

EXCLUSIVE: ROBERT SCOVILL REVIEWS THE JBL EON

EQ

THE PROJECT
RECORDING
& SOUND
MAGAZINE

SEPTEMBER 1995

BRUCE HORNSBY

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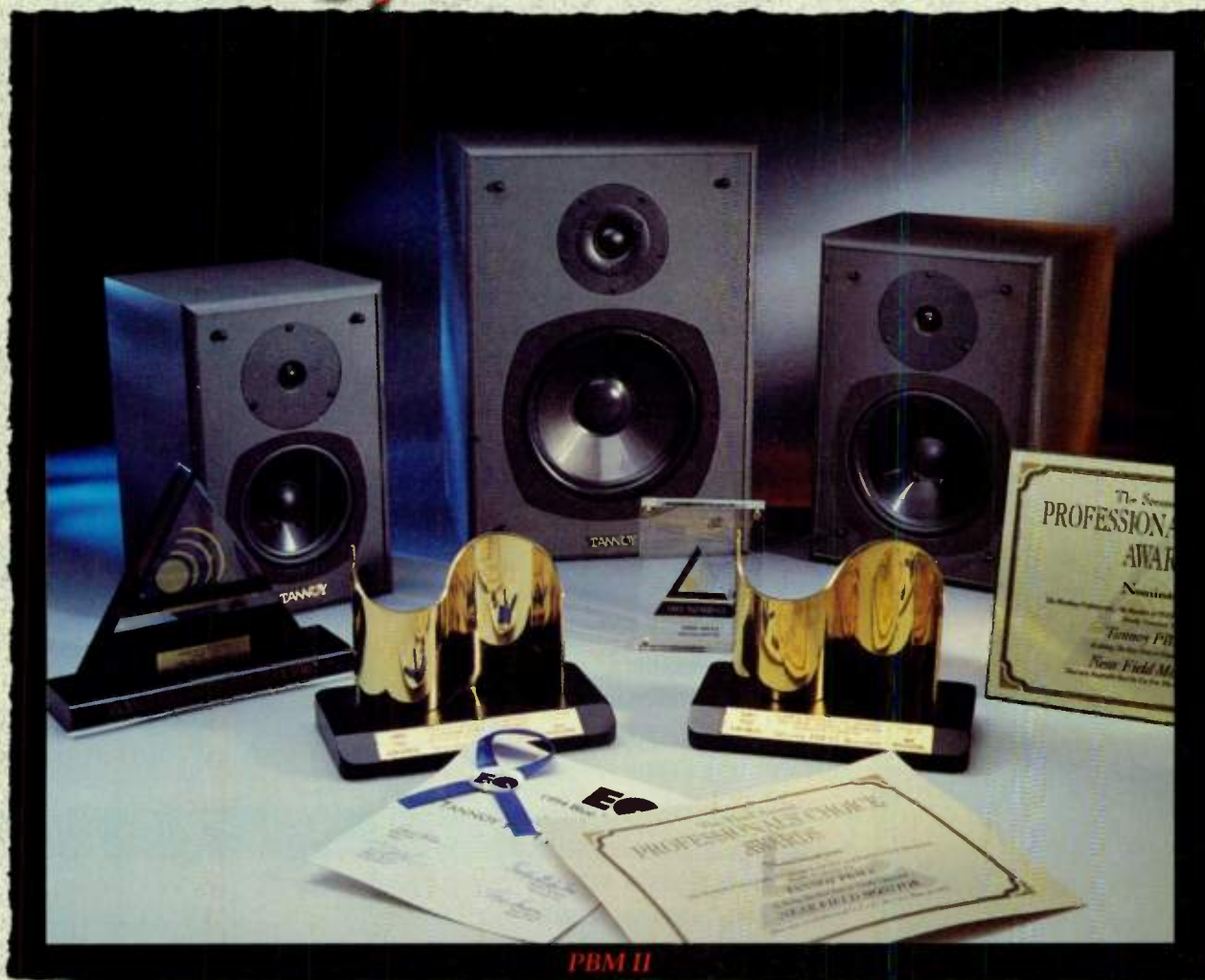
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EQ



PROJECT RECORDING
& SOUND TECHNIQUES
VOLUME 6, ISSUE 9
SEPTEMBER 1995



ON THE COVER:

Bruce Hornsby sits at his Neve 8068 console (bought used from Unique Recording Studios) in "The Hair Club for Men" — the unofficial name for his project studio. Photo by David B. Hollingsworth.

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What's a composer, recordist, performer, and father of twins to do in order to get a handle on his busy life? Build a project studio, that's what. Hornsby reveals the secrets of his home studio and the recording techniques behind his latest release.
- CD FUN**60
With decreasing prices and more models available, it seems as though recordable CDs will find their way into many project studios. In this section, Kodak engineer Bill Mueller tells everything you need to know about the Red, Yellow, Orange, and Green Book standards, letting you write CDs that can be used everywhere. This section also contains Roger Nichols's reviews of the Revelation Zip CD-DA and Pinnacle Micro RCD-1000 CD-R machines.
- TANNOY AMS-10A STUDIO MONITOR AUDITION** *By Wade McGregor*74
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World Radio History



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LETTERS TO EQ

PERFECT HARMONIA?

I just wanted to correct a statement my good friend Roger Nichols made in the August issue on page 73 in his review of the SADiE DAW. (Where *does* Roger get all the time to evaluate these things? He does a great job.)

Roger claims that the SADiE is "[the] only PQ editor that will place track IDs on audio-only CD-R units. Will also put start IDs on DAT tapes."

Well, I have been using the German Harmonia Mundi PQ Junior/Senior PQ editor since I opened Gateway over 2-1/2 years ago, and every day I have used the Harmonia Mundi PQ editor to do (guess what?) put start IDs on both CD-R and Pro DAT machines.

By the way, we own a ton of Mac-based Sonic Solutions gear, but the SADiE is my PC-based editor of choice when one wants to do only the things it does — which is a lot!

*Bob Ludwig
President*

*Gateway Mastering Studios
Portland, ME*

WE KNEW HE'D SAY THAT

Here I am pouring over sketchy "marketing" ads and downloading product descriptions, when I see the mailman pull up out front. I take a quick research break to check the post and what do I discover but my August *EQ* with a review of 15 DAWs. How'd you do that? And just moments before I reached for the phone to order. Thanks. Talk about reading your readers minds!

