, the best combination for a swing fiddle overdub was an RCA 77-DX, the Giltronics cranked up, and the player standing in a sweet-sounding spot under the boom. Supply a happening mix for the player, and faster than you can grab a wave off Waikiki, your track sounds like analog with Dolby SR.

Try as I might, I couldn't find anything I disliked about this box except that there's no audio signal indicator (incoming, outgoing, clip). Message to Giltronics: If you ever rework this model, please put in a simple green/red LED. During complex recording sessions where the patchbay begins to resemble a jungle of vines, a blinking LED on a mic preamp channel can be a welcome beacon in a dim studio.

Open the 4TMP's top cover and the craftsmanship of circuit design and layout is evident. This is a quality handmade product and does not come cheap. If you want faithful sound reproduction that is quiet and rich with amazing clarity, and you work a lot in the digital domain, this is a box worth listening to.

—Bennet Spielvogel

MANUFACTURER: Giltronics, Inc., 220 Nalomele Place, Kapaa, HI 96746. Tel: 800-682-2778 or 808-822-2778. E-mail: gilamp@hawaiian.net; Web: www.giltronics.com. PRICE: \$3600. Circle EQ free lit. #126.

Similarly, the enhancer is not just a treble boost. It picks off some of the signal, then compresses and distorts it (drive control), removes the low end (Q control), and then mixes the enhanced signal back in (enhance control). The effect is particularly striking with acoustic instruments.

The preamp itself is somewhat traditional, with an XLR mic in (switchable phantom power is provided), and a high-impedance (1.4 megohms) 1/4-inch line in for guitar or bass DI applications. Other features include an output control, 5-stage LED meter, 1/4-inch TRS insert jack, paralleled output jacks (isolated passively with resistors), and a mix in (intended for stacking several boxes with multiple signals, or adding in a second instrument input). The insert jack is particularly useful with instruments like guitar, as you can insert your favorite funky wah-wah, octave divider, or other weird-ass box.

The sound quality, while clean, is not necessarily clinical. This box strives to deliver a particular sound, not just be a neutral observer that adds some gain. Subjectively, the sound seems lively and thick, with the thickness coming not from input or output transformers, but from the compression. The lively quality is only partially attributable to the enhancer; the box in general seems to have a big-yet-transparent quality, probably due to the serious amount of headroom (around 30 dB), the transformerless input stage, and the compressor's refusal to "squash" transients.

Although the VC3 is easy to use and the compressor is very forgiving, the enhancer requires a light touch or the sound becomes strident. Another caution: The front-panel labeling is difficult to read; tiny black type against a dark green background is a visual challenge. However, I suspect that many engineers will simply find a certain favorite position and not experiment too much beyond that, unless they switch mics or instruments.

The DI features for guitar are a nice bonus,

MANUFACTURER: Joemeek, distributed by PMI, 23773 Madison St., Torrance, CA 90505. Tel: 310-373-9129. E-mail: joemeek@amhsales.com. PRICE: \$499. Circle EQ free lit. #127.



Millennia Media is a recording company that built its transformerless HV-3B mic preamp to meet the stringent requirements of classical recording. The design goal was to achieve sonic transparency, maximum headroom, minimum noise, extended bandwidth, and circuit stability regardless of cable length.

Typically (but not with the HV-3B), the input signal is converted from balanced to unbalanced and then back to balanced again, but the HV-3B is balanced from input to output. At the front end is an "octet" of discrete transistors, followed by high-performance, hand-selected IC op amps. After the initial design, even individual components were auditioned and selected for their sonic performance.

Extended input and output headroom is achieved by higher-than-average power supply rails (± 24 volts). No input pad is required — the HV-3B can handle +23 dBu at the input with the gain set to 8 dB! The maximum output level is +32 dBu and slew rate is in excess of 25 volts per microsecond. The published signal-to-noise ratio is 131 dB and 128 dB with a 30-ohm or 150-ohm source, respectively. Response is 10 Hz to 100 kHz ± 0.15 dB. CMRR is greater than 70 dB from 10 Hz to 20 kHz (85 dB typical). Maximum Gain is 65 dB.

The front panel is ultra basic. For each channel there is a Phantom On/Off switch, a rotary Gain switch (fine, 36 discrete steps), and a three-position Gain toggle switch (coarse). A pair of LEDs indicate Signal Presence and Overload. Four additional LEDs handle the power supply (± 25 volts for audio, 48 volts for phantom, and the optional 130-volt supply for the high-voltage versions of B&K microphones). There is no Phase Reverse switch. (Millennia Media's design philosophy minimizes switch and relay contacts, connector contacts, sockets, etc., and other mechanical circuit elements always prone to degradation over time.)

Inside the device is room for the optional A-to-D converters (model HV-3C). The back panel can be configured for the converters, as well as for the four-pin XLR connectors required by the aforementioned B&K microphones.

The record tests were made via a 150-foot cable run between my facility and the First Street Café in NYC. Two AKG SE300 mic bodies with CK91 cardioid capsules were arranged at a 90-degree angle. The first set featured a vocalist-acoustic guitarist accompanied by an electric guitarist. I got lucky with both the mic placement and the sensitivity of the musicians



The half-rack VC3 (optional rack ears are available for rack mounting) is more of a vocal processor than a simple mic pre, since it includes compression and "enhancement" (an exciter-type circuit). Although the specs are pro-level with extended low- and high-frequency response (10 Hz to 50 kHz @ ± 0.25 dB), in many ways more attention is given to sound than



"technical correctness." For example, the compressor is very musical and difficult to mis-set; however, the threshold and ratio are not variable; a do-all compression control influences both factors. There's also a compression In/Out button, Release control, and 1 ms/10 ms Attack Time button.

but this is a box with (for lack of a better term) "attitude," and a pop sound that's tough to resist if you're recording rock or pop vocals. If you're looking for a one-stop preamp that delivers an on-target processed sound to your recorder, this could ace out the average multi-effects, and at a lower price. —Craig Anderton

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nals without fuss. Voices sounded natural, and it was easy to distinguish the qualities of each different microphone. The noise floor was not as low as some more tweaky mic preamps, but when the gain was all the way up, the noise

to dynamics, and the recording was excellent.

For the second set (drums, acoustic bass, and electric guitar) I switched in the 10 dB pad on the microphones. Space at the Café is at a premium, limiting mic placement so as to yield a somewhat drum-heavy mix. Even so, the HV-3B was a pleasure to the ear. Bandwidth is extended, but unhypered, smooth at the top and tight at the bottom. Recordings were made to the Pioneer 96 kHz DAT deck.

The owner's manual is brief and mostly cautions the user to power down when making connections. With the potential to deliver +32 dBu, plugging in a microphone will make a serious pop at the output. No circuit documentation is provided. There are internal trim pots, but neither silk screening nor the manual indicate their purpose, which is to fine tune CMRR. There is a one-year limited warranty.

My business is not classical recording, but the idea of having the responsibility to record an orchestra would lead me to play it very safe. Even beyond sonics, the Millennia HV-3B inspires confidence. Since gain is controlled by switches and not pots, channel balance is matched to within .04 dB! Switches are gold plated and, after a brief warm-up period (as per the manual), are virtually silent. I noticed no glitches at all, and you can't beat that maximum +32 dBu output! This is a serious sonic performer.

—Eddie Ciletti

MANUFACTURER: Millennia Media, 4200 Day Spring Court, Placerville, CA 95667. Tel: 916-647-0750. E-mail: jj@jps.net; Web: <http://www.mil-media.com>. PRICE: \$1895, HV-3B (pre-amp only); \$3295, HV-3C (w/built-in A-to-D converters). Circle EQ free lit. #128.



If you believe a mic preamp should be a set-and-forget item, then Peavey has built an eight-channel unit for you. The A/A-8P is a straightforward 1U mic unit with eight discrete channels that can be configured for mic- or line-level signals, 48 V phantom power (mic level only) and individual limiters on each channel. The unit is intended for fixed installations where these mic- or line-level signals would be

processed by a [Peavey] MediaMatrix system or other line-level device. Although the design was not intended for use in the project studio or touring sound rig, the features of the A/A-8P may be appropriate to some of those users, too.

Eight channels of good-quality mic preamps sound like a perfect combination with an 8-track digital recorder. When a minimal signal chain is appropriate, the A/A-8P includes everything you might need to track directly from the mic to the recorder. Each channel includes a limiter that can protect you from clipping the recorder, and that even sounds



Peavey A/A-8P

good when squashing an acoustic guitar. The unit can accept an extremely wide range of input levels, but lacks any gain overlap between mic and line inputs.

The front panel of the unit includes screwdriver-adjustable gain controls and clip/limiting and signal presence LEDs for each channel. The rear panel has pushbuttons for the mic- or line-level inputs and recessed DIP switches to select phantom power (mic level only) and limiter for each channel. These switches and the input and output connections require the user/installer to check everything twice, to be sure. The input and output connections are made using "Euro"-style screw terminals. These removable terminal blocks allow any cable to become an instant adapter with the simple application of a pen knife and there are fewer XLR connectors to buy. On the other hand, it is easy to miswire connections and suffer from accidentally unbalanced or polarity-reversed signals.

The sound of the A/A-8P is neutral and uncolored to match the low-key gray finish of the unit. There are no frills or added lushness, and the internal circuitry is well designed but lacks any discrete transistor input stages or esoteric features. This is a simple and solid unit that makes use of a good mic input transformer and is capable of handling a wide range of sig-

nal was free of hum or other artifacts. The limiters are intended as a last resort to prevent clipping, but could also be used creatively to reduce the dynamics of some instruments with good effect.

The A/A-8P is intended for those set-and-forget installations in churches and convention centers, but it could also serve as an extension to the mic inputs in a project studio or a line driver in a concert system. The transformer-coupled inputs of the unit will also solve problems for those experiencing radio-frequency interference in the actively balanced mic preamps of their bargain mixer. Eight channels of indi-

vidual mic preamps in a single-rack space for less money than some single-channel units makes the Peavey A/A-8P worth consideration. Due to the industrial-style of the unit, it may be available only from selected Peavey dealers.

—Wade McGregor

MANUFACTURER: Peavey Electronics Corporation, 711 A Street, Meridian, MS 39301. Tel: 601-483-5365. Web: <http://www.peavey.com>. PRICE: \$800. Circle EQ free lit. #129.



Avalon Design's M5 microphone preamp features a single-channel, solid-state, pure class A design accompanied by an outboard power supply, the B2T. The M5 is beautifully constructed; the front panel is 1/4-inch thick, legends are easy to read, and all controls have a solid feel. The M5 is a half-rack wide (2U high) and can be racked singly or in pairs with optional hardware kits. Our M5 had the standard single-ended output; an optional "high performance" Jensen output transformer can be ordered as an option for fully balanced oper-

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ation. (In light of the unbalanced output, there should be a pinout on the rear panel.)

There are three inputs on the rear panel: 1/4-inch unbalanced instrument; standard three-pin XLR mic; and 130-volt, four-pin B&K mic in, which is excellent foresight (an optional card is required). There's a line-level XLR output and an input for the power supply. While the power supply uses the same type of connector as the B&K mic input (4-pin XLR), the genders are reversed to prevent an accident.

If you intend to rack mount these units, be aware that the Phantom Power switch and instrument inputs are on the rear, making them difficult to reach when the unit is installed in a rack — and you will want to use the instrument input because it is clean. The front panel has a clearly lit and labeled analog VU meter, detented gain knob (providing 20 to 60 dB of gain), bicolor signal LED, and switches for Polarity, Pad, Instrument Input and Filter. A Filter Adjust knob moves the passive 6 dB/octave high-pass from 20 to 200 Hz. There's no on/off power switch on the M5 or the B2T.

In the studio, we noticed the M5 has a very extended low-frequency response and plenty of headroom. Reverting to the console mic pre was disappointing at best — it struggled while the M5 cruised. Interestingly, when miking kick drum, the M5 did not need to have its pad switched in, whereas other pres with a similar gain range typically need their pads (using the

same mic on the same drum). We felt we were really hearing the mic with a minimum of coloration. On snare drum with the old standby SM57, the M5 captured the meat of the shell, had plenty of impact, and no hype in the highs.

For percussion instruments, the "signal" LED was a necessity due to the slow VU ballistics. This light glows green for signal present and turns red at +20 dB. Transient response on percussion was very good, and wind chimes sounded quite real when miked with an AKG C414. For percussion and voice-over, the filter came in handy: Since the low-frequency response is so extended, mic-stand noise can be a problem, but engaging the filter at settings between 45 Hz and 70 Hz cleaned up any vibration-transmitted noise. Moving the Gain knob between stops yielded a very gentle click that was only audible when the control room volume was way up; these detents made repeat settings breeze.

During a male lead vocal session, we used the M5 with a Neumann U87, straight to tape without compression. When you turn on the

M5's phantom power, the output mutes for roughly five seconds while the circuit stabilizes, avoiding any strange start-up noises. The U87's character was evident through the M5, and the two provided a quiet backdrop for the vocalist (this time we set the low filter to the 50 Hz mark). The M5's headroom was clearly evident in this application where even loud passages came through effortlessly.

Avalon has built a serious mic amp that offers the great blending of low-noise, plenty of headroom, and excellent frequency response.

—Steve La Cerra

MANUFACTURER: Avalon Design, P.O. Box 5976, San Clemente, CA 92673. Tel: 714-492-2000. E-mail: avalon@avalon-design.com; Web: avalon-design.com.
PRICE: \$1800. Circle EQ free lit. #130.



An advertisement for the Two Thousand High Resolution Control Room Amplifier. The background is a dark, textured surface with the words "Two Thousand" written in a large, elegant, gold-colored script font. Below the title, in smaller white capital letters, is "HIGH RESOLUTION CONTROL ROOM AMPLIFIER". The central focus is a glowing, circular, wire-mesh structure that resembles a hot house or a high-pressure chamber, with bright orange and red light emanating from within. On either side of this central structure are two red "CLIP" indicator lights. Below the central structure, the text "HIGH CURRENT DUAL MONO" is visible. In the bottom right corner, there is a logo for "HOT HOUSE professional audio" featuring a stylized house icon. At the bottom of the advertisement, a white banner contains the text: "Probably more power than you'll ever need... Definitely the most music you'll ever hear".

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The MD-1 is the answer to a lot of little problems in the audio business. Have you ever needed to: (1) drive a power amp from a single mic; (2) send a mic signal down a very long cable; (3) check mic level signals while troubleshooting a system; (4) add phantom power to a mic input on a consumer-grade recorder; (5) connect two dissimilar sound systems to one signal while maintaining electrical isolation and level control? The MD-1 is just the tool for these types of applications. It is a device worth having in your toolbox...just in case.

The unit has three controls on the front/top face: input gain; top input/bottom input balance; and headphone volume level. The balance control allows monitoring of the line-level signal connected to the top 1/4-inch phone jack and the input to the XLR connector on the bottom, or a balance between the two. The top face includes switches for line or mic input (to the bottom XLR connector); 18-volt phantom power (enough for many but not all condenser mics); and the power switch with an LED that indicates battery status. The 1/4-inch headphone jack is also on this face of the MD-1.

The bottom of the unit has XLR connectors for both input and output from the unit. A Loop switch allows the input signal to be directly connected to the output connector. In this Loop mode, the MD-1 becomes a headphone monitor of the balanced mic- or line-level signal with all the controls on the unit affecting only the headphone output. This mode allows the MD-1 to be a personal monitor mixer on stage or in the studio by connecting the main monitor mix send to the top line input and the local mic or DI into the bottom XLR. The "looped" signal passing between the two XLR connectors is unaffected by the top-panel controls for the headphone output, so they can be set to suit the musician. Just keep lots of 9-volt batteries handy if you give this device to a drummer.

All the controls are easy to reach while wearing the MD-1 on your belt, but are well protected (including the XLRs) from damage by the case design. I would really like to see a signal clip indicator on the unit, as it was easy to run the unit into distortion with high-output condenser mics or hot signals. The gain was not sufficient to record a gnat's breath, but was sufficient for

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the guitars, percussion, and vocals involved in this review.

The ability to bud into a line and listen to the signal without influencing the recording (except while making the connections) is a very handy feature. The MD-1 is also well suited to driving long signal lines when you have a situation where one mic is a long way from the mixing console. The good quality transformers maintain the common-mode



rejection of external noise sources, making the unit serviceable in even hostile RF saturated environments.

This is not the mic preamp to enhance the sound of your collection of vintage microphones. What it is is a very serviceable tool for getting good quality audio from difficult situations. The MD-1 offers a range of solutions for those that need to bring back audio from outside the studio or troubleshoot audio in large sound systems
 —Wade McGregor

MANUFACTURER: Whirlwind, 99 Ling Road, Rochester, NY 14612. Tel: 716-663-8820/888-733-4396; Web: <http://www.whirlwindusa.com>. PRICE: \$299. Circle EQ free lit. #131.

Wade McGregor is a senior consultant for Barron Kennedy Lyzun & Associates, an acoustical consulting firm based in Vancouver, BC. For more info visit their web site at <http://www.bkla.com>.



It's got to be Christmas, and I must have been a very good boy. I've recently been playing with the Daking mic pre, and it has convinced me just how different preamps can sound. (For some thoughts on that subject, check out my sidebar on mic/preamp interactions [page 79].)

I used the Daking as a mic preamp for vocals and acoustic guitar, and also as an outboard mastering equalizer, since it includes an excellent 4-band switchable frequency EQ with low- and high-cut filters. My first reaction was, "This thing's got gain." I could actually hear my fingerprints scraping six inches in front of the mic. And there was

an absolute lack of noise floor. Even my aged RCA 77-DX with its low-output level was above hiss level.

There was a real addition of top end to some of the mics used with the Daking. In fact, I once had to run back to the control room to make sure I hadn't accidentally bumped an EQ switch. It sounded like my Shure SM7 had turned into a condenser mic. Not a subtle effect at all; it was more like several decibels of boost at 15 kHz. But with other mics the effect was more tame. There was also an increase in "reach" on my RE-20 and Beta 58, as if the pattern got choked up a notch, for reasons I'm not sure I understand. But I enjoy being taken by surprise every now and then.

The EQ was very musical, with a wide band at low boosts, narrowing to almost a notch as more level was dialed in (great for electric guitar processing). Even though it's not a true parametric — you can't switch the frequency points during a live session since a small dropout occurs, although there's no pops or ticks when program isn't present — the switched frequency points are at the right places. Geoff Daking takes no credit for picking them. He says the great engineers in the '70s worked it all out for him. I also used it on two mastering projects with the line-level inputs, and wanted to heave my 1/3-octave EQ out the window after playing with the Daking EQ.

The road case makes this a great pre-amp for on the road. Hook it up to a DAT recorder and you've got a portable setup for live 2-track recording. This is a very flexible and powerful mic preamp/equalizer. Having lots of quiet gain means never having to say you're sorry.

I would (literally) like to see clearer legends on the front panel (especially for work in dim light); since my uncorrected vision is 20/600, I notice such things. [Note: *Daking tells us brighter, clearer legends are already on their way.* —HGL] Plus there's no decibel markings to allow you to make notes for future sessions. Easy fixes for future models. Those minor points aside, I really would like one of these for Christmas. I'll be good....