*The Crocodile Man
Digital Voodoo, Inc.
via America Online*

NOBODY'S PERFECT

In his series "What Happened to My Tapes?" Roger Nichols claims CD-R to be the "perfect format for data reliability and long term archiving." The fact is there is no perfect format for long term storage. Pressed CDs with molded impressions promise to offer the best storage so far, but they are not recordable. CD-Rs that are recordable are not the same: CD-Rs use special dyes to record data. There are two different types of dyes and differing quality levels of each. Some CD-Rs are having difficulty with uncorrectable errors, and

anyone counting on them for perfection may end up finding himself or herself with lost data once again.

The perfect medium for archiving has not yet been found, but there is a method to reduce risk to a minimum — but Mr. Nichols unfortunately slammed it. His recommendation is contrary to what many other engineers and experts both recommend and follow as a practice.

Analog and digital differ in terms of quality. Analog can vary in a range from excellent to terrible quality. When analog errors arise or deterioration (due mainly to improper storage or handling) is noticed, the problem can usually be repaired. Digital editing techniques excel these repairs because analog problems are somewhat predictable. Digital is different. Digital quality is either "perfect" or useless. Digital expects errors and corrects them up to a point. When deterioration or damage exceeds correctability, the results are often catastrophic. While analog uses a lot of space for storage, digital follows the modern trend to use high-recording densities to pack more information in smaller areas despite increased risks. If signals are stored in long wavelengths on large tracks and wide tape, any physical damage will destroy relatively little of the recorded signals. That can make analog signals fairly easy to reconstruct. If signals are stored in very small tracks on a very small medium with very high density, physical damage can wipe out an enormous amount of irreplaceable information.

Of course, artists do not want digital masters archived "on analog tape that is going to start deteriorating the second it is recorded." No one wants to use either defective tape or defective optical media. The fact is, a well-made analog tape should not see any change at all in its sound quality other than print-through if it is stored and handled properly. What print does occur can be reduced on playback if stored tails out.

BASF made the first tape recordings 60 years ago. Those tapes sound better today than they did then because of better heads and electronics. The tape itself is in excellent condition. The same is true of vast libraries of tapes from the '40s and '50s on through to recordings made last week. The "tape deterioration" horror stories are not tape problems.

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With our new Powerstation we've designed much more than just another powered mixer. Not only have we eliminated the need for a separate power amp, but we've built in one of the highest quality digital reverb units available today. The Powerstation provides everything you need between stage and speakers in a single package.



LEXICON PROCESSOR - The most respected name in digital effects, gives you a carefully selected range of unique effects that will enhance your creative control.

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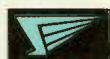
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CIRCLE 54 ON FREE INFO CARD

They are formulation problems from two manufacturers who have not had binder problems, and those who did have since corrected the problem. Tape is perfectly suitable as a medium for archiving — and 60 years is some indication of that reliability.

Until digital technology is designed for minimum risk rather than minimum size, it makes perfect sense to backup either digital or analog masters to analog tape because of the reduction of risk involved. Analog

problems are different from digital problems. Reissued CDs should be mastered from digital masters, of course, if they exist. If digital masters have uncorrectable errors, they can be patched from the analog master with a little digital editing. If the digital master is a low-density medium, it has a better chance of avoiding uncorrectable errors. A high-density digital medium such as DAT is a very risky choice for archiving. The least risk for archiving is using both a low-density digital medi-

um and analog tape recorded at high speed to decrease wavelength density.

Some, but not all, CD-Rs are predicted to have a life of 267 years. This is a guess. Analog tape has lasted 60 years so far without deterioration. That is a fact. There have been some bad tapes, and there are some failing CD-Rs. There is no perfect medium; but applying the laws of physics, mathematics, and chemistry to real-life experiences has led the technical experts at Polygram, A&M, and Motown, as well as others, to the decision to backup their vault treasures to analog tape. If anyone is getting a "major slap in the face," it is these experts who have been told that their decision is foolish. Depending entirely on CD-Rs without backing them up with other digital or analog media is once again exposing valued recordings to risk in an imperfect world.

Terry O'Kelly
BASF

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SHAQING OMISSION

In your story on Shaquille O'Neal's studio design and equipment (August, '95), the Moog tone module that is mentioned on page 52 and pictured on page 54 is in fact the Studio Electronics SE-1 "ultimate bass and lead synth." The SE-1 is a fully programmable monophonic analog synthesizer that uses authentic circuits of the MiniMoog and Oberheim S.E.M. filters. It holds 198 patches, and is the premier analog synthesizer for R&B and rap retro bass and lead sound.

Marc St. Regis
Studio Electronics
Encino, CA

LEARNING EXPERIENCE

Re: August 1995 Microphone column "Vintage Neumann"

Whenever an issue of EQ magazine
continued on page 138

WRITE TO US

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A REAL FIND

Q I found a couple of microphones while digging through some old boxes. I was hoping you could tell me something about them.

The AKG D130E looks like it is in good shape and it sounds all right to my untrained ears. Is it worth keeping and using? The E-V Model 642 Cardioid Microphone looks like a Flash Gordon ray gun. I have the case and specs for this one, but does it have any value?

Tim Underhill
Electronic Media Coordinator
Ball State University
Muncie, IN

A Don't throw either mic away! The AKG D130E is an excellent quality omnidirectional microphone that can be used for many different recording and live applications. The D130E was recently replaced by the D230, which is primarily used for broadcast field interview work.

The D130E, like other omni mics, has extremely flat frequency response and exhibits virtually no proximity effect. Vocal quality will be smooth and natural. The tradeoff, of course, is susceptibility to feedback in any live situation. This mic is best suited for studio or field recording, and since it is a dynamic in a very solid case it can take a real beating without incurring any real damage. This mic will last you a long, long time.

David Rahn
AKG Product Manager
AKG

A The Electro-Voice 642 was introduced in the 1950s, and from its wild-looking shape, you might think it followed the automotive designs of the day. The fact is, however, that its design is strictly "form follows function."

The 642 was a cardioid microphone designed for pickup of distant sound sources. Its long barrel gave the mic excellent directional characteristics above 500 Hz. The 642 won an Academy Award in 1963 for its contribution to the art of sound for movies.

Common applications for it included miking of musicians, choirs, or speakers on a stage. It also was widely used in TV production where it was suspended from a boom above the heads of the performers, who hated the large lavalier mics of that era.

The 642's frequency response was 30 Hz to 10,000 Hz. It had a two-position, low-frequency roll-off switch, which gradually reduced the bass frequencies by 5 or 10 dB at 30 Hz. It also had three switch-selectable impedances: 50, 150, and 250 ohms. The polar response patterns shown on the data sheet are text-book perfect cardioid patterns. The "Cardiline" design (U.S. Patent 3,095,484) was very effective in its intended purpose.

Although not nearly as lucrative to collect as vintage musical instruments, older mics do have value. In my travels around the country I meet many collectors of older microphones. One such collector is Nils Anders-Erickson of Rainbow Recording Studio in Omaha, NE. He has several dozen interesting pieces. He estimates the value of the 642 from \$50 to \$250, based on condition. The microphone sold for \$270 when it was discontinued in 1972.

Mike Torlone
Director of Music Marketing
Electro-Voice

QUICKENING PULSE

Q From what I've seen, most sequencers are limited to 480 pulses per quarter note resolution. Since computers are getting faster, why not increase the resolution (to 960 or even higher) to capture all the subtleties in a musical performance?

Chris Hyde
via America Online

A MIDI is not infinitely fast, and is limited to transmitting (or receiving) a maximum of approximately 1000 pieces of data per second. Therefore, at 125 beats per minute — a typical tempo for dance music — MIDI can transmit a maximum of about 480 events per beat.

Sequencers can record or play back an event every time a clock pulse occurs; the number of clock pulses per beat specifies the sequencer's resolution. In the case above, a sequencer with 480 clock pulses per beat can record the maximum number of

events MIDI can transmit during one beat. At slower tempos, there is more resolution than needed. At faster tempos, higher resolution may seem desirable; however, this places more demands on the host computer. In many cases, any advantage of using higher resolution is offset by increased computer timing "jitter."

Furthermore, in most cases MIDI's main bottleneck occurs at the instrument itself, not the computer or sequencer. It can take 3–20 milliseconds from when a keyboard receives a MIDI note-on message to when it actually plays the note.

Craig Anderton
Technology Editor

CLASS PROJECT

Q I am a University of Miami Audio Engineering student doing some installation work on campus here. The job I am doing requires a number of self-contained, single-microphone preamplifiers. I was wondering if your staff knows of any manufactured devices like this. I have researched this topic with local dealers, and have had no luck.

I will probably have to make these preamps myself, considering the only single preamplifiers I have encountered are way outside my budget since they have been made for high-quality field applications. The preamps are for amplifying the signal from a medium-grade consumer mic (speech only). Would you guys be able to fax me a schematic of such a device, with a list of the parts needed, also including manufacturers?

I know I am probably asking a lot, but I haven't been able to find much on this subject. Even if you could refer me to a book with such designs it would be greatly appreciated.

Justin Baird
via America Online

A Whew! You've set yourself up for a jumbo project. You're correct in stating that there aren't many affordable single-channel mic preamps on the market. Our own searches found several excellent single-channel units, including a few that could be labeled affordable. API, CKB Electronics, dbx, Gaines, Rane, Studio Technologies, Summit Audio, Symetrix, and Sytek Audio all make mono and/or dual-channel units for under \$750. Rane offers the

"The ProMix 01 gives me the flexibility to control all the elements of a show from my computer. Superb sonic quality and remarkable features, you just can't beat it."

- Stan Miller, Sound Designer,
Neil Diamond Tour

"I bought four of them for the Steely Dan Tour, and I haven't shut up about the 01 yet."

- Roger Nichols, Engineer, Steely Dan

"Bottom line, the ProMix really does live up to all the hype. It's very quiet, it sounds great, it operates very cleanly." "One of the most amazing introductions in years."

- Recording Magazine, October 1994

"I did my latest project on the ProMix. And it's one of my best sounding yet. The ProMix 01 is really great!"

- Hans Zimmer, Composer, The Lion King

"ProMix 01 stands every chance of becoming a landmark product, changing the way a lot of people currently work."

- Studio Sound And Broadcast Engineering, July 1994

"We're not normally violent, but in this case, we're willing to make an exception. We're not letting this mixer go."

- Mix Magazine, November 1994

WITH WORD-OF-MOUTH LIKE THIS, WHO NEEDS AN AD AGENCY?

"Premium
the trimmin's
through

Songwriter/Musician

"As a sound designer, I create illusions. Yet, the power and flexibility of the ProMix is no illusion. It most certainly contributes to the prestige of Machine Head."

- Stephen Dewey,
Sound Designer/Founder, Machine Head

"After working with ProMix 01, I am convinced its sound, quality and flexibility rivals that of mixing consoles costing many times more."

- Calvin L. Harris, Engineer/Producer -
Lionel Richie, Diana Ross, Stevie Wonder

"My two ProMix 01s store all the parameters of my mix and play it back exactly as I heard it at the moment of creation. More importantly, they sound great!"

- David Schwartz, Composer for Northern Exposure

"Yamaha has done it again, just as it did in the early '80s with the DX-7 keyboard. It has created a cool piece of gear that does more, does it better, and costs less."

- EQ Magazine, December 1994

"It took Yamaha to create a brilliant sounding digital mixer with full MIDI control. I have no doubt that the ProMix 01 will quickly become an industry standard."

- Jeff Boca, Keyboardist/Arranger/Composer -
Vanessa Williams, Robert Palmer

"Clean, quiet, powerful. The best words I can think of to describe the ProMix 01, the latest addition to my toolbox."

- Tom Jung, Producer/Engineer/President, DMP Records



If you think the ProMix 01 sounds good here, wait 'til you hear it in action. Call our 800 # and send for your free CD of The ProMix Sessions, produced and engineered by Tom Jung, President of DMP Records. Our ad agency thought we needed to say something clever here, but we told them we had enough opinions already. To order your CD, call 1-800-937-7171, Ext. 450.



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model MS1 for \$189. You should pick up EQ's March 1994 issue for a good view of the state of the preamp. The article also features a buyer's guide.

I asked EQ's technology editor, Craig Anderton, and Mr. Maintenance, Eddie Ciletti, to provide some tips you should follow when installing your system. Craig asks that you log onto America On Line for a tube preamp schematic. Simply use Keyword "SSS." Go to the "Articles and Information Collection" in the Do-It-Yourself folder. Download the "95/04 Tubehead Starved Tube Preamp." This is a full schematic from PAIA featuring a dual-channel tube preamp.