—Mike Sokol

MANUFACTURER: *Geoffrey Daking & Co., Inc., 2401 Pennsylvania Avenue, Suite 914, Wilmington, DL 19806. Tel: 800-522-3650/302-658-7003. E-mail: GeoffDake@aol.com; Web: www.daking.com. West Coast Distributor: Audio Engineering Asocs., 1029 N. Allen Ave., Pasadena, CA 91104. Tel: 800-798-9127. PRICE: \$2595, dual preamps in road case with external power supply; \$2495, dual horizontal rack mounting with external power supply. Circle EQ free lit. #132.*

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CD-Rs are now within the project studio's budget, but you only get one chance with the media. Here are tips and tools that'll help you get it right the first time.

The future is here, and you are in it. The age of two cars in every garage, a chicken in every pot, and a CD-R in every computer has arrived.

Three computer manufacturers I have spoken with said that by the end of this summer, they will be supplying CD-R drives instead of CD-ROM drives in their multimedia PCs. Now that CD-R units are cheaper than CD-ROM drives were just a few short years ago, it seems like the smart thing to do.

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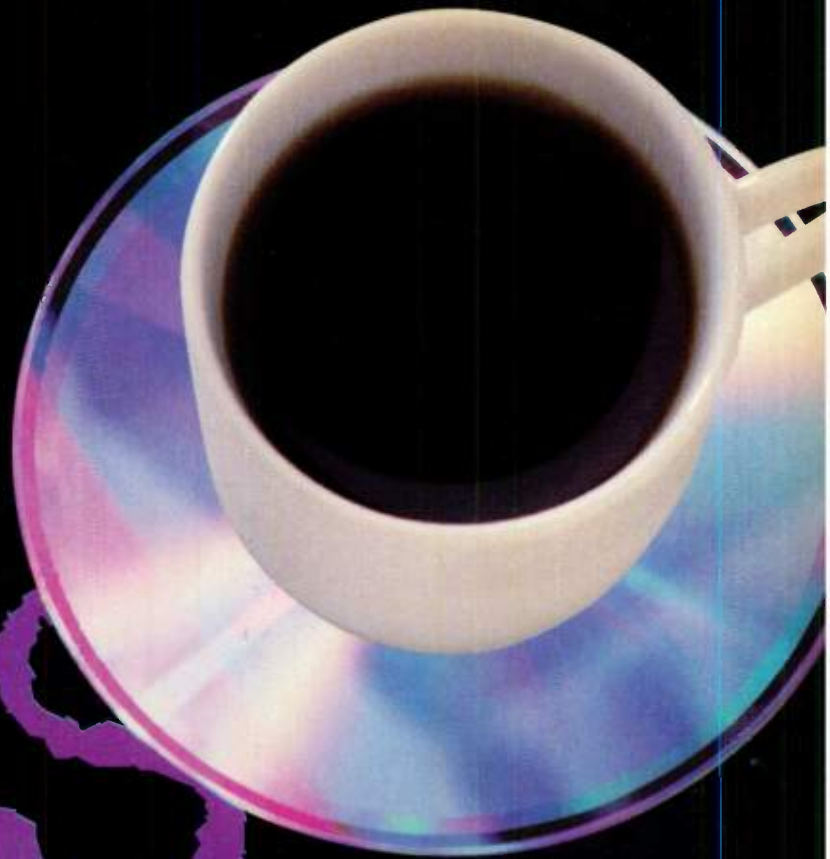
and download your favorite music and burn your own CDs. This is happening now.

If you want your CD-R drive, and the data you write onto it, to live long and prosper, then you must adapt a fresh outlook on equipment maintenance. The old adage "Cleanliness is next to Godliness" may be subject to interpretation, but "Cleanliness is next to CD-R recording" can not be debated. I have had CD-Rs bounced by CD plants because of a single speck of dust that was present on the blank CD-R before it was recorded. When the laser is in the process of writing data to the disc, the dust speck causes a shadow that prevents the pits from being formed correctly. This results in an uncorrectable error on playback.

Here are some important points to keep in mind when producing CD-Rs:

- Handle blank CD-Rs by the edges. Never touch the recording surface.
- Never set the blank CD-R down anywhere except in its original jewel case or the tray of the CD-R recorder.
- Use Dust-Off or some other compressed gas to remove dust from the CD-R and its carrier (if required) before each recording session.
- Use only the brand or type of blank CD-R media recommended by the manufacturer of your

CD-Rs



drive. Anything else will have a higher error rate.

- Choose a recorder that will produce the CDs appropriate for your requirements. Older CD-R units have small buffers and only record track-at-once, or leave a mandatory muted space between cuts.

- For the lowest error rate, record at 2x. Both 4x and 1x have more errors on most media. I use 4x for references and 2x for masters.

- If your recorder takes longer to recognize the inserted blank CD-R, then the laser lens is collecting dust. Clean it with air or take it to a repair center to have it cleaned. Do not use cleaning CDs; they can knock the laser out of alignment.

- Make an image file before cutting the CD-R.

This will ensure the best chance of avoiding buffer underrun errors that will trash the disc.

- If at all possible, record the entire disk at once, rather than multisession or track-at-once. This will ensure that the greatest number of drives can read your disc.

- Some older CD players may not be able to play CD-R audio discs.

- Audio CD-Rs recorded on Philips-based stand-alone recorders such as the Marantz 610 and 620 will not play until they are "finalized" or "fixed up." This process writes the final Table Of Contents to the CD-R, turning it into a non-recordable CD.

- Do not write on any other area of the CD-R except the printed label area. Use water-based Sharpies for the best performance.

- Sticky labels are OK for references, but do not use them for masters or archival copies.

- Do not allow prolonged exposure to sunlight. The error rates will increase.

- DVD players and DVD-ROM drives cannot read CD-Rs. Who gets fired because of this *snafu*?

With proper care and a little forethought, recording your own CDs and CD-ROMs can increase your productivity and enjoyment. Almost three years ago I made six compilation CDs of my favorite music, placed them in a cartridge, and put them in the CD changer in my car. The songs came from more than 100 different CDs and take up a lot less space.

I do a lot of work in Sound Designer and Pro Tools. When my hard disk starts getting full, I store the files on CD-ROM so that if I ever need them again, I have the region and editing information as part of the file. The CD-ROM costs less than 1/10th that of the optical disc or Jaz cartridge that I had been using to store old audio files.

1996 was the "Year of the Rat." 1998 will be the "Year of the Tiger." It looks like 1997 will be known as "The Year Of The CD-R."

—Roger Nichols

By David
Miles
Huber

MASTERING YOUR WORLD

Practical
FAQs for
burning your
own CDs

Not so long ago, having the toys, tools, and the ability to burn your own CDs was a very big and expensive deal to pull off. Nowadays, the price of the hardware, software, and media has come down in price so much that almost anyone can cut his/her own audio CDs or CD-ROMs. For example, I recently picked up a 2X/6X drive for just \$450!

Along with this huge market explosion comes the need to know how to deal with the avalanche of terms, the do's & don'ts and the what's & why's of CD recording. Hence, this collection of fast-track FAQs (Frequently Asked Questions) that just might keep you from turning your own CDs into cool lookin' table coasters. Ready, set, burn!

Q: What's the minimum recommended hardware for CD recording?

A: Many a disc has been wasted because a system was too slow or had a weak link in its speed chain. On the PC side, you should have: a 100 MHz Pentium or faster CPU; a SCSI or PCI hard-disk controller card (most newer designs place these EIDE controllers directly on the mother-

board); at least a 1 GB SCSI or AV-compatible hard disk (audio/video drives are non-thermal recalibrating, so that data is transferred at high speeds, without interruption); and at least 16 MB of RAM. On the Mac side, a Centris, Quadra, or PowerMac with 8 MB of RAM and a hard disk with 600 KB/sec transfer rate should be used operating under system 7.1 or later.

Q: What's the recording speed of a CD-R?

A: The "speed" rating of a CD-Recorder deter-

mines how fast it can record or play back data. Ratings such as "1X," "2X," "4X," and "8X" define multiples of the original speed of first generation CD-ROM players. These data transfer speeds translate to about 150 KB per second (1X), 300 KB per second (2X), 600 KB per second (4X), and 1200 KB per second (8X), etc.

Q: Why are different manufacturer's discs different colors, and is there any difference between them?

A: The various dye types that allow a CD-Rs record/playback process to work have their own distinctive color. Although the dye properties have become more standardized in recent years, there are still a number of differences among them (often relating to compatibility and longevity issues.) Phthalocyanine dye (gold discs) and its metal-stabilized derivatives were originally used to make CD-R media; however, the newer Cyanine (blue-green) and azo dyes appear to be less sensitive to changes in the CD-R's laser wavelength (thereby reducing errors), exposure to light after recording, and also seem to have increased longevity.



CONTROL YOURSELF



1 Peak and Signal LEDs show you when your signal is at an optimum level.

2 Input and Output Level Controls are digitally calibrated for precise level setting.

3 Two Segment Digital Display shows program chosen and value of parameter being edited.

4 Effect Indicator LEDs show you the type of effects chosen.

5 Parameter Indicator LEDs show which parameter is being edited within a chosen effect-up to five available per effect.

6 Tap Feature allows you to set the delay interval using a footswitch.

7 Save Feature allows you to save up to 50 of your edited/defined effects.

8 Value Control Wheel allows you to select an effect, or control the value of a parameter being edited.

9 Footswitch Controls (not shown) allow you to remotely scroll through effects, set the tap function, or select the bypass.

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So if you're looking for an effects processor built to **YOUR** specifications, then look for the New FXP from Audio Centron. For more information about the new FXP Digital Signal Processor from Audio Centron, see your nearest dealer, or write: Audio Centron, 1400 Ferguson Ave., St. Louis, Missouri, 63133.



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CIRCLE 71 ON FREE INFO CARD

MASTERING YOUR WORLD

Q: What is a "buffer underrun," and why is it a problem with some CD-R systems?

A: Basically, it means you have an attractive new coaster for your table. Seriously, folks, this show stopper gets back to our original concern for speed. When you record to CD, one of the technical happenings behind the scenes is that error-correction (in the form of data interleaving) occurs in order to make the media more robust and protect the data from large surface scratches. When the CD recorder begins to write a data stream, it can't stop at some arbitrary point before the interleaving is completed in order to wait for data to be fed in from a slow hard drive or CPU. If data isn't fed into the CD-R's memory buffer memory fast enough, a condition known as "buffer underrun" occurs that interrupts the writing process, usually resulting in an unplayable disc. There are a number of ways to avoid the dreaded buffer underrun flag.

- Use a fast, SCSI or AV-rated hard drive.
- If the software allows, increase the buffer size, so that the chance of an underrun is reduced.
- Record at a slower speed — it takes longer to empty the buffer when recording at 1X.
- Don't do anything else with the computer while recording.
- Defragment your HD, especially if you're doing on-the-fly recording.
- Record from an ISO "disk image" file rather than on-the-fly. Running a disk image will often let you know if an underrun would've occurred under real-time burning conditions, thereby avoiding the creation of a coaster. It can also take much of the processing burden off a slower computer by creating an exact hard-disk image of the CD prior to doing the final burn. Exact disk images also are great for archiving projects that will be used to create multiple discs. The potential downside is that you could need as much as 650 MB for a CD-ROM or 747 MB for an audio disc when using a 74-minute blank.
- Also watch out for things like anti-virus programs that unexpectedly "wake up"; virtual memory settings that cause swapping; screensavers that activate during the CD creation process; unusual network activity; and background data downloads or faxes. Most Win95-based software recommends turning off "Auto Insert Notification" because having this on can interfere with closing sessions or even just inserting discs into the drive.

You can disable it by opening the "System" icon in the Control Panel and selecting "Device Manager." For each item under CD-ROM, select the device, click on the "Settings" tab, and make sure the "Auto Insert Notification" checkbox is unchecked.

Q: What are "Disc at Once," "Track at Once" and "Multisession" writing modes?

A: Disc at Once is a writing mode that requires the data on a CD to be continuously written, without any interruptions. All of the information is transferred from hard disk to the CD in a single pass, with the lead-in, program, and lead-out areas being written in a single event.

Track at Once is a writing mode that allows a session to be written as a number of discrete events called tracks. With the help of special software, the disc can be read before the final session is "fixated" (a process whereby the disc's overall lead-in, program data and lead-out areas are written), allowing all of the data contained on the disc to be read by any CD or CD-ROM drive.

A Multisession disc differs from Track at Once in that several sessions can be recorded separately onto a single disc (with each session containing its own lead-in, program data, and lead-out areas). In this way, data can be recorded onto the free space of a previously recorded CD. (Note that some older CD readers can only read the first session of a multisession disc.) A CD-R that supports multisession can record a number of discrete sessions onto a single disc, and a CD-ROM drive that supports multisession can access the data that was written within any of these sessions.

Q: Can CD-R discs be used as masters for stamping?

A: Yes. If you're planning to do this, first speak with the mastering facility about its specific needs. This facility will help you to ensure that no "uncorrectable" or E32 errors are present on your disc. This is because the software used in the glass mastering process that drives the recorder's laser beam is often set up to abort the mastering process if an E32 error is encountered. Traditionally, the mastering facilities will require that you record the disc in the "Disc at Once" mode, because it eliminates the linking and run-in and run-out blocks that are associated with multisession modes, which often are interpreted as uncorrectable errors during mastering.

Q: What is "digital audio extraction"?

A: Certain hardware/software packages allow tracks on an audio CD to be directly transferred to hard disk as a 44.1 kHz WAV or AIFF file (depending upon your computer's platform).

Q: How long will data recorded on a CD-R disc remain readable?

A: Various CD-R media manufacturers have performed extensive longevity studies, with results claiming a shelf life from 70 years to over 200 years. The upshot is that the data on your CDs is safe; for how long depends on how you handle, print, and store the media.

Q: What are the options for CD-R printing?

A: CD-Rs can be labeled in several ways, depending on what level of professional look you want and what you can afford.

- Using a felt-tip pen is the easiest and fastest way to label a CD-R. However, you should *never* use a permanent marker pen that contains a solvent, since it can actually permeate the disc surface and cause damage to either the reflective layer or dye layer below the surface. Some manufacturers, like Dixon Ticonderoga, use a water-based ink that's permanent.

- The next least expensive alternative is stick-on labels. However, if you misalign the label or don't smooth the label down and there are air bubbles under the surface, your CD-R runs the risk of spinning out of balance, which could cause reading and tracking problems. Several companies have created label-positioning devices that claim to have solved the above problems. Stick-on labels are one of the least expensive professional-looking labeling methods, but be aware that some adhesives can "outgas" over time, and, over the long haul, these solvents can adversely impact the disc.

- Special ink-jet labelers can print four colors onto a custom-faced disc directly from your PC. This is a great option for those who burn lots of discs that have to have a professional look and feel.

- Finally, companies exist that can custom silk-screen your discs. This method uses the same process as mass-replicated discs and only makes sense when dealing with quantities of 100 or more. Note that it takes time to have them printed, and this is the most expensive "personalized" option. But the results are crisp, clean, and professional.

Q: Are there web site organizations where I can find out the latest info?

A: OSTA (www.osta.org) is an international trade association that's dedicated to promoting use of writable optical technology for storing computer data and images. Definitely worth checking out! The www.cdarchive.com/info site provides the latest data and links you to other related sites. Also worth mentioning is the www.adaptec.com/support/cdrec/buffer.html site that includes detailed facts on buffer underrun problems and solutions.

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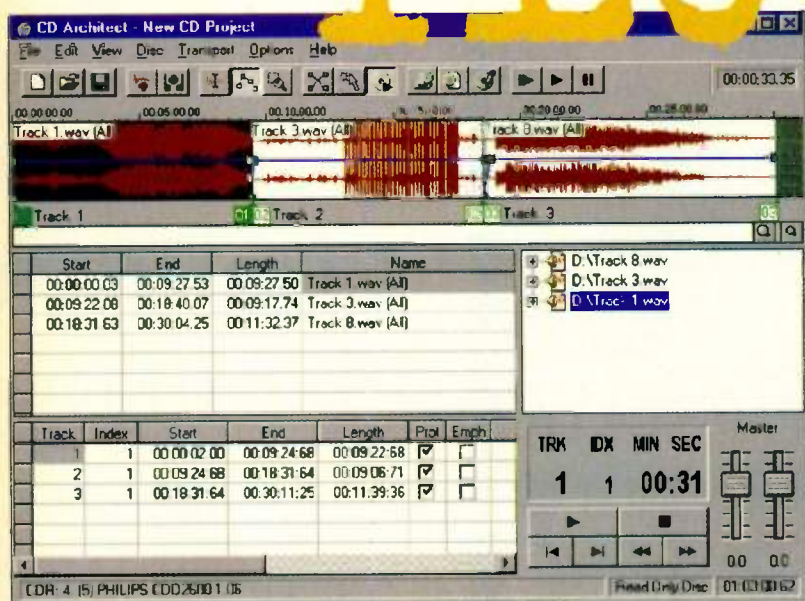
ALESIS

CIRCLE 4 ON FREE INFO CARD

SONIC FOUNDRY CD ARCHITECT PLUG-IN

By David Miles Huber

An easy
software
solution to
burning it
right the
first time



At about the same time this issue hits the stands, Sonic Foundry will be releasing CD Architect, their new CD-recording software that can be loaded either as a plug-in for Sound Forge 4.0 or as a stand-alone version that includes its own audio editor (basically, a Lite version called Sound Forge XP).

CD Architect's main operating screen consist of four windows: the Wave Display, the Playlist, the PQ list, and the File Pool. Essentially, the program works by letting you enter individual or multiple soundfiles (in

the WAV file format) into the File Pool Window. From here, the files can be drag-n-dropped

directly into either the Wave Window (which graphically displays all of the waveform, index, and volume parameters) or into the program's PQ List (which displays event names and numeric track ID, index, start-stop time, length values, and fields for setting copy protect flags, emphasis flags, and ISRC codes).

Once the desired files have been placed into their proper order, their waveforms will appear in the Wave Window. From here, you can easily drag each soundfile or region to a desired position, move individual index in and out markers, and insert sub-index marker points. Volume, fades, and

crossfades can be either automatically or manually drawn on-screen (using rubberband-type grab boxes). Depending upon your machine's speed, these level changes can be non-destructively performed in real-time when doing a CD burn or during playback from hard disk or in order to reduce system overhead on slower machines, the changes can be written to disk as an image file before the CD is burned.

SOUNDFILE CITY

Let's back up a moment and discuss the various ways soundfiles can be imported into a CD project. First, using CD Architect, any number of soundfiles can be selected all at once or one at a time. If a group of selected files are named in order as they appear on the disc, a playlist can be automatically built up by selecting the "Add to Playlist" and "Create Track in PQ List" options. In this way, the files can

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ALL D-90 MODELS are rack mount hard disk recording/editing systems with 2.55GB removable hard drive which offers about 60 minutes of 8-track recording; 16-bit linear **no compression, no compromise** CD quality sound; detachable front panel for full function remote control; 8-track simultaneous recording; random access cut/copy/paste/move editing with undo/redo and jog/shuttle control, plus a large, comprehensive fluorescent display. New features include:

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CIRCLE 92 ON FREE INFO CARD

SONIC FOUNDRY CD ARCHITECT PLUG-IN

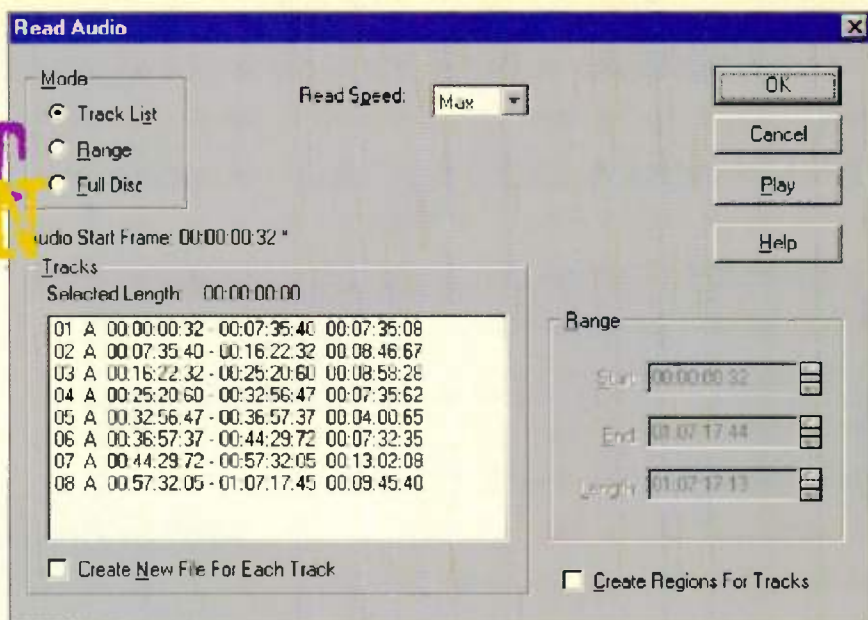
be automatically entered into the project and all you'd have to do is graphically fine tune the project in the Wave Display.