Ed Ciletti advises that you pay particular attention to the potential RFI/TVI problems. [Also, he feels the PAIA project "may be a bit much for a first-time project. It combines a tube with op amps and is more of a clean vs. distorted crunch box than a straight-ahead preamp. It doesn't actually show how one might use it as a mic pre because there's no transformer — unless the Radio Shack type, spec'd below, is used..." But go ahead, download it and check it out.] Here are Ed Ciletti's RF-proofing tips.

1. Use a metal chassis.
2. Use metal, not plastic-insulated, jacks. If the input and/or output is unbalanced, use a quarter-inch jack with a metal bushing.
3. Transformer-input designs might be less prone to noise. Using a low-Z/hi-Z transformer such as the Radio Shack 274-016 is a cheap and dirty way to get started. That followed by almost any single IC dual op amp circuit with adjustable gain will work — at least to demonstrate the concepts of building/experimenting/tweaking a circuit for a specific application.

4. Keep wires short.

5. If the power supply is external to the chassis, use a pair of caps (10 μ F and .1 μ F) across the power supply legs to ground at the point of entry.

Good luck with your project.

Hector G. La Torre
Executive Director

Send your queries to:
EQ Editorial Offices,
939 Port Washington Blvd.,
Port Washington, NY 11050
E-mail: EQMagazine@AOL.COM



Here's five hot plugs for **Vortex & JamMan:**



Duran Duran guitarist **Warren Cuccurullo** uses a pair of JamMan processors on the new Duran Duran album, "Thank You". They are also prominently featured on his forthcoming solo album, "Thanks to Frank."

"My whole rack has been designed around the two JamMan processors. These things make music!"

David Torn has been extending the guitar's sonic boundaries for many years. In the 1994 Readers' Poll in Guitar Player Magazine, he was voted "Best Experimental Guitarist". Lexicon processors have always been an essential ingredient of his unique soundscapes and are evident on his new album, "Tripping Over God." **"JamMan has become one of my very best friends, and Vortex is a benignly psychotic visitor from another planet."**



Michael Manning shocked the bass world in 1994 with his daring release, *Thank*. This record helped him win the "Bassist of the Year" honors in Bass Player Magazine's Readers' Poll. A longtime fan of Lexicon processors, Manning has recently begun to experiment with JamMan and Vortex, taking his solo bass flights into hyperspace. A new album is due in 1995.

"Vortex and JamMan offer an immense range of exciting new creative possibilities."

Now plug one in yourself.

It's no secret that **Lexicon digital effects systems** are used by most of the world's recording studios, and by many top performers. Lexicon's **Performance Series** effects processors are also affordable, and they're also used by the world's leading-edge musicians. Like these players and many, many more. So why not check 'em out for yourself?



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Leni Stern is widely regarded as one of the finest composers on the scene today. Her pristine guitar sound has been called "remarkable" and "fluid" by *Musicians Magazine*. A new solo album, "Words", is due in mid-1995.

"JamMan has become an essential composing tool, as well as a welcome addition for live performances — and I'm getting some great new sounds from Vortex."

Grammy Award-winning composer/trumpeter/keyboardist **Mark Isham** has used Lexicon products for years. JamMan and Vortex have added to his unique palette of sounds, taking his distinctive, ethereal trumpet sound into fascinating new realms. Isham stays busy with major film scores, including a forthcoming soundtrack album for the film "Waterworld."

"Impressive. Really impressive. Vortex and JamMan really give space and depth to my sound."

24x4x2...SWEPT MIDS...PFL/AFL...6 AUX NOW SHIPPING: MACKIE'S SR24-4, THE

GREG MACKIE DID IT AGAIN... The new 4-bus SR24-4 is the first live sound console with the **high headroom**, low noise and superb sound quality that have established our **8-Bus console** series as an industry standard.

That's because the SR24-4 is a **direct descendent** of the 8-Bus and is equipped with many of the **same features**, components and circuitry.

Through **economies** of materials and manufacturing processes, we're able to offer the SR24-4 at an astonishingly **low price**.

Call us toll-free for **full information**. Better yet, visit your nearest Mackie dealer. The SR24-4 is **in stock right now**.

VLZ (Very Low Impedance) circuit design developed for our 8-Bus consoles reduces noise and crosstalk at critical points in the SR24-4's signal path.

CHANNELS 1-20 are mono with 3-band EQ, 1/4" TRS balanced line inputs and Mackie's renowned, high-headroom, low-noise mic preamps.

SWEETENABLE MID EQ from 100Hz to 8kHz, 1.5 times wider bandwidth than other consoles for more musical equalization. 15dB boost/cut.

-20 SIGNAL PRESENT LED on every channel.

80Hz LO SHELving EQ. Even at ± 15 dB, it doesn't interfere with mid EQ the way many shelf EQs do.

New-design **60MM FADERS** with the same precision, log-taper as our 8-Bus consoles give you more useful control range than cheaper, D-taper faders. SR24-4 faders use a recently-developed, long-wearing wiper contact material first employed in sophisticated automotive sensors. You'll get longer fader life and improved resistance to solid and liquid contaminants that inevitably get into live sound boards.

SOLO/MUTE LED on every channel (plus our mondo master rude solo LED over in the master section).

HI SHELving EQ with 15dB boost/cut at 12kHz. Designed with the same circuitry as our 8-Bus Hi EQ, it won't interfere with mid EQ.

LOW CUT FILTER with 18dB/octave roll-off at 75Hz just like on our 8-Bus console. Gets rid of room rumble, wind noise and mic thumps — which can save amp power, too. Also allows you to safely use Lo EQ on vocals — the audible bass range is boosted but the unwanted frequencies below 75Hz (like microphone handling noise) are chopped off. Also very useful for miking during studio recording.

INSERTS on every mono channel and subs as well as main L/R outputs.

The **MOST COMPACT 24-CHANNEL** live sound console ever!

At 30.75" wide, the SR24-4 takes up less space than most 16-channel live sound boards, yet its controls are still spaced so that they're easy to use.

Mackie's renowned ultra-high headroom **MIC PREAMPS** on Channels 1 through 20. -129.5 dBm E.I.N., ultra-wide bandwidth and 0.005% distortion. The same Mackie mic preamps top artists and groups are using to track their current albums.