If the files aren't in order, you can automatically place them into the list by selecting them one at a time. Alternatively, CD Architect can also import a single soundfile (such as a large file that contains all the songs on a CD), where the individual selections have been previously defined as regions using Sound Forge. In this instance, the file's associated regions can be imported into the File Pool and then manually placed into the project.

Sure-as-shootin', I can't move onto other things without talking about the program's easy-to-use Read Audio feature. This handy little digital audio extraction tool makes it easy for individual tracks on a prerecorded CD, a defined range of sound, or the entire disc to be copied onto hard disk and then (should you wish) be placed into CD Architect's playlist for making backup copies or CD clones.

WATCH YOUR P'S & Q'S!

Once you've "finessed" all of your start times, index markers, and volume



changes into a final, edited form, CD Architect's Emulate CD audition mode can be used to check your edits before committing them to disc. Basically, this feature changes the program's transport controls so that they closely imitate the controls on a CD player. In this way, you can manually skip from index-to-index and actually hear how the disc will sound before you actually cut it. Should the overall levels be too low or too high, two independent volume faders allow for overall levels to be recalculated in real time. Finally, once you've decided to accept all of your track edits and set levels, you can save the playlist file and move on to the task of cutting CDs.

All you need to do to start burning discs is to click on the Write icon, select your writing speed (choosing "Max" will automatically select the drive's highest speed), and burn the disc. If you don't want to run the risk of burning a coaster, you can simply check the Test Write box. This will simulate a burn that will check for errors prior to the actual recording. Once you've passed the test, you can do the actual burn.

MY 2 CENTS

Testing out this program has allowed me to burn a number of demo discs that I've been needing to cut. I've only burned one coaster — and that was my fault! I would, however, like to point a few things out.

Make sure that you carefully check all of the markers and volume levels in the Wave Window before committing them to disc. Whenever you move a soundfile's position, the index markers and volume curves won't move with it. Failure to carefully adjust these parameters and to fully check the project from head-to-toe (both visually and using the Emulate CD mode) might result in a coaster — but hey, this holds true for most graphics-based, CD-burning software. When using the Architect, it's also possible to place the markers so accurately that CD players can't unmute the sound at the beginning of the track. This isn't a beef, but rather a reminder that you might want to set the CD emulator's Unmute setting a little bit higher to account for how the burn might sound on older CD players.

All-in-all, I can safely say that Sonic Foundry's CD Architect is by far the most solid and reliable CD-recording program I've dealt with thus far.

MANUFACTURER: Sonic Foundry, 100 Baldwin Street, Suite 204, Madison, WI 53703 Tel: 608-256-3133. Web: www.sonicfoundry.com.

APPLICATION: A plug-in for Sound Forge 4.0a or stand-alone program that reads and writes Red Book audio to a CD-R drive that's connected to your PC.

SUMMARY: CD-mastering software that provides extensive support for on-screen waveform and playlist-based editing that can be auditioned from hard disk and then recorded to CD in real-time.

STRENGTHS: Once you get the initial hang of loading soundfiles into the program, it's fairly simple to use; the Read Audio feature lets you copy data from prerecorded CDs like nobody's business; this program consistently burns great-sounding CDs, with virtually no coasters to date!

WEAKNESSES: I wish that there were a way to lock the subcode and volume curves to a soundfile (or selected soundfiles) so they can be moved without having to re-adjust these variables each time. [Sonic Foundry says this'll probably make it into the final release version.]

MANUAL: Although my prerelease version didn't have the pretty pictures that yours'll have, it was easy to follow, had a good quick-start section, and a killer section on CD-recording terms and definitions that should be required reading.

SYSTEM REQUIREMENTS: Windows 95 or Windows NT 4.0, Pentium 100 MHz or faster CPU, 16 MB of RAM, CD-R drive, VGA graphics (SVGA recommended), Sound Forge 4.0a 32-bit version.

PRICE: \$395

EQ FREE LIT. #: 133

How to buy your next reverb without listening to it.

The first criteria in choosing a reverb is always sound quality.

Everyone claims they sound the best but the



Yamaha REV500 has superior 32-bit internal processing and 20 bit A/D and D/A conversion. Most everyone else has 24-bit or less processing and 16 or 18-bit conversion.

The difference between 32-bit and 24-bit is audible: 32-bit processing gives you significantly smoother decay so your reverb fades imperceptibly into "silence." The difference between 20-bit and 16/18-bit conversion is also dramatic; 20-bit A/D D/A means the REV500 is excep-

plates and special reverbs. These simulations of actual environments place your signal in "real" locations for unparalleled realism. And the REV500 also gives you 100 spaces to store your own settings.

The third criteria is the ease of accessing the effects.

REV500 true stereo halls, rooms, plates and special reverbs are instantly recalled from the front panel. The REV500 has



front panel controls for reverb time, pre-delay, high-frequency decay and early reflection level. If you want to change these settings, just turn that control and the LCD instantly shows a picture of what's happening. You can see what you're hearing.

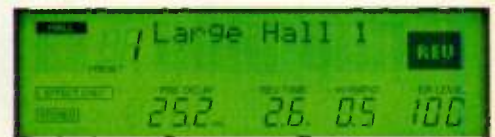
If you want to hear it, too, only Yamaha has built-in drum samples so you can hear the effects without an external sound source. Just hit the "audition" button as you select and customize your effect.

The fourth criteria is price.

Once again, the REV500 delivers like no one else: \$499 for a professional reverb. But if you'd rather pay more, you can buy the \$1299 Yamaha

ProR3 which has the same 32-bit engine and 20-bit A/D D/A with a keypad for calling up effects, two types of EQ and a gate which can be placed around any reverb.

Now that you know enough to buy the REV500 sight unseen, we recommend you go listen to it. The sound quality will blow you away. Call (800) 937-7171 ext. 680 to find the Yamaha REV500 dealer nearest you.



Large LCD display shows effect type, name and current settings



Turn the reverb time control, see the reverb time displayed graphically.



Turn the HI-RATIO control, the REV500 instantly shows high frequency decay.



Stereo professional +4dB/-10dB balanced inputs and outputs.

tionally quiet, eliminating noise in recordings and adding headroom in live applications.

The second criteria is the actual effects—what are they and how do they sound? The REV500 includes 100 top quality halls, rooms,

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RIMAGE PERFECT IMAGE CD PRINTER

Make professional-looking CDs in your own project studio

By Roger Nichols

I know that normally when you think "Perfect Image," you turn to the page opposite the inside back cover of *EQ* magazine. Now you have another choice — the Perfect Image CD Printer from Rimage.

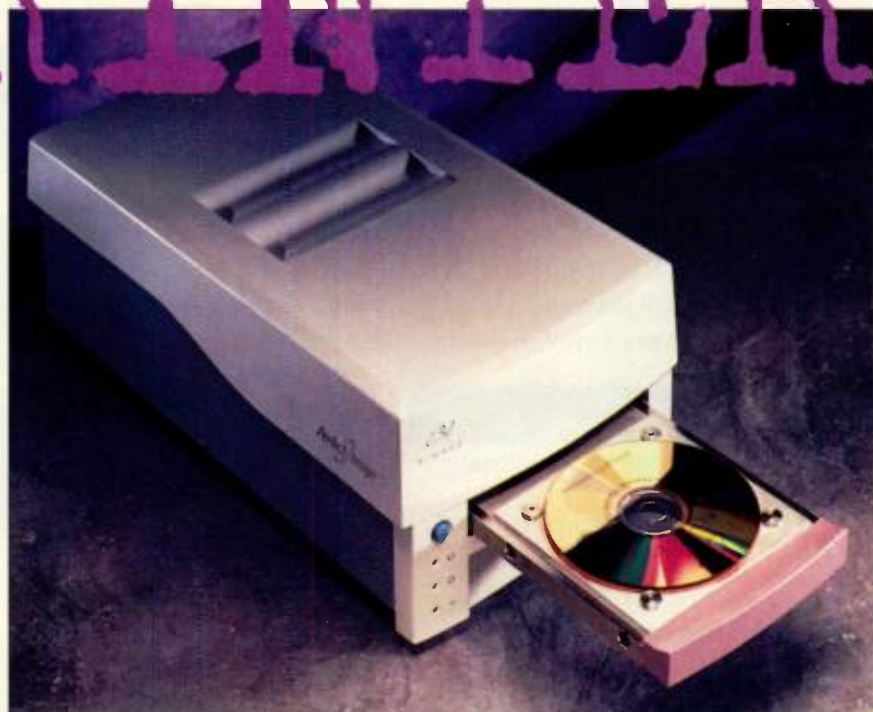
The Perfect Image printer is a thermal-transfer printer that was specifically designed to print 300 by 300 dpi monochrome text and graphics on CD-R media. One thermal transfer ribbon will print up to 2000 CDs and is available in black, blue, red, and green. The printer can handle lacquer (shiny finish), matte (protective coated), and white surface (designed for felt-tip writing) media.

ADVANTAGES

There are ink-jet printers that have been modified to print on the back of CD-R media, and the full-color images look great, but the ink runs if the label area comes in contact with water or moisture. If you are making CD-Rs that will be stored for long periods of time and the label must remain intact, then thermal transfer is the only way to go.

Silk-screen printing is the most sturdy, but it is cost prohibitive for runs of just a few CDs. The Perfect Image label will not easily rub off of the printed CD-R. I had to use alcohol and swabs with a lot of pressure and hard rubbing to remove the text from the printed CD. This is about as close to permanent as you are going to get.

The blank CD is placed on an open drawer much like that of a CD player. The



difference is that this drawer has a rubber mat to support the CD and metal pins for CD alignment. When the PRINT command is given, the drawer clamps the CD and draws it inside the printer. The print head presses down on the CD with about 16-20 pounds of force, and the printing is performed on the CD's way out of the printer.

The stepper motor positioning the drawer makes a loud buzzing noise as it incrementally positions the CD for each row of dots. The first time I heard it, I thought it was sawing my CD in half, but when it emerged, it contained laser-printer accurate text that made my CD-R look like a million bucks. (No, it wasn't all

green and wrinkled.) Eight-point text is nicely formed and very readable. Graphics and half tones are much more than just acceptable.

The only drawback I noticed is the time and effort it takes to change the ribbon. If you want to consistently use two or more colors on each CD, then it would probably be easier to buy two or three printers, one for each ribbon color.

Because of the high printing pressure, there has been some concern about damage to the CD-R data area during the printing process. All you need to do is keep the CD and the disc drawer clean and there will be no problem. Just as you can have a disc write error because of

It's unanimous... critics love Audix Studio 1A monitors

"Sensual is the buzzword for the Studio 1A... delivering clear, transparent resolution and luxuriant, full-bodied sound... makes critical listening a joy."

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"I found it hard to believe that all that sound was coming from such a compact pair of speakers - some of the finest monitors I've heard in their class."

—Tony Thomas, **Recording**

"Excellent bass... tight and responsive even at very high SPLs... great clarity and transparency without any cabinet resonance to muddy up the sound."

—Andrew Roberts, **Pro Audio Review**

"If you're looking for a viable alternative to NS-10s, try the Audix Studio 1A's. You'll be pleasantly surprised."

—Bobby Owsinski, **EQ Magazine**



Everything about the Audix Studio 1A monitors will surprise you. These compact speakers deliver incredible imaging, luxuriant, full-bodied bass response, and the ability to handle high sound levels without missing a beat. Mix late into the night without ear fatigue due to the 1A's amazingly smooth reproduction and the total absence of the dreaded midrange 'bump'.

The Studio 1A is constructed with a 6.5" polycarbonate die-cast woofer and a proprietary 1" cloth dome tweeter housed in a reinforced wood-composite enclosure. Custom crossover components are sorted and matched to provide the highest levels of accuracy and consistency possible.

The most surprising fact is how easy owning your own pair of Audix Studio 1A's can be... since the suggested retail price is only \$599 per pair.

Audix Studio 1A

SPECIFICATIONS

frequency range	50Hz-18kHz (± 3dB)
power capacity	100-250 watts
nominal impedance	8 ohms
sensitivity	87 dB
crossover frequency	3K
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CIRCLE 57 ON FREE INFO CARD

RIMAGE PERFECT IMAGE CD PRINTER

templates for the various configurations so that you didn't have to re-type all of that information and line it up for different media.

dust on the CD-R during recording, it is also possible to scratch the disc if there is dirt on the rubber mat during printing. I checked many discs before and after printing with a Stage Tech EC2 CD-R checker and found no difference in errors before and after printing.

The Perfect Image printer comes with graphics software that runs under Windows 3.1, 95, or NT. All necessary printer drivers are also included. Be warned, though, using the software with Windows 3.1 is like trying to push a car uphill with a rope. Some of the printing features are not available and image positioning is somewhat less than accurate. Under Windows 95, however, the software performs at its best.

Except for the fact that the graphic window is preformatted to show the printable area on the CD, the software is about the same as you would expect from a free graphics program. There are basically no useful drawing tools and the text editing and positioning is rudimentary at best. It does get the job done if you import the graphics from other drawing programs and spend some time trying various text positions. Rumor has it that there will soon be a bundled version of Corel Draw included with the Perfect Image Printer. That would clear up a lot of problems.

Currently, the software is not available for the Mac, but I was able to print from SoftWindows using a serial-to-parallel adapter. It was a kludge, but it worked. I found it easiest to dedicate an old 486 PC to the task of CD-R label printing.

What I would like to see is a label printing program that would allow you to change templates while retaining the same data, like some of the laser label printing programs. It is hard to get a good supply of "non-branded" CD-Rs, so quite often you have to print in the spaces around the manufacturer's logo. Ampex CD-Rs leave a nice white space at the top, while Sony leaves their printing area at the bottom. It would be nice if you could set up different

AUTOMATED CD LABELING

Hand fed by humans, the Perfect Image printer does an excellent job, but what if you need to record and print a few dozen CD-Rs to send to dealers? You can integrate the Perfect Image printer into a completely automated setup.

Kodak has a device called the Disc Transporter that automates the CD-R recording process when used with Kodak CD-R recorders. The Disc Transporter also interfaces to the Perfect Image printer. The Disc Transporter holds 75 CDs. The system will allow you to automatically record a CD-R and print its label. They can be multiple copies of the same CD, or different material for each CD.

Revelation Products in Valley Forge, Pennsylvania, has a CD-ROM jukebox that can incorporate the Perfect Image printer with the same results. Rimage has also announced their own automated CD production unit that will record and print CD-R media.

CONCLUSION

If you need CD labels fast, with no wait for the ink to dry, and no worries about the labels smearing, then the Rimage Perfect Image printer is for you. It is not, however, the least expensive way to go.

When I bought my Perfect Image printer, it was priced at \$5995, and I thought it was well worth the money. The printer now retails for \$3995 and replacement ribbons are about \$75 (7.5 cents per CD).

It is not very often when I get to test a product for a year-and-a-half before writing the review. It was nice having two of them (mine and the review unit) side by side with different colored ribbons. I bet you I was the only guy on my block with two Perfect Image printers. But, with the results I have been seeing, it won't be long before everyone else catches up. Remember, I am 5 milliseconds ahead of my time. **EQ**

MANUFACTURER: Rimage Corporation, 7725 Washington Avenue South, Minneapolis, MN 55439. Tel: 612-944-8144 or 800-445-8288.

APPLICATION: CD-R labeling for the project studio.

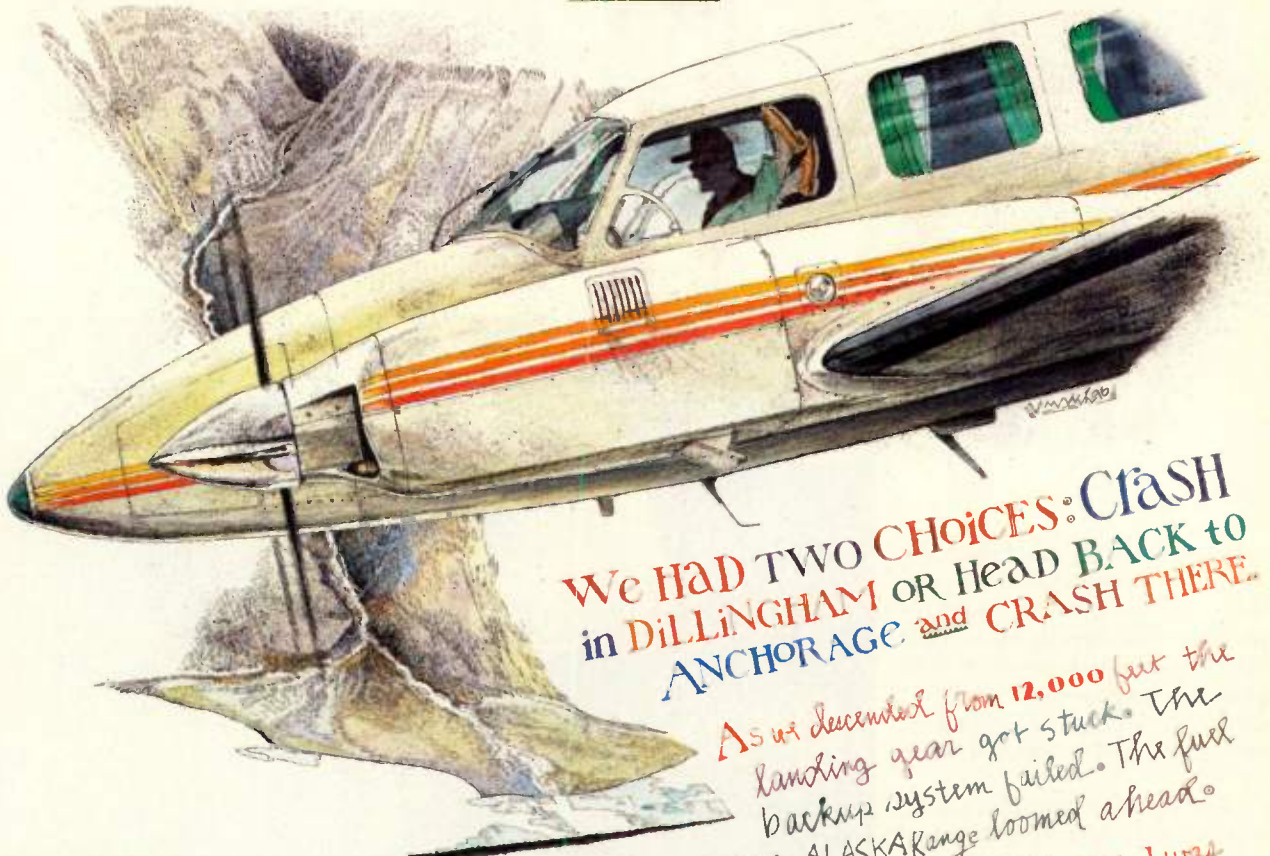
SUMMARY: Does nice work and doesn't damage the CD at all.

STRENGTHS: Good quality; doesn't harm the CD; labels won't smear or run; works with several automation systems.

WEAKNESSES: Ribbon is difficult to change; no templates; weak graphics program.

PRICE: \$3995

EQ FREE LIT. #: 134



WE HAD TWO CHOICES: CRASH
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ANCHORAGE and CRASH THERE.

As we descended from 12,000 feet the landing gear got stuck. The backup system failed. The fuel level was getting low. And the ALASKA Range loomed ahead.

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CLUNK, CLUNK, CLUNK, the landing gear descended and locked.

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SIGNATURE

By Roger
Nichols

CD

PRINTER

The Signature CD Color Printer allows you to print razor-sharp text, vibrant spot colors, and photo-realistic artwork directly on to a CD without using stick-on labels. The operation is simple, the quality is high, and the printed image is durable and highly smudge resistant.

The Signature printer is a color thermal ink-jet printer capable of up to 600 x 300 dpi resolution. The Signature has a Centronics parallel port for connection to Windows-



CD PRINTING CHOICES

1. Felt pen (\$2.50): If you must use a felt pen to label your CD-Rs, then use a water-based Sharpie and print only in the area provided. For quick labeling of temporary CD-Rs that won't be seen by the client, this may be fine. Regular felt-pen inks can seep through the backing and damage data.

2. Sticky Labels (\$17-\$90): When CD-Rs first hit the scene, this was the choice of mastering facilities and multimedia companies. Type the data on the label, peel it off, try to center it around the hole, and stick it on the CD. Now there are better ways of sticking labels. Avery labels are available for CDs. They can be printed on a color ink-jet printer, a laser printer, or copied on a copy machine. For centering the label, you place the CD in the jewel box and use the CD tray for alignment.

Zip-It and PressIt make sticky labeling systems for CDs that provide special tools to ensure that once the label is printed, it is perfectly centered when applied to the CD. Glue can seep through to data area and cause errors. Special care must be taken to ensure label alignment. Labels can smear and tear.

3. Ink Jet (\$1200): For CD-Rs, there are color ink-jet printers with a specially designed drawer to hold the CD as it is printed.

An example is the Signature reviewed here. These print directly on the specially coated CD-R. CDs are about \$2 or \$3 higher than regular CD-Rs. Printer can print directly on booklet and insert. Special coating protects CD from ink damage. Label won't peel. Resistant to smearing.

4. Thermal Film (\$3995): Thermal film is used by thermal printers that use a special ribbon to transfer images to CD-Rs. The Rimage CD printer [see review on page 104] is an example. It can print on the back of unbranded CD-Rs or in the printable area of branded CD-Rs. Ribbons are available in black, blue, green, and red. Ribbon is difficult to change and can't be changed in the middle of a print job. It uses 16 lbs. of pressure and a thermal print head to transfer image. Image is the most smudge-resistant of all CD-R printers; they are impossible to remove completely with solvents. Used by the government for labeling CD-Rs. (The Pentagon house band?)

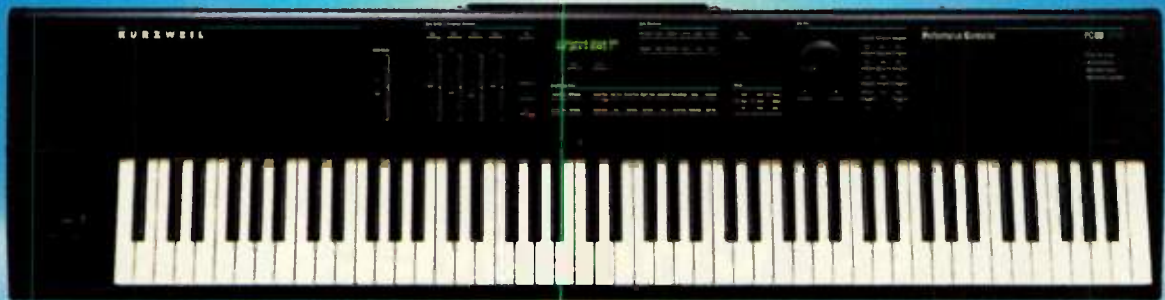
5. Silk Screen (\$10,000+): What they use on commercial CDs. The best. The most expensive way to do it yourself. If you have a lot of CDs with the same label, there are companies that will press your CDs and print them up with the four-color graphics that you provide. I would have one if there were any room left in my basement.

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CIRCLE 94 ON FREE INFO CARD



MANUFACTURER: Fargo Electronics; distributed by Microboards Technology, 1480 Park Road, Suite B, P.O. Box 846, Chanhassen, MN 55317. Tel. 612-470-1848. Web: www.microboards.com

APPLICATION: Printing black and white or color graphics directly onto CDs and CD booklets.

SUMMARY: A color CD printer that looks good and won't break your bank account.

STRENGTHS: Prints color booklets and inserts via low-cost ink-jet technology; water-resistant; works with Windows or Mac.

WEAKNESSES: Must use specially coated CDs available only from Fargo and which cost an extra \$2-\$3 each; can take up to five minutes to print a complex color image; heavy black areas in photos color shift a few days after printing.

PRICE: \$1295

EQ FREE LIT. #: 135

based PCs, and a high-speed serial port for connection to Macintosh computers supporting color Quickdraw. The Signature printer I reviewed came with Windows printer drivers and a graphic editing program to build images for CD printing. The drivers for the Macintosh were not ready, but will be shipping with the printer by the time you read this.

GETTING STARTED

It takes about five to ten minutes to install the printer driver and the image-editing software. The next step is calibrating the printer so that the image position is correctly printed on the CD. To calibrate the printer, you insert one of the cardboard blanks that are supplied with the printer for test prints and

print the registration image. You then turn the cardboard blank around 180 degrees and print the test image a second time. Follow the instructions and enter the observed numbers into the calibration window. The printer image registration is now complete.

IN USE

The CD layout software is easy to use. You are greeted with a visual image of the CD with red lines showing the boundaries of the outer edge and center hole. You just select the text tool and start typing. Any font available to the

system can be used on the CD. There are grids for snapping and auto alignment tools for curved text that can be typed on any edge — inner or outer — of the CD. There are some basic line- and shape-drawing tools, but for most artwork you would be better off importing finished artwork from another, more full-featured program.

Photographs can be imported either in TIF or BMP format for placement in the editor. After importing the graphic, text can be entered over the graphic before printing on the CD. A

continued on page 136

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CIRCLE 24 ON FREE INFO CARD

EQ
LIVE

Sheryl Crow



CLUB PROFILE
A Look Inside the Boulder Theater

PAGE 120

WHAT, ME WORRY?

TRADITIONAL
MICROPHONE
SCIENCE BRINGS
CONSISTENCY
AND RELIABILITY
TO SHERYL CROW'S
LIVE SOUND

By Gregory A.
DeTogne

It's line check time again for the crew of the Sheryl Crow tour, and monitor mixer Geno Salerno pauses in hurried motion beneath the garden-type shovel on the drum riser. His eyes scan the opulent, decaying landscape of Chicago's Riviera Theatre with the concentrated intent of a leopard closing in on its prey. But he is actually listening, not looking.

At stage left, in the darkness of monitor world, system's engineer Tiny Behrens's hands deftly move through a reticulated mass of cable resembling a large rodent's nest. In the center of it all stands FOH engineer David Eisenhower, his feet residing comfortably on the spiraling patterns of a swath of oriental carpeting laid across the stage.

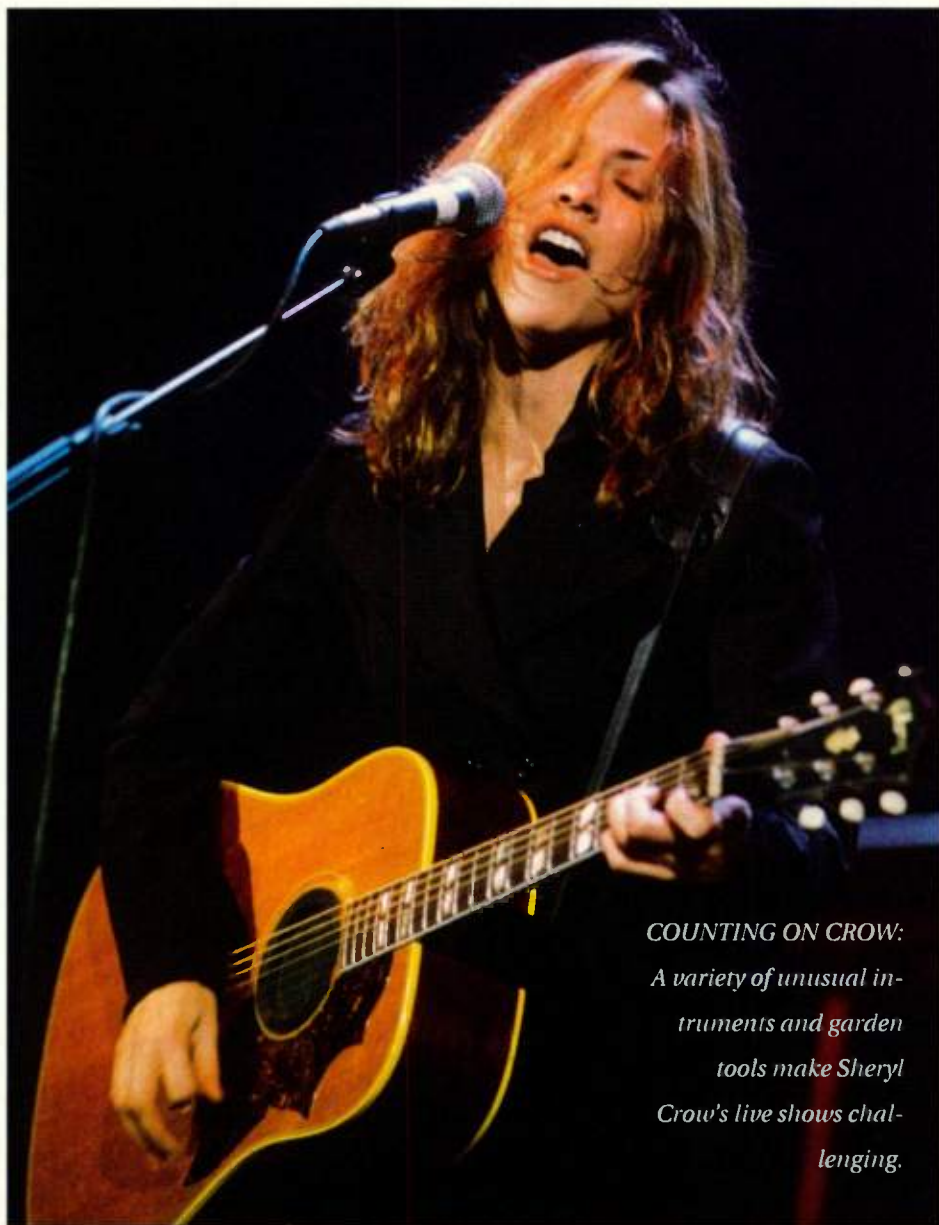
"What's that?" Salerno asks no one in particular with great urgency. His head ratchets back and forth, one hand cupped to his ear. Geno always worries about what he'll hear during line check. Even if there is nothing to be apprehensive about, which there usually isn't. His worrying is transcendental, a means by which he reaches a

state of harmonic assuredness.

"If I'm not worried when she walks onstage, she won't be worried," he says. "Nor should she have a reason to be. As with everyone else on this crew, I believe reliability and consistency are the paramount issues at stake here. We're not going out of our way to make this rocket science. We're here to make things happen the right way every time."

Earlier that morning, prior to line

check, this same triumvirate of audio-oriented humanity sat assembled in the crew bus parked along the north side of Lawrence Avenue. There, at the behest of this writer, the topic turns to microphone techniques. A paper plate heaped with soft, moist raisin cookies from catering is passed around. There are half-empty cans of Sprite on the dining area's table next to an overflowing ashtray. Billy, the Varilite guy, is rooting around in back,



COUNTING ON CROW:
A variety of unusual instruments and garden tools make Sheryl Crow's live shows challenging.

PHOTOS BY PAUL NATAKIN/PHOTO RESERVE

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GARWOOD



CROW'S MEN: (l-r) Geno Salerno, David Eisenhauer, and Tiny Behrens

loudly demanding to know where his vodka is.

In support of her eponymously-titled second disk on A&M, Sheryl Crow is in town as part of a U.S./Canadian tour that began on January 23rd of this year in New Orleans and that came to an end on April 2nd in Vancouver. Playing to a sold-out crowd at Chicago's Riviera, as well as in other clubs, theaters, auditoriums, and college arenas in its path, the tour utilizes sound supplied by Nashville-based MD Systems/Clair Brothers. As its name implies, the recently-merged sound company marries the efforts of John McBride's MD Systems with the omnipresent Brothers Clair.

Among the members of the sound crew, David Eisenhauer occupies a place at FOH behind a Yamaha PM-4000. A St. Louis native, the 26 year-old Eisenhauer came up from the clubs-and-festivals circuit to begin fulfilling his current role in June of 1993, right as the Grammy-winning Ms. Crow braced herself for the launch of *Tuesday Night Music Club*. The man behind the controls of monitor world's Midas XL-3, Geno Salerno, is a Nashville import. As systems engineer, Tiny Behrens does his job so quietly and efficiently it's hard to tell he's around. Tiny was listed in tour itinerary books for the longest time under his given name, Robert Behrens. Today, Salerno admits that it took him a number of months to draw the connection between the listing and the actual man, as everyone everywhere just calls him Tiny.

For tonight's show, as with all other tour stops, five musicians will plant their feet on the risers along with Sheryl Crow. There's Jim Bogios on drums and percussion; the multi-talented Roy Scott Bryan on keys, guitar, percussion, and pedal steel; Tim Smith on bass; Jeff Trott on guitar, mandolin, and pedal steel; and lead guitarist Todd Wolfe (who also takes a turn or two at pedal steel). Consider that Sheryl Crow provides vocals, plays guitar, some keys, and an ancient accordion, as well as the fact that other members of the band supply frequent vocal support, too, and you can start to appreciate the miking complexities of the lot. Then there's things like the aforementioned shovel, but never mind that just yet...

MAXIMUM MIKAGE

Developing an underpinning miking philosophy for the tour began when Eisenhauer first put a Shure SM58 in front of Sheryl Crow about four years ago. Since then, miking techniques have undergone continual refinement under the care and supervision of the entire crew.

In a most basic sense, the 44 inputs coming from the stage are managed by traditional mainstay components and methods. By the artist's preference, everything is hard-wired. The real trick to it all is in dealing with the sheer number of instruments and the constantly revolving positions of the performers within a context that produces a natural hi-fi sound. Aesthetics play a key role as well, as few consciously

set out to create a stage filled with obtrusive elements poking their heads from every corner.

Nine vocal mics have been incorporated into a mono scheme, all of which are Shure Beta 58A's mounted on tall tri-base boom stands. In addition to Sheryl Crow's vocal mic at center stage, two others are located at far stage right and center stage right for Roy Scott Bryan and Jeff Trott, respectively. A fourth gated unit can be found at the drum kit for backing vocals. Another stands at the pedal steel position, and is shared by whomever may be in front of the instrument during the course of things. Two more stand ready within the keyboard section of the stage plot to provide the convenience of not having to swing a mic around when changing from one set of keys to another. The eighth vocal is in front of bassist Tim Smith's position, while the ninth is located within the percussion section.

"When all of this first started, Sheryl tried an SM58 and it just worked really well," Eisenhauer recalls. "Therefore, making the transition to the Beta 58A when it arrived upon the scene was a natural. I've found that the new Beta 58A has the familiar sound of the original only with a little less low end. Some of the improvements are mechanical, like the new shock mount and transformer isolation. On a performance level, the mic is extremely tight. Now I'm not having to go in and mute things constantly when there is a whole lot of instrumentation playing at once onstage. We use it at all the vocal positions as a matter of uniformity. Consistency is a beautiful thing, you know."

Particular attention is paid to Sheryl Crow's vocals. Out front, Eisenhauer does his best to create a warm, breathy sound for her that arrives in the back row with the same clarity as found among the ringside seats. With 44 inputs all craving space in his stacked-to-the-max PM-4000, however, there's not a hell of a lot of time to spend on any one given thing. This bit of reality stands in direct opposition to his goals along with the dynamic range and power of Sheryl Crow's voice. It is quite common for her to cruise along in low alto (think of the song "If It Makes You Happy" from her latest disk) and then suddenly nail you to your seat with extremely high alto parts.

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CIRCLE 74 ON FREE INFO CARD



To keep check on the full-range of her voice, as well as to provide a warm stereo sound, Drawmer 1960 tube preamp/compressors are employed by both Eisenhauer and Salerno to put the squeeze on things without affecting intelligibility, performance, or tonal qualities. Used on three vocal mics onstage, the Drawmer 1960's are plugged into the mic lines right before they reach the consoles. The Drawmer outputs then travel into the console inserts, effectively replacing the mic preamps for those channels. The preamps in each

of these devices can be used alone or in conjunction with the onboard compressors.

Both Eisenhauer and Salerno have opted for the latter configuration.

From his perch on a sofa in the crew bus, Salerno explains further: "David and I have found a sweet spot on the Drawmer 1960's compressor where you can just set it and leave it alone throughout the whole show. We're covered all the way from the low end of her dynamic range right on up to her Judy Garland stuff at 2K."

"That's true," Eisenhauer says from across the littered dining area



DIG THIS: The percussionist's shovel.

table and a diminishing cookie plate. "After I discovered the sweet spot, I could bring a whisper right out front in the mix. When she really nails it at the high end, it doesn't rip your face off either — and trust me, she has that power. The best thing about the Drawmer 1960 is that it's extremely transparent. You don't even know it's doing its job."

THAT STRING THING

Five acoustic guitars available onstage are each used with an active DI. So is a Hammond B-3 and whichever aging Wurlitzer among the three found in the truck pack feels like working properly on any given night, without picking up the radio station down the street. At the Riviera, the crew experiments with an articulating Beta 52 on bass, as well as on Leslie bottom. A pair of Sennheiser 409's see regular stereo duty at Leslie top, left and right.

"Being a large diameter mic, the Sennheiser 409 is very guitar friendly as well," Eisenhauer notes. "It has its own unique clarity, which maintains this aura of darkness." Suspended by their cables in a time-honored tradition over the fronts of the guitar amps and the rest of the backline elements, six more 409's make their way into the input list.

KEEPING THE BEAT

Playing no small part in Sheryl Crow's music, the onstage percussion section includes the familiar as well as the outright bizarre. On the ordinary end

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of the spectrum, you have what you'd expect in a drum kit. An SM91A rounds up the collective thumps of the kick drum, while a Beta 56 captures snare top. Shure SM98A's outfitted with polar modifiers are mounted to rack and floor toms. AKG 451's help complete the picture at snare bottom and hi-hat. Overheads are entrusted to AKG 414's.