Not shown but definitely there: The usual Mackie **INTERNAL FEATURES** like impact resistant, double-thru-hole-plated fiberglass circuit boards, sealed rotary controls, gold-plated interconnects, RFI rejection, electronic protection and ultra-high headroom mix amp architecture.

SENDS...8-BUS SOUND QUALITY...\$1599* MSRP. BEST LIVE SOUND CONSOLE VALUE EVER!

CHANNELS 21-24 are stereo line input channels with Hi & LO shelving EQ plus 2 peaking Mid bands.

6 MONO AUX SENDS per channel, ALL accessible at any time. Aux 1 & 2 are pre-fader; 3 & 4 are switchable pre/post; 5 & 6 are post-fader.

Balanced 1/4" TRS OUTPUTS.
PHANTOM POWER switch.

Balanced **XLR MAIN OUTPUTS** with +28dB capability.

AUX SEND MASTER level controls with Solo switches.

BNC Lamp socket.

3-WAY METERING shows internal operating levels

of main L/R, solo (channel, bus, Aux send or Aux return) or stereo tape return. -40 to +28 range with marking for easy, accurate level setting via solo.

PFL or SOLO IN PLACE. Globally switchable Pre Fade Listen (for checking a signal at full level before fader or pan) or stereo Solo In Place/AFL (after ch. fader, EQ & pan).

TALKBACK section with separate rear XLR input (so you don't tie up a channel), level control & assign buttons to send Talkback to main mix or to Aux 1 & 2 for stage monitors.

TAPE RETURN TO MAIN MIX not only routes Tape Returns to Main L/R outputs but also disables all other inputs to the mains. This feature enables you to play a tape or compact disc during intermission without losing channel and submaster settings.

BALANCED INPUTS & OUTPUTS. Important, but really hard to point to with a yellow arrow.

Bal. **"DOUBLE-BUSSED" SUB OUTS** let you feed an 8-track recorder without repatching.

HEADPHONE OUTPUTS on the back so that headphone cords can't snag faders.

Bal. **STEREO AUX RETURNS** also feed Aux Sends 1 & 2 via separate controls so you can return delay or reverb to stage monitors.

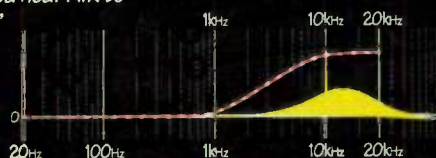
Balanced **MONO MAIN OUT** with separate output level control.

AUX RETURN 4 can be assigned to main L/R, Submasters 1 & 2 or Submasters 3 & 4.

HOW DID WE DO IT? There is no "catch." The SR24*4 is built without compromise and features solid steel main chassis, sealed rotary controls and our famous impact-resistant horizontal circuit board design. We've drop-tested, drop-kicked and "beta-tested" the SR24*4 with local grunge-thrash bands for months before release. This is one tough mixer.

***THE USUAL FINE PRINT.** Price is U.S. Suggested Retail only. Slightly higher in Canada.

FACTORY "AIR" on each submaster! A unique peaking equalization circuit for enhancing guitars, vocals, drums — and sound reinforcement speaker systems themselves. Centered at 16K, AIR applies a gentle boost to the extreme high end without affecting lower treble octaves like Hi shelving EQ does (red line). You've gotta hear AIR to believe the "hi fi" effect it has on PA systems, with horns and compression drivers.



drives two stereo Phone outputs and Control Room output on rear panel. Switch can route stereo Tape Return to Phones/Control Room for monitoring 2-track recording. **SUBMASTER FADERS** have Pan controls, L/R Assign & Solo switches.

PHONES/CONTROL ROOM level control

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EQ AES PREVIEW

It's coming...and it's going to be big. We're talking, of course, about this October's AES Convention — the place to be to see the latest product introductions and see what the future holds for audio production. Here's a sneak peek at what's going to be on the show floor.

CLASS MONITOR

Westlake Audio will show its new Lc 6.75 studio reference monitor at the show. Its rugged cabinet incorporates an aligned, dual-port design that houses a 6-1/2-inch polypropylene woofer and a 3/4-inch soft dome tweeter. The Lc 6.75 delivers sound over a bandwidth of 60 Hz–18 kHz ± 3 dB. The pair lists for \$999. For more information, contact Westlake Audio, 2696 Lavery Court, Unit 18, Newbury Park, CA 91320. Tel: 805-499-3686. Circle EQ free lit. #101.



...AND IT WAS GOOD

The Korg Trinity Music Workstations DRS (Digital Recording System) Series consists of four keyboards, all of which have an 80,000-note, 16-track MIDI sequencer. An optional hard disk recording board enables the 61- and 76-note instruments to record directly to an external hard drive at 48 kHz, and provides SPDIF I/O, 4-track playback, automated levels and panning, plus synchronization to their onboard MIDI sequencers. Each member of the Trinity family sports a new tone-generation system operating at 48 kHz. This system employs 24 MB of PCM ROM yielding a total of 256 programs and 256 combinations created with 375 new Multisounds and 258 new drum samples. For more details, contact Korg, 89 Frost St., Westbury, NY 11590. Tel: 516-333-9100. Circle EQ free lit. #102.



GIVE US AN "H"

Demeter will introduce its new "H" Series midline tube pro audio gear at AES, and it is aimed at project studio owners. The "H" Series will consist of several components: a stereo EQ, a two-channel compressor/limiter, a two-channel mic preamp, and a one-channel compressor/limiter and mic preamp (all in one). Utilizing tubes in a hybrid technology, the "H" Series performance will rival those of Demeter's current line of pro audio gear and will retail at approximately half its price. For more details, contact Demeter Amplification, 2912 Colorado Ave. #204, Santa Monica, CA 90404. Tel: 310-829-4383. Circle EQ free lit. #103.

IN THE HOUSE

Hot House will heat the AES up with its new SDX electronic crossover designed for its High Output Series monitors. The SDX is a 24 dB/octave crossover affording two- or three-way stereo, four- or five-way mono, and discrete four-channel biamp operation from a single rack space. Ultra-high frequency or constant directivity compensation circuits and insert points are both standard features. Available optionally on all individual outputs are limiters, fully parametric two-band EQ, low-frequency contour, and infrasonic or all-pass filters. The SDX has the ability to be custom-tailored to meet any specification from critical studio monitoring to high-end reinforcement. For more details, contact Hot House, 275 Martin Ave., Highland, NY 12528. Tel: 914-691-6077. Circle EQ free lit. #104.