Gating is kept minimalist in design, with light amounts applied on kick and toms via Drawmer 201's. "Jim Bogios frequently goes from playing with sticks to playing with brushes," Eisenhauer says. "So I have to be careful not to overdo it with the gates, because some of the things he does are so subtle. One of the nicer things in this setup is that you can determine the primary frequency on the toms and then tune the Drawmers so even if the head is being hit with a brush, the gate will open. Just produce that primary frequency and it works; it doesn't take a lot. I leave the release time fairly open to ensure that all the grace notes and ghost notes come through."

Bongos, congas, shakers, and djembe all receive miking from SM98A's, with polar modifiers once again being used on congas (left and right) and bongos. A device which fits atop the SM98A, the polar modifier, narrows the microphone's pattern to supercardioid. Ideally suited for toms, they are useful in other applications where focused control is required.

Given the available amount of real estate on the percussion section's riser, it was imperative that the use of mic stands be kept to a minimum. Therefore, the crew devised their own space-saving microphone mounting methods wherever possible, using factory-provided goosenecks with the SM98A's, wireties, and various adhesive materials.

SHOVEL SOUND

Things on the percussive side take an unorthodox turn thanks to the inclusion of a standard, garden-variety shovel. A vital element within the mix for "Maybe Angels" and nowhere else, the shovel is struck by Roy Scott Bryant to produce the steely-edged chime accompanied by washboard riffs and tambourine that serve as a propelling undercurrent within the song from start to finish. Sampled and looped on the version heard on the CD, the unusual industrial-sounding rhythmic combina-



tion is a human-generated, real-time creation when on tour.

Transforming the shovel from an instrument of labor into something with musical gifts was a process that began with its stand-mounting. To that end, the top two extensions of a three-way round-bottom stand were removed, leaving only the bottom extension within the big, round base. Inserted handle-down into the remaining extension piece, the shovel was secured in place with tape. For miking purposes, a circle was drawn around the hot spot on the shovel's blade, or "bell," if you will. When struck within the encircled area, the desired chiming effect was captured ping-for-ping by another polar modifier-equipped SM98A on a gooseneck taped to the handle.

The only real items of note left on the input list are Sheryl Crow's accordion and harp. With repeated tests revealing that fans love both this girl and her accordion, the crew spared no expense in adapting one more SM98A to the well-used, circa 1963-or-so Baldoni squeezebox she refuses to part with. The gooseneck-and-tape mounting system was employed once again, using the accordion's shoulder strap to hide the cable. As for the harp, a traditional Chicago-style sound pays homage to the likes of Sonny Boy Williamson and Little Walter courtesy of Shure's legendary 520D "Green Bullet."

The initial routing of the 44 inputs from the stage to both monitor world and the FOH desk is a task left to four color-coded, 12-channel multipin boxes that form a sub-snake system leading to a splitter kept in front of Geno Salerno's console at stage left. When patching chores are complete, individual lines bear the same channel numbers at both desks to keep an even strain on things.

Line check is completed with only one errant howl being heard on-stage. Perhaps it is Scout, Sheryl Crow's canine companion, a true "road dog" traveling with the band as usual. "This is the gig of a lifetime," Eisenhauer tells me out on the sidewalk in the brisk Chicago air. The cookies on that plate have vanished without a trace. Soon fans will be lining up out front under the marquee bearing Crow's name. Everyday is a winding road. Did that Varilite guy ever find his vodka?

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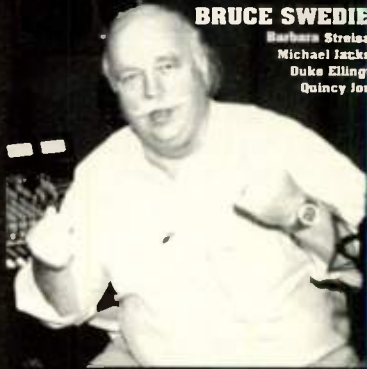
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CLUB PROFILE: THE BOULDER THEATER

DESIGNING A
NEW SOUND
SYSTEM FOR AN
OLD CLUB WITH
NEW OWNERS
AND A VARIETY
OF ACTS CAN BE A
TRICKY TASK

By Glenn
Webb

So far, I've been fairly low-key about the new sound system and light install at the Boulder Theater, but that's not how I really feel. The truth of the matter is that I'm very excited to have purchased some very cool equipment, and it goes together in a package that's just right for our theater. It's not often that I get to spend thousands of dollars on really good gear, but the new owners of the theater — New Hope Entertainment — told me that they didn't want to rent PA anymore and that I should go out and buy them one. So I started by making a list of the various components we'd need without specifying brands or model numbers. Just saying, "We should have at least 32 or preferably 40 channels of input at both the house and monitor consoles, at least eight subgroups and four bands of sweepable EQ..." and so on down the line, until I spec'd what our gear should be like. Then I started working up the budget. I ended up with a range of prices with a high and a low total. The owners didn't say, "Spend the least amount possible," but they

didn't let me have the big number either, so I had to be very careful.

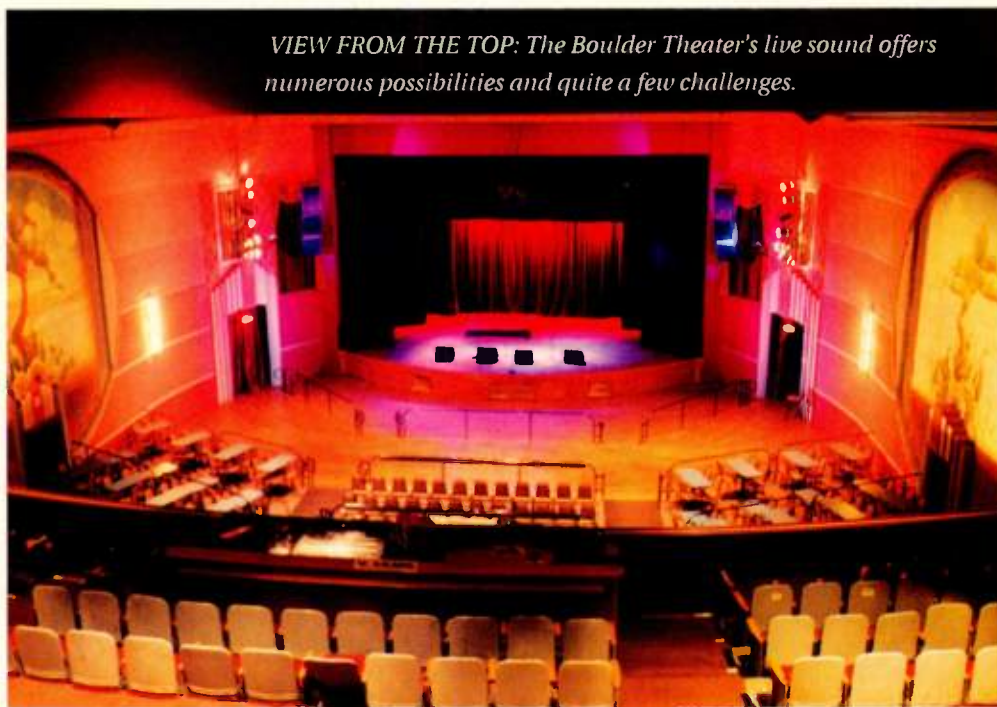
One of the Boulder Theater's strengths has always been its multi-use versatility — we do everything from alternative bands such as Mazzy Star to gut-thumping reggae to wedding receptions and corporate seminars. This is a challenge when designing a sound system because it has to sound equally good for Boulder Philharmonic chamber music, Run D.M.C. (who was in here recently), and E-town radio tapings. Seating capacity of the room is about 750 (fire-code is 999), and a lot of times we clear chairs from the front area, whether it be for banquet tables or moshing. That's why I needed a PA that could go balls to the walls and not fall apart, but also could sound clear and pretty at low volumes for people over 30! This task has not been easy, but the challenge is always enjoyable for me.

Acoustically, the Boulder Theater is a somewhat live-sounding hall, which is both good and bad. For live theater and unamplified music, this

"live-ness" helps the sound carry throughout the hall and gives warmth to the tone. For loud amplified shows, the acoustics require a bit of finesse and good judgment on behalf of the engineer, but our speaker system gives them an edge.

At the heart of our PA is a Turbosound "Floodlight" speaker system that is very directional. This means the amplified sound is focused on the audience instead of bouncing around off the walls and ceiling. We're using six Turbosound TFL-760H mid/high cabinets, each with 12-, 6.5- and 1-inch drivers, flown three per side in a vertical column and splayed approximately 10 degrees between each cabinet. Unlike many speakers that have metal-horn compression drivers operating well into the vocal range, the Floodlights reproduce the vocal signal in a paper-cone driver right up to about 8000 Hz, allowing the subtle overtones of musical instruments and the human voice to be heard distinctly without harshness. Without destroying the architectural elegance and history of the theater with ugly

VIEW FROM THE TOP: The Boulder Theater's live sound offers numerous possibilities and quite a few challenges.



PHOTOS BY BEN WRIGHT

acoustical treatments, we've achieved clarity in the amplified sound.

Filling out the low end is a total of six Turbosound TSW-721 subwoofers, loaded with 21-inch bass drivers [no, that's not a misprint — Ed.]. Two per side are sitting on the floor and tied in with the left/right full-range system. Then there's another pair in the middle underneath the stage. These are powered as a mono sub block fed from an aux send at the house console, which is a 40-channel Allen & Heath GL-4. The additional two subs are there to smooth out the frequency response in the middle of the room because we have got the weird lobing that you sometimes get in a room when you put bass sources on either side. A Turbosound LMS-660 crossover divides the audio into four bands, which is then amplified by Crest 4601, 6001, and CA-12, and Ramsa 9220 power amplifiers.

Because the Floodlights are so directional, the system left a small triangle of uncovered area right up front, so we added a center fill cluster with two Turbo TCS-612 full-range cabinets. These front-loaded, trapezoidal boxes are biamped with 12-, 6.5-, and 1-inch drivers and are directed toward the front row of seats. They are used just for things that aren't loud coming off stage already — like vocals. Overall system limiting is taken care of by the Turbosound LMS-660, which is pretty transparent — if you really slam the system, you can tell it's there but it doesn't squash the sound and make it horrible.

Mixing in the Boulder Theater can be a little difficult because you cannot really hear the center cluster that well — it's kind of off-axis to the mix position. If you turn the center cluster up loud enough to where you distinctly hear it, it's generally too loud for the people it is meant for and will be out of balance with the left/right mains. So during soundcheck you have to walk back and forth to balance the center cluster with the left/right columns. We patch the

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THE STAGE

The stage at the Boulder Theater is 40 feet wide with a depth of 20 feet at the proscenium; then there's a curved thrust that extends another 7 feet in front. It's quite a bit of room, and we have areas to store dead cases as well, so they don't take up any extra space. Our monitor console is another 40-channel Allen & Heath GL-4 that can do ten mixes but we usually run eight. We have ten Martin Audio LE-600 biamped wedges (each with a 15- and a 2-inch) and two 3-way side/drum-fill cabinets each with a JBL 18-inch woofer, a Gauss 10-inch mid driver, and a Radian 1-inch driver. It's sort of an either/or situation with the drum fill and side fill. In the past year, there has only been one occasion where we needed to have both, so we rented a few boxes. Power amps for the monitors are

center cluster differently depending on who's engineering. Some engineers like it to be fed from an auxiliary send while others like to use a matrix output — so we can repatch and feed it from a matrix. Sometimes I like to use the GL-4's mono output to feed the fill cluster — then it's just a matter of assigning a channel to the mono bus. The result is an overall sound engineering environment that I find very enjoyable.

MIX POSITION

I have worked here at the Boulder Theater on and off for the last nine years, and once upon a time (like so many clubs) the sound and lights were in this funky little booth upstairs in the balcony. Everybody hated it. Anybody touring with FOH racks and consoles basically screamed and yelled about having to carry gear up the stairs and then back down the stairs when the show was over. When the theater reopened under the new ownership, I was able to lobby to get the mix position placed right in the middle of the room, just in front of the balcony overhang so that you are not under the balcony. You are on the first floor, about 60 feet from the stage. It is a dream come true. Right now I am working on getting another snake and running it up to the balcony mix position because for certain events we might want to have that space in the center of the house back again.



THE BOULDER & THE BEAUTIFUL: The recording booth features a 32-channel Mackie 8•Bus, Yamaha 02R, and TASCAM DA-88's.

We've been getting a bit of legitimate theater and dance-type shows, and, for those, the audio control position can be in the balcony and it's not that big of a deal. It wouldn't require so many channels, so I can remove and hide away the GL-4, grab a ProMix and throw it in the balcony and patch the snake in. Then replace the 20 seats where the console was, which are, of course, prime seats. There's a bar underneath the middle of the balcony behind the mix position, so sight lines from the seats aren't ruined by the mix position. In addition to the GL-4, the gear at the FOH also includes a Roland SDE-1000 delay, Yamaha SPX90II and SPX900, a CD player, Behringer Multicom and Multigate, and a dbx 3231L dual 1/3-octave graphic EQ.

Ramsa 9220 (a total of nine), four Stewart 1000's, and a Crest CA-12. Our microphone selection includes the usual suspects like Shure Beta 58's, SM58's, SM57's, SM98's, and SM91's, AKG 391's, 535's, and C3000's, a Beyer M88, and a couple of Sennheiser '421's, as well as Countryman and Whirlwind direct boxes.

Every week or so we do a taping for a nationally syndicated radio show called E-town that might require me to do a few extra monitor mixes. They often use a telephone interface to facilitate call-in conversations with a person in some far away place, so I have to feed the phone interface with a send from the monitor desk. I've found that

continued on page 136

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105	Audix	93	503-682-6933	128	Neato	52	800-984-9800
138	AXI-Dynaudio Acoustics	10	617-982-2626	35	Otari Corporation	53	415-341-5900
110	Azden Corporation	12	516-328-7500	11, 69, 111	Peavey	45, 46, 51	601-483-5365
140-143	B&H Photo	11	212-807-7474	106	Polyline	57	818-969-8555
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89	Behringer	14	516-364-2244	26-27	QSC	54	714-754-6175
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138	Klarity Kasette	38	800-458-6405	129	Waves	96	423-588-9307
37	Korg USA, Inc.	29	516-333-9100	56, 93	West L.A. Music	97, 79	310-477-1945
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Yorkville AP-812

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fader; headphone jack; two LED VU meters; easy access,

top-mounted input and output jacks; and 19-inch rackmount options. The AP-812 offers ultra-quiet performance thanks to internal fan cooling. The suggested retail price for the AP-812 is \$1649. For more details, contact Yorkville Sound Inc., 4625 Witmer Industrial Estate, Niagra Falls, NY 14305-1390. Tel: 716-297-2920. Circle EQ free lit. #137.

JEWEL ON TOUR

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Rock Box

Offering high efficiency power circuitry, digital reverb, and a suggested retail price of \$649.95, the Yamaha EMX640 6-channel powered mixer could be a blessing in disguise for gigging musicians. The EMX640 features two, 200-watt amplifiers built in; one for front-of-house speakers and one for monitors. When monitors are not used, the two am-



Yamaha EMX640

plifiers can be bridged to produce 400 watts for the main speakers. Both amplifiers feature built-in limiters, as well as independent 5-segment peak-reading level meters and 7-band graphic equalizers. All six inputs offer balanced XLR connectors (with switchable phantom power), with inputs 1–4 including switchable pads and balanced 1/4-inch jacks, and inputs 5 and 6 including two unbalanced phone jacks each. Yamaha also provides RCA inputs for tape or other line level sources with separate level control, as well as an additional



Bag End Crystal-R

Aux input provided with its on level control. Each input channel also offers 3-band EQ controls for flexible signal routing. For more details, contact Yamaha Corporation of America, Professional Audio Products Department, P.O. Box 6600, Buena Park, CA 90622-6600. Tel: 714-522-9011. Web: www.yamaha.com. Circle EQ free lit. #139.

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Meyer PSM-2

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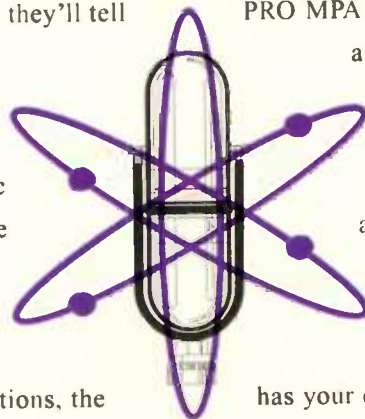


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CIRCLE 47 ON FREE INFO CARD

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The STC-8 allowed me to start with faster-than-typical attack time because the "Shape" control determines the severity of the processing. Like all of the pots, Shape is calibrated from 0 to 10, which, when turned clockwise, goes from gentle to aggressive. Once set, it allows a more usable range of both the attack and release controls.

The STC-8 is a stereo (or dual-

You can access all compressor parameters by setting the Preset switch to the "V" at the 5:30 position. Each quadrant of this switch has A, B, and C presets that are optimized for vocals, punch, and program averaging, respectively. Three of the four quadrants have "smart" features like Auto Release and dynamic Attack Modification (A-MOD). A-MOD allows the peak limiter to modify the attack time of the compressor.



mono) device with a logical front-

panel layout. No kidding. How many dual-channel devices place the bypass switches at the farthest possible extremes? I've got "carpool tunnel" from such products. On the STC-8, all of the toggle switches are positioned in one centrally located column. From top to bottom, these are: Left Channel In/Out, Right Channel In/Out, Stereo Link, and Mode. Mode selects the odd/even harmonic content (more about that in a moment). Bypass is hardwired via relays.

One control, Shape, alters the attack and release curves. This single feature has reprogrammed my approach to dynamics processing. I normally start with the slowest attack and fastest release settings and usually don't go beyond half of the available range for either. So many modern limiters sound like crap at the fastest attack setting that I sim-

ply avoid going in that direction.

The southeast quadrant features the aforementioned fully-variable position. The ability to lock in certain parameters while leaving a minimal

ROAD **TEST**

MANUFACTURER: Crane Song Ltd., 2117 East 5th Street, Superior, WI 54880 USA. Tel. 715-398-3627.

APPLICATION: Audio dynamics processor.

SUMMARY: Stereo or dual-mono compressor/limiter.

STRENGTHS: "Shape" feature is unique and improves the functionality of attack and release controls; high-voltage Class A circuitry delivers +25 dBm at the outputs; remote control of sidechain.

WEAKNESSES: None.

PRICE: \$3200

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number of tweaks provides a useful starting point. (A full disclosure of preset defaults are in the manual.) In addition, the Attack Modification feature makes the compressor do more of the dirty work, freeing up the peak limiter — which is broadcast fast — to do a more precise job.

The operator's manual is clearly written and thorough, and offers an excellent tutorial on dynamics processing. That and using the STC-8 actually taught me something. Illustrations show how the STC-8 modifies the attack envelope, graphs indicate how the compressor and limiter interact, and a chart attempts to quantify elusive attack, release, and ratio variables. Also included is a block diagram and the pinout for the unconventional sidechain port, a DB-15 connector that includes remote activation. Inputs and outputs are standard XLR connectors.

The STC-8 has a very useful LED bargraph display to indicate gain reduction, peak reduction, and output level. When set to gain reduction, a single LED confirms that the peak limiter is engaged. As mentioned earlier, the Mode switch selects the harmonic content. Fast release times typically generate odd-order harmonics (HARA mode). The Mode switch can turn these into more pleasing even-order (octave) harmonics (KI mode). On program, this effect is subtle, but when I really squashed a drum kit, HARA mode is brighter while KI mode is warmer.

I challenged the compressor/limiter with bare vocals, acoustic guitars, and lots of program. "Before" and "after" program samples are available at Craig Anderton's Sound Stage and Studio site (keyword SSS on AOL), and also at my humble web hut (<http://www.users.interport.net/~edaudio>). Mix bus compression is a challenge easily met by the STC-8. Presets make smoothing bass or vocal tracks easy with enough reserve power to zoom in and makes tweaks.

This device is a major contender. It is versatile without compromise.

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The Profit Motive

One reason to get up in the morning: money



PHOTO BY STEVE JENNINGS

BY JON LUINI & ALLEN WHITMAN

Guess what's making money on the Web? If you guessed the sex trade you are right. It seems that an interest in adult entertainment has driven the public's acceptance — and embracing — of several technologies, from photography to the videocassette recorder. And music is following in the sex trades' footsteps in making money on the Web. But how does this factoid help an independent musician make money on the Web? Let us FezGuys help you out...

You place your music on a server, you dress up your site as appealingly as possible, and you promote the *hell* out of your URL. Now you've set the scene for the first people to tentatively approach you, and (hopefully) gain an interest in hearing more of your music and supporting you as an independent artist (there's always the political angle... human nature being what it is).

How are you going to be compensated for your musical works? How will we throw money at you? Do you want us to throw money at you? Do we want to throw money at you? Will it hurt if you are pelted with money being thrown at you?

Why don't we assume that we want to throw money at you, and you don't mind if it hurts. Instead, let's focus on how to interact with the buyer, collect the funds, and deliver the product (your music).

INTERACTING WITH THE BUYER

You want to give the public good reason to purchase your music, and this can be done in a wide variety of ways — be cre-

ative! Offer portions of the music for free up front (either clips of multiple songs, a few songs in their entirety, or combinations thereof). Remember that wonderful old industrial revolution axiom whereby making stuff available gratis creates a demand where none previously existed: "The first one's free, sonny!" Use traditional marketing (postcard mailing lists), combine that concept

continued on page 132

THINGS THAT ARE NEW

Expanded deluxe National Association of Broadcasters version

Ghetto-ized by a bemused-but-cautious industry of smokestack romanticists, the Internet Island at the National Association of Broadcasters (NAB) conference hosted most of the usual suspects, who ran around in packs with matching shirts with the company name embroidered between their shoulder blades. This year it also hosted your friends and Fezzes on the scene — us, the FezGuys.

The technologies associated with audio on the Web are myriad. There's RealAudio, LiquidAudio, Shockwave, Xing, Beatnik, Telos, Waves (straight outta Tel-Aviv), and several others — and who knows what Microsoft will toss into the mix? LiquidAudio is angling for your attention with the claim that they are the most understanding of the music industry, specifically. Everyone pretty much said that they were best for music. There is so much activity and confusion in the industry right now that there must still be an opportunity for you, Dear Reader, to leap into the fray and launch your own streaming codecs company. You'll have just about as good a chance as anybody else at being very busy and spending lots of money.

One interesting development is the recognition, by participants in the audio (and video) streaming community, that a system of protocols must be agreed upon and a sharing of information must be established at some level. To that end, an ad-hoc committee gave birth to itself in one of the many meeting rooms at the Las Vegas Convention Center. The first physical meeting of the International Webcasters Association (IWA) had about 40 people show up in a room that could hold 200. They were a scrappy and influential bunch. Promotional, marketing and legal groups were represented, as well as AT&T, NHK, BMI, Progressive Networks, SonicNet, UCLA, and people from Web radio stations. Their (and, by default, yours and ours) mission: to establish a rapport, worldwide, for the open exchange of information as it is relevant to streaming content on the Web. Or, as Reverend Jon the Fez whispered to Uncle Al the Fez during a particularly passionate exchange between high-level geeks: "Maybe this will provide added security that the big boys won't come in and make ridiculous rules."

It was fascinating to watch humans of different cities and ideologies express the exact same concerns to each other in such disparate regional dialects. The Web: the great equalizer. Many had communicated only through e-mail. They smiled shyly at each other, recognized and acknowledged their mutual intimacy and embarrassment for an instant, and got down to business. The FezGuys support the creation of a unified voice of concerned and respected (or, at least, powerful) people within the community. Of course, absolute power corrupts absolutely. We'll keep you posted. As has been asked by Decimus Junius Juvenal, (Roman pundit, A.D. c. 50–c. 130): "Quis custodiet ipsos custodes (who will watch the watchers?)"

We recommend individuals and businesses alike take a moment to check out what the IWA are about at <http://www.webcasters.org/>



**THESE GUYS'
READ ONLY ONE
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EQ
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FEZGUYS

continued from page 130

with the new tools (electronic mailing lists, online promotion of your Web site) to generate interest in bringing people to the virtual store counter (but without those awful lines!). Tempt them with unique specials like an autographed coffee mug or, for a lower budget, a sticker or pin.

Another choice (often overlooked) is to offer the music, in its entirety, for free, with the message alongside to send money if they like or use it. In lieu of cash, people can also be asked to send you an amusing postcard. Heck, try bartering. You never know what you'll get — look what Jack did with those beans he traded for his cow. Think of it as a sliding scale for hungry geeks.

COLLECTING THE FUNDS

The transaction of commerce using the encryption of credit cards by way of the Internet is not yet an exact science. There are various companies springing up designed to provide the interface for accepting credit cards — research them (on the Web, of course). The system itself works (ask www.amazon.com or the sexworkers), but the absolute integrity of your encrypted credit card number remains challenged by those paranoid about the Internet (who, strangely enough, tell faceless drones on 900 phone lines their account numbers). Until public perception changes, keep in mind that blank money orders are virtually untraceable. Cash will never go out of fashion. If you feel up to the challenge, take a stab at online digital cash systems like First Virtual (www.fv.com) and DigiCash (www.digicash.com). It may not be simple, but it's not rocket science, either.

DELIVER THE PRODUCT

You are probably already familiar with shipping a copy of your CD or cassette out via postal mail, but what about other, more cutting-edge (and far more efficient) opportunities? You can make access to sections of your Web site restricted by assigning passwords to users who have paid for the privilege.

By being exposed to a worldwide audience, you're going to get a worldwide set of reactions. More opportunities for more people to hate you, love you or do something in between. And you get all this without the hired services of the entrenched, old-boy distribution network that crouches with its meaty

hands around the music industry's throat!

LIST OF RESOURCES FOR WEB COMMERCE

First Virtual — <http://www.fv.com/>
DigiCash — <http://www.digicash.com/>
Verifone — <http://www.verifone.com/>
Verisign — <http://www.verisign.com/>
Visa — <http://www.visa.com/>
MasterCard — <http://www.mastercard.com/>
American Express — <http://americanexpress.com/>
May the Fez be with you!

Please check out the FezGuys Web site: <http://www.fezguys.com/>.

ROOM WITH A VU

continued from page 29

Eventide Harmonizer H3000SE [2] and H910; Roland SDE-3000, SDE330, SDE1000 DDL, SBF325, SDD320-Dimension 'D', SRV2000, and DEP5 reverb/fx; Korg SDD-3000 delays [4] and SRV3000; Yamaha Rev5 [2], SPX990 [2], and SPX900 [2]; Ensoniq DP4

KEYBOARDS/MIDI: Fender Rhodes MK.I; Tube Wurlitzer; Alesis D4 drum module and SR16 drum machine; Roland R8M (rackmount R8), Octapad, Juno 106 synthesizer, JD990 synthesizer, and U-220 rackmount synthesizer; Sequential Circuits Prophet 600; Oberheim OB-Xa synthesizer, and Matrix 1000 synthesizer; Yamaha TX81Z synthesizer; E-mu Emax II, Proteus 2, and Proformance piano module; Kurzweil Midiboard 88-key weighted controller

COMPUTERS & SOFTWARE: Digidesign Sound Tools II with Pro Tools interface, Q10 I.I equalizers, DINR noise reduction, and Hewlett Packard disk drives; Opcode Studio Vision and Studio 3; 360 Systems Patchers

EQUIPMENT NOTES: Owner Jonathan Pines states: Our recent decision to upgrade to an AMEK Galileo has been a wonderful choice for us. As a previous AMEK owner (Mozart), I love the ease of use of the Supertrue automation and great sound, and now having automated effects returns, Virtual Dynamics, and Recall really enhances Mixdown. Who hasn't come in the next day/week/month and wished to change one or two minor things? Being able to return exactly to where we were is a great plus. Our studio has an enormous amount of vintage and state-of-the-art outboard gear [40+ channels of EQ and 35+ channels of compression], but we now find ourselves using more and more of our console's EQ and Dynamics.

STUDIO NOTES: Pines continues: Started in the late '70s as one of the first "project studios" in the country by a group of artists, Private Studios has always catered to the needs of artists and producers. We provide a comfortable environment with first quality equipment and staff. Private was designed and built by myself with consultation from the late Duanne Cooper (former president of the AES and inventor of Ambisonic's and many noted pieces of equipment). We love having rooms with exterior views and light.

PRODUCTION NOTES: Pines states: Producers who have tried our facility seem to return often. We are always complimented on our monitoring and the successful translation of our mixes to the "real world." **EC**

ALESIS TYPE II

continued from page 36

There's actually a ninth track in the Type II: an analog, linear auxiliary track (with discrete, balanced XLR I/O) that, among other things, aids users in finding cue points when scrubbing. This is recorded on an edge track in the same manner that standard audio tracks are recorded on a traditional VCR, and the Type II deck includes an internal mixer that can mix the signal from any combination of the eight digital tracks to this ninth track.

To accommodate the expanded functions of the Type II, Alesis has produced a new remote control system. The CADI (Controller Autolocator Desktop Interface) duplicates all of the front-panel controls of the new machine, including the jog/shuttle wheel. Studios that dedicate a single machine to recording comp tracks will love the fact that individual Type II's can be remotely put on- or offline via the CADI. One CADI is capable of transport control and track arming for up to eight Type II's. Connection to the machines is via standard RJ-45, allowing runs of up to 1000 feet between the remote and the machines. Used in conjunction with the Remote Meter Display and CADI, Type II's could be housed in a remote machine room.

ADAT Type II will be available in late summer of 1997 at a list price under \$7000. For more information, contact Alesis at 800-525-3747 or e-mail alecorp@alesis1.usa.com. Circle EQ free lit. #142.



right-angular — unlike any of the waves in fig. 1. In these cases, one simple picture indicates the complex filtering that is applied to a signal as it passes from analog to digital and back.

The top-most wave was passed through an ADAT, which is unique in that the “ringing” occurs only on the leading edge, much like an analog tape recorder. The next two waves came from the Otari DTR-8S and the Pioneer D-9601. The sample rates were 48 kHz and 96 kHz, respectively. You can clearly see that doubling the sample rate reduces the ringing.

Ringings normally means that someone is trying to communicate via telephone. In this case, it indicates the ability of the anti-aliasing filter to severely limit high-frequency bandwidth (just before 24 kHz) without affecting the amplitude of the preceding octave. (Phase is another story...)

are more magical than others.

The monkey wrench in the digital works is the sample rate (fs), which is of fixed pitch and against which some very nonmusical harmonics can be created. For example, an oscillator set to 20 kHz and connected to a standard DAT deck set to 44.1 kHz (fs) will create a beat frequency of 4.1 kHz. As the oscillator approaches the Nyquist frequency (one-half the sample rate or 22.05 kHz), the beat frequency will sweep downward into the bass region. There is a null point at the Nyquist frequency, above which will be generated a mirror image of beat frequencies from low to high.

The artifacts from the aforementioned test are low-level, but their proximity to the noise floor is level dependent. Therefore, excessive compression and/or a treble-heavy mix are not the recommended methods of compensation. Also keep in mind that at 11.025 kHz (1/4 fs) there are only four snap shots. Critics have argued that the region above 11 kHz is less-than-adequately captured.

Viewing a 1 kHz square wave can tell almost as much and sometimes more than sweeping a sine wave from the lowest lows to the highest highs. Square waves start out life in just the way their name implies — perfectly

The last two images show what the Otari DTR-8S and the Pioneer D-9601 (and their respective sample rates) do to a 10 kHz square wave. The “sine wave” is also typical of what happens to a square wave after a round trip via analog tape. Square waves are composed of odd-only harmonics, all above the fundamental. If it ain't obvious, nothing above 24 kHz is recorded. The D-9601, however, does a more reasonable job because at least two octaves of harmonics are represented.

P.S. Audio Note: Spring is normally the time of rebirth, but sadly we have lost two members of our audio family. Bill Titus was a technician who installed and serviced several recording facilities in the New York City area, most notably, Sear Sound. He and his wife Leslie had just recently moved out of the city and had a baby. Bill died of complications resulting from a bicycle accident on March 24, 1997. Gabe Weiner, owner of Quintessential Sound, Inc. and PGM Recordings, died of heart failure on April 9, 1997 in his Manhattan apartment. He was 26 years old.

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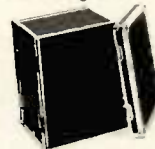


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FARGO CD-R

continued from page 110

nice feature is that you can import a square image and the graphic will be clipped correctly for printing on the round CD.

CD BOOKLETS

Besides printing on CDs, the Signature printer will also let you print color CD booklets (that go in front of the CD) and inserts (that go inside the jewel case behind the CD). There are a pair of plastic tabs in the front of the CD drawer that hold the blank booklet. In the image editor you can select the format to be printed and the orientation (portrait or landscape) of the graphic. I found out that you have to change the selection between CD and booklet in two places, or it doesn't work correctly. You must select CD or booklet in the image editor, and also in the printer driver setup page. If you don't, then you will get a round image on the square booklet.

PRINTABLE CDS

Because the Signature is an ink-jet printer, the ink goes on wet. Microboards Technology supplies (Fargo manufacturers the unit) CD-R media that has been specially treated to accept the liquid ink and dry it instantly. They call the process Tuff Coat. So far the only place to obtain these blank CDs is from Fargo [contact Microboards Technology]. The CD-Rs I received were Azo (blue dye manufactured by Taiyo Yuden, the inventor of CD-R). I have some plain white printable TDK CD-Rs that I tried in the Signature printer, but the colors smeared together and after a week are still sticky to the touch. The Tuff Coat CDs from Fargo, however, were very durable, dry to the touch, and would not smear. In addition, they are water resistant. The people I showed it to were amazed and kept trying to peel the picture off, thinking it was a sticky label.

CONCLUSION

If you are image conscious, then maybe you had better start thinking about how your CD-Rs look to the record company when you send them demos. If the A&R department head leaves your CD on his desk because it looks cool, maybe you stand a better chance of getting that elusive record deal. Who knows?

Personally, I found a font that looks exactly like handwriting with a felt pen. I think I'll use that and see if anybody notices.



DOLBY ROBERTSON

continued from page 73

that I hear I adore and it makes me want to go and learn to orchestrate stuff like that. Then if you took an average piece of successful or popular classical music it sounds to me like somebody saying: "2 + 2 = 4, 2 plus 2 equals 4, two + two = four" And yes, we have reassured ourselves over and over again that the planets will revolve.

Do your dual roles of being a musician and running a business get in each others' way?

I think that you have to immerse yourself in whatever job it is that you're doing. And I think that might be quite tricky. My hope is that I can go back to music and do it purely for the love of it and not have to even worry about making a living doing it. That would be a useful benefit. A lot of amateur or semi-pro musicians I think overlook that somewhat. They forget that they will be giving that up if they go professional. There's something to be said for the fact that if you're not making any money doing music, then you're doing it for the right reasons.

Real musicians have day jobs.

Yeah. So I do rather like the idea of going back to music without having to depend on feeding my family from it.

Do you look forward to the day when you'll write and publish music with your own software and negotiate the lion's share of your licensing and sales using the Internet, all from your home?

The more time goes on the more I consider that a seriously viable way to go. To take Beatnik and do some serious work in it, I think, is becoming more and more viable.

Would you be interested in releasing your music on the Web using Beatnik and sidestepping record companies?

Absolutely.

We've been waiting for years to hear professional musicians like you say that...

I think we're starting to hear it from disgruntled world-class recording acts like George Michael, the artist-who-formerly-made-lots-of-money. And then you also hear it from disgruntled up-and-coming bands who get their tapes returned to them unopened from A&R departments. And I think, hopefully, there'll be a twin-bladed effort to drive home a really viable alternative that doesn't require you to go through the mill like that. I think that's really starting to happen.

Are you happy?

Yes. I mean it's stressful as hell; it seems like to go on tour right now would be a vacation.



CLUB PROFILE

continued from page 122

the signal you are sending to a telephone interface makes a big difference in the way it sounds. If you are sending it any program below about 300 Hz and above 3- or 4-kHz, then that material is just making the interface work harder to try and null that part of the signal back out — and those frequencies are filtered from telephone transmission anyway. If you EQ the heck out of the signal and send only the critical frequencies in the voice region, then the interface can do its job a lot more easily and it works better.

We have a three-way, transformer-isolated mic splitter on stage that gives us an extra feed to a recording booth upstairs where we record E-town live to DAT with multitrack as a backup (there's a 32-channel Mackie 8•Bus, Yamaha 02R, and two TASCAM DA-88's in there along with an assortment of signal processors). At the rear of the hall behind the facade of the building is a third story that is the old movie projection booth. This level has been turned into office space, but a couple of the offices have big glass windows facing the auditorium. So I used one of those for the recording room and you have a great view of the stage from upstairs.

There's a reasonable amount of isolation but the low end can be a problem due to structural-borne sound transmission. Sometimes you're not sure if what you are hearing is low end transmitted through the structure or control room low end (the only way to get rid of that would be to float the entire recording room). So I've just put in a Paradigm subwoofer to augment the Genelec 1030A's — the idea being that if you get the low end from the studio monitors happening well enough, then you can distinguish it from the room. Hopefully this will help give a nice tight low-end reference so that you'll know what you are recording versus what the house engineer is mixing.

We have had some great guests on E-town, including Rickie Lee Jones, Julian Lennon, and James Taylor. For me it's been a fantastic opportunity to mix artists at that level because they don't always come in with their engineers. E-town used to have to hire a remote truck to do the show, but now it's a real pleasure because we don't have to deal with running and checking lines, tying power in, and so forth. It's all there — patched and ready to go.

Glenn Webb is the production manager at the Boulder Theater. He can be reached at 303-449-9630, extension 808 or gwebb@newhope.com

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If we wanted tips from the biggest pros in the industry, it just wouldn't show up on our doorstep! No, we'd have to set traps and when one'a them pros stepped into it — **POW!** And we'd keep 'em till they told us all they knew.

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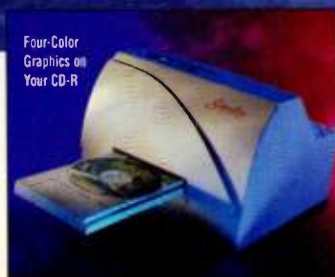
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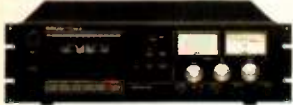
Provides high-fidelity sound reproduction and a wide frequency response, as well as a host of features to help you easily dub, edit, record or playback using 1 or 2 cassettes.

- Dual Auto Reverse, Normal and high-speed dubbing
- 4-second autospacer
- Dolby HX Pro extends high frequency performance and minimizes distortion
- Auto sensing for Normal, Metal and CrO2 tape
- Functions like Intro Check, Computerized Program Search, Blank Scan and One Program quickly find the beginning of tracks you want

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

- Individual/simultaneous record capability—both decks
- Cascade and Control I/O let you link up to 10 additional machines for multiple dubbing or long record and playback.