PLAY HARD (DISK) BALL

Vestax will introduce its HDR-8 eight-track hard-disk recorder at AES. The unit includes a built-in digital mixer for fully digital recording. Two fully parametric digital EQs for each track allows users to adjust between high/low shelving or peaking, with both bands capable of covering the full range of frequencies. Flexible production is achieved through the full edit function, allowing the option to insert, overwrite, move, copy, or delete sections. The HDR-8 is totally MIDI compatible, synchronizable, and expandable with only an optical cable. Other features include auto punch in/out with undo function, auto location for instant access, and real-time pitch control. For the whole story, contact Vestax, 2870 Cordelia Rd., Suite 100, Fairfield, CA 94585. Tel: 707-427-1920. Circle EQ free lit. #105.



REAL CRAFTY

Soundcraft will launch the DC2020 surround sound console at the AES. The console offers straightforward connection to four-, five-, and six-channel systems with integrated monitoring, routing, and dual LCRS panners. Processor-controlled Replay/Direct switching, calibrated monitor level adjustment, and assignable Cut groups add to its flexibility. The DC2020 Surround, available in 24-, 32- and 40-channel inline formats (with or without patchbay), boasts 4-band split semi-parametric EQ, six auxiliaries, and Soundcraft's "floating bus" architecture. The C-3-based automation system encompasses motorized faders, SMPTE-driven automated cuts and aux sends, and integrated machine control for audio multitracks and Sony 9-pin VTRs. Prices begin at \$31,950. For more info, contact Soundcraft, 8500 Balboa Blvd., Northridge, CA 91329. Tel: 818-830-8278. Circle EQ free lit. #106.



CA-LLING CREST

Crest will be showing its CA Series of amplifiers at AES. These amps offer power specifications of 450 (CA4), 600 (CA6), 900 (CA9), and 1200 (CA12) watts per channel into 4 ohms. Advanced technology and extensive protection features allow all CA models to operate with great efficiency under difficult power conditions and 2-ohm loads. Two variable speed DC fans provide cooling. For more details, contact Crest Audio, 100 Eisenhower Dr., Paramus, NJ 07652. Tel: 201-909-8700. Circle EQ free lit. #107.



FOR THE RECORD

Ampex Media will roll out two new lines of recording products — the CDR series and 472 studio audio cassette series. The CDR series of recordable discs is compatible with all CD formats, including CD-Audio, CD-ROM, Extended Architecture CD-ROM XA, and CD-Interactive formats, and also conforms to the Orange Book Standard and ISO9660 technical specifications. Available in 63-minute/580 MB and 74-minute/680 MB configurations, the CDR series can be used in a broad range of applications. These CDRs are certified for use on high-speed recording drives that record at 2X, 4X, or even 6X normal play speeds. The new 472 high-bias IEC type II analog studio cassettes will be available in 10-, 20-, 30-, 45-, 60-, and 90-minute configurations. The 472's dual-coated pure chromium-dioxide IEC type II tape formulation offers improved high-frequency response and S/N response. For more details, contact Ampex Media, 401 Broadway, M/S 22-02, Redwood City, CA 94063. Tel: 415-367-3809. Circle EQ free lit. #108.



EQ AES PREVIEW



THE GREAT WHITE INSTRUMENT

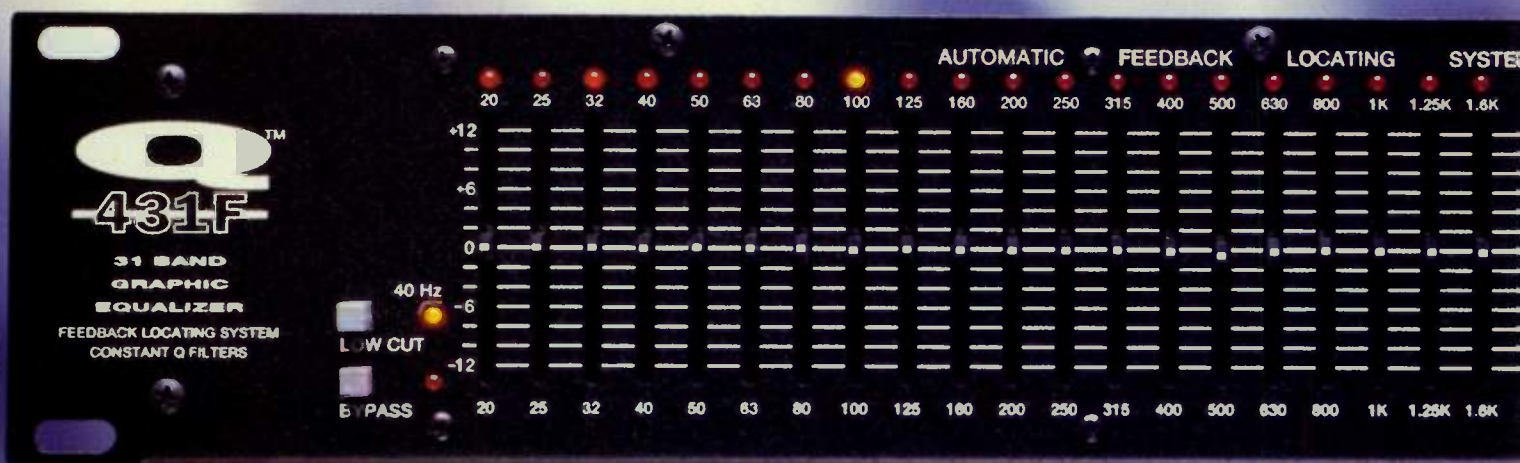
White Instruments will feature its DSP5024 signal processor with crossover, parametric EQ, and delay functions. No computer is needed because all controls are right on the front panel. There's also no need to rely on battery back-up power since all parameters are stored in EPROM. The DSP5024 features Butterworth, Bessel, Linkwitz-Riley crossovers for 2-, 3- or 4-way configurations at 6-, 12-, 18-, or 24-dB/octave crossover points. The parametric EQ has 35 center frequencies from 20 Hz–20 kHz, adjustable in 1 cycle increments. For more details, contact White Instruments, 1514 Ed Bluestein Blvd., Austin, Texas 78721. Tel: 512-389-1515. Circle EQ free lit. #109.