112mkII/112RmkII



A classic "no frills" production workhorse, the 112 mk II is a 2-head, cost effective deck for musicians and production studios. Extremely rugged and reliable, the 112 mk II is ideal for production mastering and mixdown. It also features a parallel port for external control and an optional balanced connector kit means it is flexible enough to integrate into any production studio.

- 112R mkII Advanced Features-**
- Three-head transport with separate high-performance record and playback heads
 - Precision FG servo direct drive capstan motors
 - Hysteresis Tension Servo Control (HTSC) virtually eliminates wow and flutter by maintaining consistent back tension on the tape all through the reel
 - Auto Reverse mode plays or records in both directions
 - Continuous Reverse mode allows you to loop the tape during playback up to 5 times, or record in both directions

HEADPHONES



K240M

The first headphone of choice in the recording industry. A highly accurate dynamic transducer and an acoustically tuned venting structure produce a naturally open sound.

- Integrated semi-open air design
- Circumaural pads for long sessions
- Steel cable, self-adjusting headband
- 15Hz-20kHz, 600Ω



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.



marantz

CDR615 / CDR620 Compact Disc Recorder



Both next-generation stand-alone write-once CD recorders they 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, and analog level automatic track incrementing. 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)



PMD Series

Portable Professional Cassette Recorders

The tower standard for field recording, the PMD line is also the value leader. They all feature RCA line input/outputs, 1/4-inch headphone jack, built-in speaker, pause control, audible cue and review, tape counter, full auto shut-off and low battery indicator

- All models except the PMD-430 have 1/2 speed playback/record capability. With 1/2 speed playback, musicians can slow down complicated passages for analysis. At 1/2 speed the pitch is lowered by exactly one octave so the notes are still musically correct.

- By recording at 1/2 speed, a three hour meeting can be recorded on a single tape. A built-in mic and automatic level control make operation simple, and built-in speaker makes transcription convenient.

- Three standard 'D' cell batteries provide up to 7-12 hours of operation and the optional RB430 rechargeable battery delivers up to 5-1/2 hours.

General	PMD-101	PMD-201	PMD-221	PMD-222	PMD-430
Stereo/Wono Heads	Mono	Mono	Mono	Mono	Stereo
Inputs/Outputs					
Mic Input:	1/4-inch	Miniplug	Miniplug	Mini/XLR	1/4-inch
Condenser Mic	Built-In	Built-In	Built-In	Built-In	—
Remot. Jack	—	Yes	Yes	Yes	—
Modular Tel. Jack	—	Yes	Yes	Yes	—
External Speaker Jack	—	Yes	Yes	Yes	—
Record Controls					
VU Meters	—	1	1	1	2 (Illuminated)
2-Speed Recording	Yes	Yes	Yes	Yes	—
Dolby B NR/dBx NR	—	—	—	—	Yes
Mic Attenuation	—	0-10dB -20dB	0-10dB -20dB	0-10dB -20dB	0-15dB -30dB
Ambient Noise Cont.	—	Yes	Yes	Yes	—
MPX Filter	—	—	—	—	Yes
Manual Level Control	—	Yes	Yes	Yes	—
Limiter	—	Yes	Yes	Yes	—
ALC	Yes	Yes	Yes	Yes	—
Peak Indicator	—	—	Yes	Yes	—
Playback Controls					
Pitch Control	±20%	±20%	±20%	±20%	±6%
Bias Fine Adj.	—	—	—	—	Yes
Tone Control	Yes	Yes	Yes	Yes	—
Memory Rewind	—	—	Yes	Yes	Yes

Telex

ACC2000/4000 Cassette Duplicators

Designed for high performance and high production, Telex duplicators offer easy maintenance and operation. The ACC2000 is a 2-channel monaural duplicator, the ACC4000 is a 4-channel stereo duplicator. Each produces 3 copies from a cassette master at 16X normal speed and with additional copy modules you can duplicate up to 27 copies of a C-60 original in **under two minutes**. And they copy both sides at once!



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 and bias.

Easy Maintenance:

- Slanted work surface and "heads-up" cassette platform prevent oxide build up on the heads and makes cassette loading and unloading easier.
- 3 point tape guidance system eliminates skew problems and prevent unnecessary wear and tear on the tape head mechanism.
- Audio and bias along with head adjustments are made easily from the top of the unit. A switch on the back engages the head and pinch roller for convenient cleaning.

Fingertip Operation

- Individual rotary audio level controls, "Peak" LED indicators
- Side A or A/B select button
- Stop all tapes instantly, at any point during the copy or rewind cycle
- Short tape indicators alert you if a tape stops before the original does, identifying incomplete copies caused by jam or short
- Automatic or manual selection of rewind and copy operation.
 - Rewinds tapes to the beginning or end automatically (AUTO mode) or manually
 - In AUTO mode the copy button activates the entire rewind/copy/rewind sequence. In manual mode, it starts copying immediately

Telex Copyette EH Series Duplicators

The Copyette series produce high quality, low cost cassettes in large quantities at approximately 16X normal speed. The 2 versions are capable of duplicating either 1 or 3 cassettes at a time. Available in both mono and stereo.

Stereo Copyette 1+2-1

Weighing only 8 lbs. (3.6 kg), this unit has a durable, impact resistant housing and includes a removable power cord, carrying handle and protective cover. Optical, non-reflective end-of-tape sensing system provides gentle tape handling



Stereo Copyette 1+2-3

This duplicator copies both sides of three cassettes at once, yet it's as small as the 1+2-1. It weighs only 12 pounds (5.4 kg) and includes a hard cover to protect the unit while not in use. It uses all DC Servo motors for the ultimate in reliability.



MICROPHONES



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- 20Hz-20kHz.



Studio Condenser Mics

The "bench mark" for cost and performance, the Eteket series of microphones incorporate a unique servo design and exceptional flexibility to provide extraordinary ballistic capability and exceptional transient response.

E-300

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 10 Hz to 20 kHz and an exceptional dynamic range of 137 dB. Also extremely low self noise of 11dB. Ideal for the most critical applications



Shown with optional ZM-1 Shockmount

Unique powering of all mics is accomplished with a pair of rechargeable nicad 9-volt batteries in combination with 48-volt phantom power. This overcomes inherent current limiting associated with most phantom power supplies and can supply 10X the current.

E-200/E-100

The first member of the Eteket family, the E-200 is also a dual capsule side address multi-pattern condenser mic but with lower specifications than the E-300. The E-100 uses the same electronics as the E-200, but with only one of the same capsules in a supercardioid pattern.

- Frequency response of 10 Hz to 18 kHz.
- Dynamic range of 137 dB • Low self noise of 16 dB.



audio-technica

AT4033

Cardioid Capacitor Microphone

The AT4033 is a transformerless, studio microphone designed for use in the most demanding applications.

- Gold-plated, "aged-diaphragm" condenser element with internal baffle plate to increase S/N ratio which, coupled with low-noise transformerless electronics, makes the AT4033 ideal for critical digital recordings.
- Dynamic range is 123 dB without built-in attenuator
- Accepts up to 140 dB SPL without distortion above 1% T.H.D. A built-in switchable 10 dB (nominal) pad increases it to 150 dB.
- Internal open-cell foam windscreen.
- Integral 80 Hz hi-pass filter for easy switching from a flat frequency response to a low-end roll-off.

AT4050/CM5

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

- 2 capacitor elements
- Cardioid, Omnidirectional, and 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.



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MDX 2100 Composer



- Integrated auto/manual compressor, expander & peak limiter.
- Compresses "musically" in dynamic range without any audible "pumping" or "breathing".
- Attack & release times are controlled automatically or manually.
- Interactive Gain Control (IGC) combines a clipper and peak limiter for distortion-free limitation on signal peaks.
- Servo-balanced inputs and outputs are switchable between +4dB and -10dB.

APHEX

107 Tubessence 2 Channel Mic Preamp



- The 107 delivers outstanding sonic performance, as well as a great degree of presence, detail, openness and image.
- 2 independent channels with front panel XLR inputs
 - 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 with red LED indicator: 80Hz, 12dB/octave
 - Polarity inversion switch with LED indicator
 - Individual channel remote mute capability
 - Switchable +4dB/-10dB output with 1/4" TRS phone jacks

TUBESSENCE combines the best attributes of both tube and solid state circuitry to provide performance unmatched by conventional designs. The solid state front end is transformerless and only high end capacitors are used in the signal path. The tube circuit imparts the sonic characteristics of tubes without the extremely high voltages, heat fragility, and short life span of conventional tube circuitry.

109 Tubessence Parametric EQ



- The Apex 109 is an extremely versatile and high performance parametric vacuum tube EQ with unique features, flexibility and sound.
- Great for "warming up" digital signals.
 - True tube circuitry in the output stage.
 - Dual (stereo) 2 band or mono 4 band EQ configuration offers flexibility from general sweetening to critical problem solving.
 - Operates in the EQ flat mode yet still passes signal through the Tubessence vacuum tube stage.
 - 1/5 octave to 2 octave bandwidth adjustment.
 - Switchable -10dBV/+4dBu operating level.

t.c.electronics

Wizard M2000 Studio Effects Processor



The M2000 features a "Dual Engine" architecture that permits multiple effects and 6 different routing modes. There are 250 factory programs including reverb, pitch delay, chorus, flange, phase, EQ, de-essing, compression, limiting, expansion, gating and stereo enhancement. The M2000 also features 20-bit A/D conversion, AES/EBU and S/PDIF digital inputs/outputs, "Wizard" help menus, 16-bit dithering tools, Tap and MIDI tempo modes and single page parameter editing.

HIGH-END MIC PRE-AMPS

Focusrite

Red 1 / Red 8 Mic Pre-amps



The Focusrite Red Series is instantly recognized by leading engineers worldwide for its fidelity, musicality, precision and control. The Red1 is a 4 channel mic pre while the Red 8 has 2 channels. Both are ultra-high quality for use in digital recordings, and with high-quality ribbon, valve, and condenser microphones.

Each channel offers-

- Phantom power & Phase reverse.
- Warm, and crystal-clear.
- Easy-to-read, accurate illuminated VU meters.
- Low noise floor with high gain bandwidth.
- Mic gain has 66dB range.

ISA 215 Dual Mono Mic-Pre & EQ



Engineers, producers, and musicians worldwide are familiar with the legendary ISA 110 mic pre/EQ that forms the heart of the Focusrite Studio Console. Frequent requests for a 19" rack unit with the same circuitry have led to the development of this high-quality studio device.

- 2-independent mic pre-amp & EQ.
- Microphone inputs feature variable gain and switchable phantom power.
- Independent HF and LF shelving sections.
- Overlapping Upper and Lower Mid EQ w/variable bandwidth.
- Independent High and Low pass filters.
- Integrated PSU
- Large, easy to use control knobs and switches.

Focusrite Green Range
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ALESIS

3630 Compressor RMS/Peak 2Ch.Comp/Limiter/Gate



The 3630 is a dual-channel compressor that offers Ratio, Threshold, Attack and Decay controls to handle the toughest signals. It also offers a choice between RMS and Peak compression styles, plus Hard and Soft Knee dynamic curves for every application from subtle gain control to in-your-face punch. Ideal for use in applications from studio recording and mixing to live sound reinforcement and broadcast.

M-EQ 230 Dual 1/3 Octave/Precision Equalizer



Used extensively in recording studios since 1989, the M-EQ 230 provides 2 independent 30-band 1/3 octave graphic EQ in a single rack space. Covering every band from 25 Hz to 20 kHz in 1/3 octave increments the M-EQ 230 is ideal for tuning the monitors in your project studio or even getting the most out of a home stereo setup.

MidiVerb 4 2 Ch. Parallel Processor w/Auto Level Sensing



The MidiVerb 4 extends Alesis' line of affordable professional multi-effects processing. It provides the sonic quality and programming power required for studio recording and live sound reinforcement at an affordable price.

- Wide variety of dense, natural-sounding reverbs, rich chorus and flange, versatile delay, rotating speaker simulation, pitch shift, panning and more.
- Auto Level Sensing feature automatically sets your input signal to the optimum level to take advantage of the MidiVerb 4's wide dynamic range.
- 18-bit oversampling digital converters add to the excellent audio fidelity, with a resulting 20 kHz frequency response and a dynamic range over 90dB.
- 128 preset and 128 user-editable programs.
- Mono or Stereo single effects, dual-mono effects, and multi-chain configurations for 2 or 3 effects at once.

QuadraVerb 2 2 Ch. Master Effects w/Digital I/O



Alesis' most powerful signal processor, the QuadraVerb 2 offers the amazing audio fidelity of a high-end dedicated vocal reverb while providing powerful multi-effects capabilities.

- 300 programs (100 preset and 200 user-editable),
- 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, overdrive and more.
- 5 seconds sampling, triggered pan, and surround sound encoding are also 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.

MIDI

O P C O D E



Studio 5 LX Macintosh MIDI Interface



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

- 15 Independent 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.
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PROCESSING



White instruments

4200A, 4400 & 4700 L-C Series 1/3 Octave Active Equalizers



- The 4200A (active, cut only graphic EQ) and 4400 (active graphic EQ) provide 28 1/3-octave filters on I.S.O. centers from 31.5 Hz to 16kHz. Hand-tuned inductor/capacitor (L-C) resonant circuits provide the ultimate in performance and reliability.
- Better than 108 dB signal-to-noise ratio with no degradation even when filters are used.
- Continuously adjustable high and low-pass filters band-limit unwanted subsonic and ultrasonic noise.
- 3 outputs and powered accessory crossover socket facilitate distribution and level control to three subsystems (Bi-amp or tri-amp operation with optional 2 way and 3-way plug-in crossover networks).
- The 4200A has a -15 dB control range, the 4400 has a ±10 control range.
- The 4700 is similar in specifications to the 4200A/4400 EQs, the difference is that all functions of the 4700 are digitally controlled.

DSP 5024 Digital Signal Processor

- 2 input, 4 output signal processor with 107 dB of dynamic range.
- Crossover can be configured as 2-way, 3-way, 4-way or dual 2-way.
- Adjustments can be performed in frequency 1Hz steps, slope (6, 12, 18, 24 dB/oct.), shape (Butterworth, Bessel, Linkwitz-Riley).
- Parametric filters include boost, cut, high pass, low pass, rising shelf and falling shelf, adjustable in 1 Hz steps, 1/10 dB steps and bandwidth from 1/70th octave to 4.8 octaves.
- Delay up to 680 ms on each output.
- Ten non-volatile memories and presets with password security.
- Remote preset select interface includes PA422.



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STUDIO MONITORS



Control 5 Compact Control Monitor Loudspeaker



The Control 5 is a high performance, wide range control monitor for use as the primary sound source in a variety of applications. Its smooth, extended frequency response combines with wide dynamic capability to provide acoustic performance that's ideal for recording studios, A/V control rooms & remote trucks.

- 6-1/2" low frequency driver provides solid, powerful bass response to 50 Hz and a pure titanium 1" dome handles high frequency response to 20 kHz.
- Magnetically shielded for use near video monitors.
- Choice of black, gray or white finish.
- A host of mounting systems including ceiling, rack and tripod allow positioning in exactly the right spot.

4200 Series Near-Field Monitors



The 4200 Series near field monitors come in 6.5" (4206) and the 8" (4208). Both offer exceptional sonic performance, setting the standard for today's multi-purpose studio environment.

- Multi-Radial baffle directs the axial output for optimum summing at approximately 3 to 5 ft.
- Curved surface of the ABS baffle virtually eliminates baffle diffraction distortion.
- Superb imaging and greatly reduced phase distortion.
- Vertical alignment of the transducers across the baffle center produces natural mirror-imaging.
- Pure titanium diaphragm high frequency transducer provides smooth, extended response.
- Magnetically shielded for use near video monitors.

6208 Near-Field Monitors



An internally bi-amplified near field studio monitor, the 6208 provides excellent reference in a small, portable package. It combines optimized electronics with an 8", two-way speaker system on a Multi-Radial baffle that aligns acoustic centers of high and low frequency transducers. The transducers are magnetically shielded to allow safe placement near sensitive equipment such as tape recorders and video monitors.

- XLR or 1/4" inputs are compatible with both -10 dBv and +4 dBu nominal operating levels.
- 2.6 kHz electronic crossover with discrete circuitry.
- Low feedback design, with no slew rate limiting and extremely low distortion.
- 8", low frequency transducer delivers a long, linear excursion resulting in a smooth extended bass output with low power compression. It is coupled to a one inch titanium diaphragm, high frequency transducer with patented "diamond pattern surround" exhibiting flat response, +/-2 db from crossover point to 20 kHz.

MIXING BOARDS



EURODESK MX 8000

24 Channel 8-bus Console

- 48 input channels with dedicated EQ, Mute, Pan, & Level.
- Channel, Subgroup, and Mix insert points.
- Direct Outputs, 24 balanced tape ins/outs.
- 4 band EQ with sweeps
- 6 Aux sends, 6 stereo Aux returns w/extensive routing.
- Optional MB-8000 Meter-bridge
- Optional Cybermix automation software for Windows.



CR-1604 VLZ

16-Channel Mic/Line Mixer

A hands-down choice for many major touring groups and studio session players as well as broadcast and sound contracting. The CR-1604 VLZ features everything you would expect from a larger console, and then some!

- 24 line, 7 AUX, 3-band EQ w/ mid sweep, 10-segment LED output meter.
- 90 dB S/N and 108 dB dynamic range.
- 16 studio-grade, phantom powered mic preamps.
- AFL/PFL solo & mute w/ overload and signal indicators.



- Rear panel features 1/4-inch/ XLR connectors, inserts on every channel, and RCA tape inputs/outputs.
- Rotary I/O "pod" allows 3 different positions for set-up.

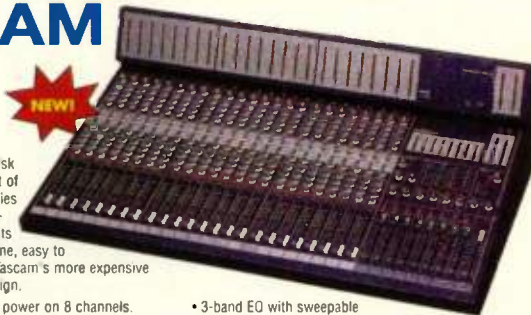
MS1202VLZ and MS1402VLZ IN STOCK!

The new MS-1202, 1402 and 1604 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.



M-1600 16/24 Channel 8-bus Console

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 option for inputs and outputs and uses the same, easy to install D-sub connectors as Tascam's more expensive console, 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 and Balanced Group/Direct outputs using D-sub connectors.
- TRS Balanced Line Inputs on all channels.
- 3-band EQ with sweepable mids.
- 5 Aux sends (1 stereo).
- 4 assignable aux returns.
- Perfect for use with DA-88 and ADAT setups.

Digital Multi-Track Recorders

TASCAM DA-88

- Hi-8mm tape format.
- ATF system ensures no tracking errors or synchronization loss on up to 16 cascaded decks.
- 16-bit D/A, selectable 44.1 or 48KHz.
- Flat 20Hz to 20KHz, 92dB dynamic range
- Seamless Punch-in and out, for programmable digital crossfade and insert.
- Individual track delay for special effects and timing correction.



PCM-800 Digital 8-Track In Stock!

ALESIS adat xt

S-VHS DIGITAL

The ADAT-XT sets the standard in modular digital multitrack recording. The ADAT-XT operates up to four times faster than the original ADAT and offers an intelligent software-controlled tape transport as well as provides onboard digital editing and flexible autolocation.