THIS IS A TEST

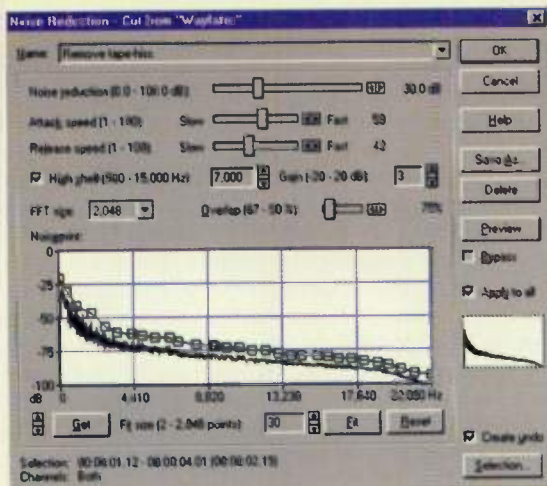
Audio Precision will be showing the full production version of the new System Two 2322 Dual Domain Audio test set. The unit, unveiled in prototype at the European AES, features full digital interface measurement capabilities according to the AES 3 standard, as well as high analog performance. For more information, contact Audio Precision, P.O. Box 2209, Beaverton, Oregon 97075. Tel: 800-231-7350. Circle EQ free lit. #110.

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PLUGGED IN

For use with its Windows sound editor, Sound Forge 3.0, Sonic Foundry has designed a Noise Reduction plug-in. It is designed to analyze and remove background noise such as tape hiss, electrical hum, and machinery rumble from sound recordings. Sonic Foundry boasts that this plug-in reduces noise with minimal effect on the source material. During processing, the Noiseprint is used to distinguish between "noisy" and "clean" signals, while preventing attenuation of favorable frequencies. The Noise Reduction plug-in includes a Click Removal tool that detects and removes clicks and pops for use in the restoration of vinyl recordings. This tool also allows either manual or automatic glitch replacement. Noise Reduction and Click Removal install separately under the "Tools" section of Sound Forge. The Noise Reduction plug-in is the first in a series of plug-ins to come in the next several months from Sonic Foundry. Retail price is \$249. For details, contact Sonic Foundry, 100 South Baldwin, Suite 204, Madison, WI 53703. Tel: 608-256-3133. Circle EQ free lit. #111.

MIRACLE MILES

Miles Technology's MTI-3 TriSonic Imager is a system for enhancing 2-channel stereo sound quality through the use of three loudspeakers, or loudspeaker clusters.

With Miles' patent-pending TriSonic Imaging, the MTI-3 takes center-panned sound sources from the mix, such as lead vocals or a kick drum, and reproduces them in the center channel. Accordingly, side-panned sounds radiate unmasked from the side loudspeakers. The result is an increased optimum stereo listening area, as well as better vocal intelligibility. The unit also includes two surround outputs for high-fidelity ambience extraction or for conversion to mono sends. For more information, contact Miles Technology, 70 N. St. Joseph, Niles, MI 49120. Tel: 800-280-8572. Circle EQ free lit. #112.



THE Q 431F EQUALIZER WITH AUTOMATIC FEEDBACK LOCATING SYSTEM



the other LED. • The Constant Q filters control slider frequency-band width so slider adjustments won't affect adjacent slider frequencies. Constant Q filters also improve headroom at high cut/boost levels. Compare to other EQs using inferior gyrator circuitry which doesn't limit band width.

\$299.99

- 31-bands of 1/3 octave graphic equalization, standard ISO centers, +12dB cut/boost.
- Low cut filter and Bypass switches with LEDs.
- 20Hz to 20kHz bandwidth.
- Independent overall gain control.
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EQ AES PREVIEW

GETTING THE X

What do you get when you combine direct digital linkup with ADAT, RD-8, and DA-88 recorders, total recall and dynamic automation, internal 24-bit DSP, and expandability? RSP's Project X recording console. Before expansion, Project X has 32 channels, 16 recording busses with six groups and eight auxiliaries, and, if desired, Project X can be expanded to 64 channels. Audio signals, the power supply, and other processor functions are rack-housed (eleven spaces) from the control surface. There is total recall and dynamic automation that is available to every function on Project X, and every channel contains a read/write/update switch for convenient automation access. The on-board memory will store up to 30 minutes of final mix information and can be downloaded to any standard sys ex storage device. Each channel has its own programmable gain, HUSH® single-ended noise reduction, gating, compression, 4-band parametric EQ (pre- or postcompressor assignable), and offset delay. For details, contact RSP Technologies, 2870 Technology Drive, Rochester Hills, MI 48309. Tel: 810-853-3055. Circle EQ free lit. #113.



ON CUE

Furman Sound will introduce its upgraded line of headphone cueing equipment for recording studios at AES. The SP-20A stereo power amp, a half-rack unit, provides 20 watts per channel and is used to power nearfield monitors, as well as headphones. The HA-6A headphone monitor/amplifier, a single-space rack unit, is designed to power up to six stereo headphones and nearfield monitor speakers, with 20 watts per channel. The front-panel provides six stereo headphone jacks, each with its own volume control and switches for two sets of speakers. The HA-6A and SP-20A both feature a new toroidal transformer that eliminates electrical hum, mechanical noises, and leakage. Also redesigned is the Furman HR-2A headphone remote station, which is a compact box that clamps to a microphone stand and provides two headphone jacks, each with its own volume control. Any number of HR-2A stations may be connected to the HR-2A, HA-6A, or SP-20A using standard mic cables. For all the facts, contact Furman Sound, Inc., 30 Rich St., Greenbrae, CA 94904. Tel: 415-927-1225. Circle EQ free lit. #114.

AUSSIE AMPS

ARX Systems will show off its SX300 power amplifier. Specifically designed for applications with lower output requirements, the SX300 offers the same features as the other members of the SX series, with a power output of 150 watts per channel into 4 ohms and 100 watts per channel into 8 ohms. This amp comes standard with ARX's exclusive "Ultrafin" heatsink, toroidal transformer-based extreme duty power supply, dual fan cooling, balanced inputs, and relay-based DC protection and muting. For more details, contact ARX Systems, 9400 Culver Blvd., Suite 207, Culver City, CA 90232. Tel: 800-ARXSYST. Circle EQ free lit. #115.




CAN YOU SPARE A DYM?