- Includes LRC remote control with transport and locate functions
- Advanced transport software continuously monitors autolocation performance.
- 56-pin ELCO connector operates at +4dB and -10dB
- Built-in electronic patchbay
- Flawless copy/paste digital edits between machines or within a single unit.

STUDIO MONITORS



Monitor 1

Near Field Reference Monitors

- 6.5" low frequency driver provides excellent image and transient reproduction, powerful bass, and smooth, extended high frequency detail.
- Exclusive SuperPort speaker venting technology eliminates the "choking" effect of port turbulence for solid high-power bass transients and extended low frequency response.

Monitor Two

Mid Field Studio Reference Monitors

Today's popular music demands more bass at louder volumes than a small near field monitor can possibly produce, the Monitor 2 delivers.



- 10" three way speaker design with a unique asymmetrical crossover to maintain the same accurate tonal balance and imaging of the Monitor One—but with a much larger sound field.
- 5" mid frequency driver offers exceptional mid frequency detail.
- 1" silk dome high frequency driver delivers a broad but natural frequency response from 40Hz to 18kHz.
- Covered in a non-slip rubber finish, the Monitor Two comes in a mirror imaged pair for mixing accuracy.

Point Seven

- 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.



PBM Series II Near-field Reference Monitors

The PBM II Series is the industry standard for reference monitors providing true dynamic capability and real world accuracy.



PBM 5 II

- Custom 5" injection-molded bass driver
- Woofer blends seamlessly with the 3/4" polyimide soft dome ferro-fluid cooled tweeter providing extended bandwidth

PBM 6.5 II

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

PBM 8 II

- High tech 1" soft dome tweeter and 8" driver capable of powerful bass extension under high SPL demands.
- Hard wired crossover features true bi-wire capability.
- Full cross-braced matrix medite structure virtually eliminates cabinet resonance as a factor.
- Ensures precise low frequency tuning by incorporating a large diameter port featuring laminar air flow at higher port velocities.

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- Built in MIC limiter and 20dB pad
- TRS jack w/level control for monitoring
- Includes shoulder belt, AC adapter, & battery



PDR1000/PDR1000TC



- 4 head Direct Drive transport
- Balanced XLR mic and line analog inputs and two RCA analog line outputs. Digital inputs are outputs include S/PDIF consumer (RCA) and AES/EBU XLR
- Left/Right 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 two hours. AC Adapter/charger included.

PDR1000TC Additional Features:

- All standard SMPTE/EBU time codes are supported, including 24, 25, 29.97 (drop frame and non-drop frame) and 30 fps.
- External sync to video, field sync and word sync

STUDIO DAT RECORDERS

Fostex

D-25/D-30



- Pro DAT master recorder featuring confidence monitoring and insert editing with a 4-head transport.
- Sync functions include the ability to chase sync to a master timecode. Resolves to WORD/VIDEO/DAT frame signal + WORD.
- Independent left/right recording.
- Scrub from tape or buffer. Jog/ Shuttle 1/2X to 16X.
- SMPTE/EBU TC generator/reader
- On board chase/lock sync. RS-422 slot
- 4-head 4-motor transport.
- 16 MBit RAM buffer/for instant Start & Edits.

D-30 Additional Features:

- Large, high resolution backlit LCD display which shows all parameters at a glance
- Intuitive menus from 10 dedicated soft keys
- 2/ RS-422 ports for added flexibility.

FOSTEX D-15 TimeCode DAT NOW AVAILABLE!

Panasonic

SV-3800/SV-4100



The SV-3800/SV-4100 feature highly accurate and reliable transport mechanisms with search speeds up to 400X normal. Both use 20-bit D/A converters to satisfy the highest professional expectations. The SV-4100 features instant start, program and cue assignment, enhanced system diagnostics, multi-tape dual head, and more.



A-90EX Master Controller for the Next Century



The A-90EX is an 88-note, weighted master controller with the best keyboard action currently on the market—bar none. 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.

Keyboard Controls

- Master Volume Slider and Global Transpose features allow you to send control commands to your entire MIDI setup without changing the balance between connected units.
- Sequence Control Section lets you control song selection, tempo and other parameters quickly.
- The keyboard can be split into eight zones and features 20 different controls and connectors.

Superb Sound

- 2 types of stereo-sampled grand pianos, various acoustic and electric pianos (including a great classic Rhodes).

- 128 patches selected from Rolands extensive "JV" and "JD" series library
- 64-voice polyphony Built in effects

Extensive Performance Configurations

- Stores up to 64 Performances (128 w/optional M-512E card) which may consist of up to 4 preset Patches along with various user-configurable parameters such as zone, effects, and MIDI channel.

88 Key Keyboard

- Proprietary 88-note hammer-action, velocity sensitive keyboard w/aftertouch offers the natural resistance and rebound of an acoustic piano and control of a synth.

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

JUST IN

Features

- 64-Voice polyphony / 16-part multitimbral capability.
- 8 slots for SR-JV80 series expansion boards.
- 3 independent effects sets plus independent reverb/delay and chorus.

- 64-Voice polyphony/16-part multitimbral capability.
- NEW patch finder and Phrase Preview functions for easy access to the huge selection of patches.
- Large backlit graphic display
- Compatible with the JV-1080, XP-50, and XP-80.

NEW SR-JV80-10 "BASS & DRUMS" EXPANSION BOARD NOW AVAILABLE!



DM-800

Digital Audio Workstation

A compact, stand-alone multi-track hard-disk recorder that provides an amazing array of features at an unbelievably low price. Used music production, post production and broadcast, it performs all digital mixing operations from audio recording and editing to rotation track-bouncing and final mixdown. It supports SMPTE and MTC and features a built-in Sample Rate Resolver for sync with any time code.



VS-880 V-Xpanded

Digital Studio Workstation

The VS-880 V-Studio Digital Workstation, is now even more versatile with the release of the VS-880 V-Xpanded. This new version incorporates powerful additional functions that allow you to get the most out of the VS-880's incredible creative potential.

NEW FEATURES

Mixer Section

- Auto Mixing Function records and plays back song data in realtime including fader movements and panning positions. No external sequencer is required.
- 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.

Recorder Section

- Simultaneous playback of 6 tracks in MASTER MODE recording.
- Digital output with copy protection.

Effects Section*

- 10 additional effect algorithms (30 total) including Voice Transformer, Mic Simulator, 19-band Vocoder, Hum Canceller, Lo-Fi Sound Processor, Space Chorus, Reverb 2, 4-band Parametric EQ, 10-band Graphic EQ, and Vocal Canceler.
- 100 additional preset effects patches.
- Effect change by MIDI program change message.
- Effect edit by MIDI control change message.



And More...

- Additionally, over 20 powerful and convenient features in editing/sync sections have been added.
- The functions marked * require the optional VS8F-1 Effect Expansion Board

VS-880-S1 SYSTEM EXPANSION KIT

Current owners of the VS-880 now enjoy unprecedented support from Roland with the release of this System Expansion Kit. Supplied on a ZIP disk and including a new owner's manual, the VS-880-S1 will provide current version users with all of the benefits of the VS-880 V-Xpanded at a fraction of the cost.

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A professional Multitrack Digital Audio Workstation for the PC, the SSHRD1 combines the highest quality processing hardware with easy-to-use Windows-based software for the most complete and affordable solution for high quality digital audio recording and editing on the PC. The SSHRD1 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, recording music in project studios with an 8 track system, to multiple unit 32, 48 and 64 track systems used by major TV and film studios for audio post production linked to video.

- All audio processing, disk handling and sync. is carried out by the powerful DSP in the hardware, so any PC can be used. Even a 386!!!
- Up to 64 virtual tracks all with Move, Copy, Trim, Slip, Solo, Repeat, Delete, Cut, Glue edit functions.
- Solo/Multi-track audio scrubbing, 999 named markers
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- Automated Punch In/Out. Volume contouring.
- All SMPTE formats, including 29.97 and 29.97 DF.
- AV file support w/full sync. (Req. Video for Win.V1.1).
- Optional EDL File support w/full auto conform via RS422.
- Volume and Pan controls, assignable fader grouping.
- Reverse/Phase Invert/Compute tempo.
- Optional Time Module features Time stretch/Time compression Pitch shift and Sample rate conversion.
- 8 physical output channels, selectable for each PART
- Non-destructive sample-resolution editing.
- Cycle record mode with stacked TAKES and pre-roll (like analog multi-track tape recorders)
- AND MUCH MORE...

Fostex

DMT-8 VL



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

- 18 bit A/D, 20 bit D/A conversion.
- 3 channel mixer. CH. 1&2 feature both mic & line level
- 2 band EQ and 2 AUX sends per channel
- Cut/Copy/Move/Paste within single or multiple tracks.
- Scrub from tape or buffer. Jog/ Shuttle 1/2X to 16X.
- Built-in MIDI Sync, 6 memory locations.
- Dual function Jog/Shuttle wheel provides digital "scrub" without pitch change.
- Divide the drive into 5 separate "virtual reels" each with it's own timing information.
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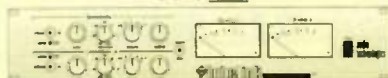
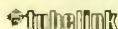


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The Project Studio "Sound"

Despite commercial studio criticisms, project studios open up the creative floodgates



BY MARTIN POLON

The second half of the last decade before the arrival of the second millennium has seen a kind of confusion swirl around the project studios like a fog in an old black-and-white San Francisco film-noir movie. Several issues have been raised by many in the project studio business and by more than a few in the larger studio universe, all suggesting in so many words that project studios have their place, but also have their limits. To wit; money counts and what you spend is what you get. What they are really saying is, "You can hear the difference."

To some extent, this can be seen as a business reaction by the large studios to the extraordinary growth of the project sector and to the record labels decision that, in many cases, it is "more better" (more cost-effective?) to help signed groups to purchase or enhance their own project studios. This change in direction for album production spending, rather than working in an unlimited way in a large-scale studio (possibly costing the record label in excess of \$1000 per day), has cost many large studios many days of billed time.

In fact, several label managers referred to the time and tape (T&T) savings of using project studios owned by their contracted artists. By time, they were referring to an almost unlimited rehearsal and recording time continuum with a project studio operated by their own artists. As to tape, the cost

of large dimension multitrack tape is very much higher than the cost of consumer-style videocassettes used for some project studio digital recording.

As to those within the project universe who are hearing the frequently unfounded criticism of others and are now questioning whether to move out from their supposedly limited universe, they represent many who also are not quite sure what is gained by an eventual move for both their projects and the project studio from small to big.

The very bottom line that renders all of the other arguments about project studios of considerably lessened value is that of just how good is the equipment used in the project studio and the sound that is produced therein. Even by the standards used in large, commercial recording studios just a few years ago, the equipment that today's project studios use — be it discrete or virtual — needs to make no apologies in quality.

But, it is that project studio "sound" that has become the essence of project recording. Now, we all labor in an industry that values the various kinds of sounds that have been accepted by record labels, the musician groups, and the consumers who buy records. Perhaps it is unnecessary to argue as to whether big studios are better than small studios or vice versa. Each has its specific sound and the musical output of each is as important as the other.

Now it happens that the sound of a previously somewhat unheralded English producer named Joe Meek has become quite popular with studios, artists, and producers today. Meek made experimentation with all elements of the recording evolution fashionable well before the coming of the project studio, but Meek may well have paved the way for the kind of technical, acoustic, and production experimentation that has become the trademark for the project studio

sound. [See the feature story on Meek in the December '95 issue.]

Now, it may be apocryphal or apocalyptic or anecdotal or all of the above, but Joe Meek was supposed to have pioneered a technique for mono echo send and receive. A microphone was suspended over the bowl of a toilet at the end of a long hall. A full range Tannoy dual-concentric loud speaker system driven by an echo send to a Quad power amplifier was located at the other end of that hall. Now this was not as obscure a technique as it seems, and oth-

ers on both sides of the Atlantic tried and used it again and again. There are those who will argue that Meek pioneered it and they may be right. And Meek certainly was supposed to have experimented with the placement of both the mic and the speaker, the degree of openness for the door to the toilet and perhaps even the amount of water in the miked toilet bowl. But, according to the body of legends or myth that has surrounded Meek, the very special Meek touch was to send a trusted associate down the street for a double order of the greasiest fish and chips to be found in the British Empire then or now. The associate would indulge rapidly and then regurgitate in the aforementioned toilet bowl. Now that was echo. It was also the Joe Meek

sound. Everyone who hears the story accepts that and there are those today who have tried the technique (hopefully sans vomit) in their project studios.

That is what personal and project is all about. The flexibility to try new and old techniques over and over again until they get it right!

Let us all be that accepting of the creativity and flexibility of the personal and project studio sound and realize that what we have is a special and very exciting environment to work with!

*It is that project
studio "sound"
that has become
the essence of
project recording.*

ACROSS THE BOARD

continued from page 154

the same spot on the original master, inverted one copy and added them together. The results was an empty file. They were exact, sample by sample. We turned the congas up a little (very precise technical term) and printed the new master. We did the same with four other songs. Recall the mix, change a couple of little things, and reprint the master.

ONE SONG PER DAY?

The reason behind the one-song-per-day schedule is this: After you spend a lot of time getting everything to sound perfect, your ears get tired and you get used to hearing things that may not be exactly the way you want them. Over the years it has become common practice to get the mix to where you think it is done, make a DAT of the mix, and take it home to listen. Maybe you will listen later that night, or maybe the next morning when your ears are fresh. When you go back to the studio, you make the changes you need to make and print the master. Some artists and producers print mul-

tiple "versions" of the mix just in case later they decide that the vocal should be a little louder or a little lower.

When the versions are printed, you start on the next mix, get it to the place where you think it is done, make a DAT, go home, and finish it the next day. The cycle continues until you are done.

This is the benchmark that seems to work out the best. Of course, there are exceptions. Sometimes the mix is kept up for three or four days to a week or more. The artist could come back after listening at home and decide to redo the vocal, or try an entirely different approach to the mix, or take a two-day break to go waterskiing. Who knows. Who cares. If you have your own studio, or the budget to lock out someone else's studio, then fine, go for it.

The underlying premise is that nothing gets touched or changed until you are finished with that song, because everyone knows how hard it is to get back to where you were.

THE DIGITAL WAY

Back to our Capricorn mixes. Our work days in the studio weren't that long each day, and I knew that we would want to do some recalls on the last day. We had already mixed one song in Los Angeles

on a Neve 72-VR. The Capricorn mixes sounded much better, and I wanted to remix the L.A. tune. Our schedule of one tune per day would not give us enough time to mix the additional song. What's a guy to do?

Each day I went to the studio a couple of hours early, stored the song in progress, and worked on the extra song. When the artist came in to OK the previous day's mix, I stored what I was doing and recalled the mix in progress. The changes were made, the mix printed, and the next tune brought to completion. The next day, I came in early, recalled the extra song, worked on it some more, and so on. A few days before the end of the project I also gave the artist an overnight DAT of the additional song that was OK'd and printed the next day.

WOE IS ME

I asked my wife to proofread this article. The next time I went downstairs my Yamaha 02R was gone. It was in her demo studio and her old analog console was leaning up against the wall. I just got my Yamaha 03D, so I may have a hard time convincing her to return the 02R. Maybe if I offer her a nice assortment of colored grease pencils... **EQ**

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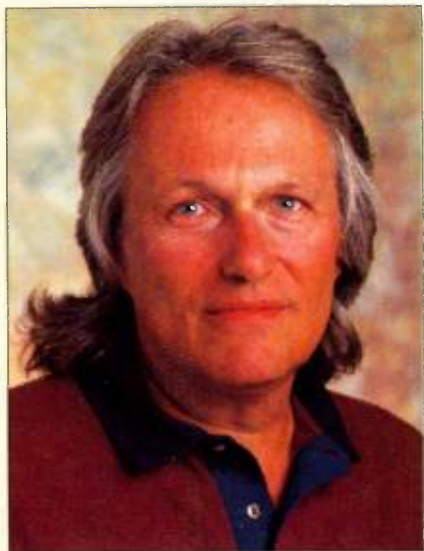
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Capricorn-ucopia

Life in the digital domain
is a beautiful thing

BY ROGER NICHOLS



I just finished mixing the Japanese album I mentioned last month. I mixed it at Chung King Studios in New York City on their AMS/Neve Capricorn digital console. This was, so far, the most fun I have ever had with my clothes on.

When talking about the size of a Capricorn console, you must mention the total number of I/O channels and the number of physical faders. The normal analog spec that mentions the number of inputs, busses and aux sends is meaningless, because the inputs and outputs of the Capricorn can be anything you want them to be. The Capricorn at Chung King had 190 channels of I/O pairs (one in and one out is a pair). The inputs could be configured as analog inputs through NVision converters, digital inputs from digital multitracks, returns from effects, or returns from DATs or other mix destinations. The outputs could be sent to channels of the digital multitrack, analog multitrack, aux gear, 2-track mix machines, or anything else you could think of.

The physical console consists of a center section and one or more sections that contain 24 channel strips each. The Chung King console was fitted with

three of the 24 strip sections. The number of physical channel strips is up to the client, because you can actually record and mix a 96-track digital project with only a center section with one fader. There is a Capricorn in Nashville and one in a mobile truck that only have a single 24 channel strip section.

Do you like the EQ before the dynamics, after the insert, before the fader, or EQ on the dynamics sidechain? A graphical interface allows you to configure the DSP blocks anywhere you want. Do you want to insert some of your own digital processing before the master fader and use the final dithering in the console? No sweat.

BUT HOW DO I REALLY FEEL?

On one particular mix, I had what I thought was a good sounding mix, but I wanted to try a few things with drum balances, panning, and EQ. I spent about 90 minutes screwing up what I had. It took less than five seconds for the console to reset to what I originally had going. I could even easily toggle between them. At one point I kept everything I had from the mix I was working on, and recalled all of the drums from the final mix of another tune.

OK, so you can do this with a digitally controlled analog console. But try this: I had a guitar track that exhibited some phasing between the direct tracks and the amp tracks. Delaying the direct tracks made the guitar part feel funny, so I advanced the amp track earlier. The ambient mics for the drums sounded too far away, so I made them earlier, and the drum sound tightened right up. I had trouble setting deep gates on the

toms, so sidechained them from an earlier feed from the tom tracks so the gates would open in time.

I also used mostly digital outboard gear, like the Lexicon 480-L, Lexicon MPX-1, Roland 880, TC-M5000, TC Finalizer, and Valley Audio 730LT.

I CAN'T RECALL

During the Steely Dan Live album mixes, Donald Fagen wanted to recall a mix to turn one guitar down about a dB. We put everything back just exactly the way it was during the mix, which took about two hours, and then A/B switched between the final mix we had and the recall. We got things pretty close, but the new mix just didn't feel as good as the final we had. We could not match them up close enough to make the change, so we left it the way it was.

Part of the reason for the difference is the accuracy of the positioning of each of the thousand knobs on the console. An EQ knob off by a hair, reverb sends off by a smidgen, a different "Fader Cal" on Neve Flying Faders or VCA drift on an SSL can all contribute to the mismatch.

The final test of the Capricorn came on the last day of the two weeks of mixing. The artist wanted to make some very small changes to some of the mixes that had already been printed to the

master tape. Recall of the mix with all of the cross-patching, outboard gear settings, and fader labeling took less than one minute. To confirm that the mix was identical, I printed a piece of the new mix to hard disk, lined it up with

continued on page 152

*The artist
could come
back after
listening at
home and
decide to
redo the
vocal, or
take a 2-day
break to go
waterskiing.*

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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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