Electro-Voice is adding the new N/D157B to its line of N/DYM microphones. The N/D157B boasts excellent sensitivity and signal-to-noise ratio, making it good for studio or stage applications. Besides the tough, hard-shell road case, this mic has a WarmGrip handle for added comfort and noise insulation, as well as a dent-resistant Memraflex grille screen. Its special elastomeric shock-mount ensures low-handling and cable-transmission noise. For further details, contact Electro-Voice, 600 Cecil St., Buchanan, MI 49107. Tel: 616-695-6831. Circle free lit. #116.

THE PRE'S COME OUT AT NIGHT

Night Technologies will announce its new NightPro PreQ3 mic/line preamplifier at AES. The PreQ3 offers wide frequency response, low noise, wide dynamic range, and a unique selectable frequency Vari-Air™ Air Band control. Other features include input polarity reversal, mic/line switch, 48 V Phantom power, and a 20 dB pad. There are four independent channels in a standard 19-inch, 1 U package with an ergonomic layout and function display. The tentative list price for the PreQ3 is \$2495. For further information, contact Night Technologies, 1680 West 820 North, Provo, Utah 84601. Tel: 801-375-9288. Circle EQ free lit. #117.



If you feel like

we've met before,

it was probably

in your dreams.

Imagine, for a moment, you enter your studio. As you begin to work on your latest masterpiece, you become more creative. More productive. And the world becomes your oyster.

If any of this sounds familiar, you're either having another nocturnal vision at R.E.M. speed or you've been working on a Studioframe™, the most intuitive system you can get your hands on.

With Studioframe, you'll have the confidence of single screen editing, so all the information you need will be on screen at bullet speed. It also comes with 8-16 or 24 track record/play simultaneous outputs and the DSC-100 Edit Controller, our dedicated user interface. All of which allows you to become one with your machine — not to mention the creative process.

We could go on about Studioframe, but it would be a lot more productive if you simply tried one for yourself. And stop dreaming about it. For more information or a demonstration, call (619) 727-3300 ext. 3038 or FAX us at (619) 727-3620.



Studioframe™ by TIME/LINE
London, New York, Los Angeles and a place called Vista.

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EQ AES PREVIEW

THE C'S HAVE IT

The new Crown CM-700 compact cardioid condenser microphone provides high sound input without use of an internal pad. Rugged enough for the road, the CM-700 is also ideal for studio music, acoustic instruments, and drum overheads. The mic can handle loud sounds

without distortion and incorporates protection from static and RFI. The CM-700's balanced output and low impedance permit long cable runs without high frequency loss or hum pickup. Users will appreciate added touches such as the ultralight diaphragm, humbucking transformer, polycarbonate capacitors, and a gold-plated 3-pin connector. For further details, contact Crown International, 1718 West Mishawaka Rd., Elkhart, IN 46517. Tel: 219-294-8000. Circle EQ free lit. #118.

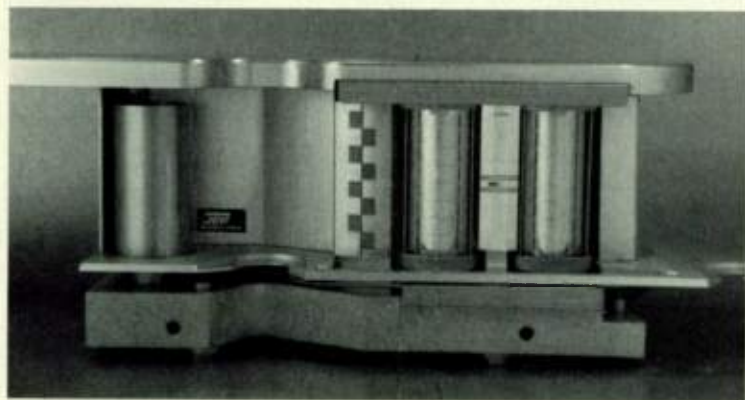


EIGHT TO GO

The Fostex DMT-8 is a portable 8-track hard-disk recorder/mixer/editor that features CD-quality, 16-bit recording to an internal hard drive, fluorescent metering, dedicated nondestructive cut/copy/paste editing keys, a user-friendly interface, jog/shuttle wheel, two bands of sweepable EQ, and 16 channels of mixdown. The DMT-8 includes a 540 MB hard drive that provides 12.5 minutes of recording time across all eight tracks. The drive is archived or restored from a DAT machine via fiber optic S/PDIF transfer. An 8 x 4 x 2 mixer has a unique four-bus architecture with two aux sends, two stereo returns, dual parametric EQ, and inline monitoring. Retail price is \$2700. For further details, contact Fostex, 15431 Blackburn Ave., Norwalk, CA 90650. Tel: 310-921-1112. Circle EQ free lit. #119.

DAT'S ENTERTAINMENT

Otari's DTR-8 low-cost DAT recorder includes enhanced facilities for recording user-entered ID characters and accessing other subcode information. The DTR-8 allows the user to record and then erase up to 60 characters or various subcode time information at the beginning of each track. The characters are displayed on the DTR-8 front-panel display on playback, and can be read by other compatible machines. This DAT recorder offers selectable sample rates of 48/44.1/32 kHz, high-speed search, (up to 300 times play speed), active balanced analog inputs and outputs on XLR connectors, and both AES/EBU and S/PDIF digital inputs and outputs. Retail price for the DTR-8 is \$2000. For more information, contact Otari Corp., 378 Vintage Park Drive, Foster City, CA 94404. Tel: 415-341-5900. Circle EQ free lit. #120.



HEADS UP

JRF Magnetic Sciences will introduce a new 2-inch 8-track "Ultra Analog" head conversion package for the Studer A800 tape machine at AES. Features include eight 200 mil (1/2-inch 2-track width) tracks and an independent Timecode Head (center track) with PAW TC-50 Timecode Processor, which provides complete isolation of the timecode signal from the analog tracks. For more details, contact JRF Magnetic Sciences, 249 Kennedy Rd., Greendell, NJ 07839. Tel: 201-579-5773. Circle EQ free lit. #121.



PROMIKEY LIKES IT

SPL will display its ProMike microphone preamplifier featuring dual channels, double ground-shielded PCB, and ServoDrive technology for minimum DC-offset. The ProMike is equipped with phantom power, phase reversal, padding, two 20-digit PPM displays, and high-pass and low-pass filtering. Maximum preamplification is +72 dB with 127.5 dBu E.I.N. For more information, contact SPL, 56 Central Ave., Farmingdale, NY 11735. Tel: 516-293-3200. Circle EQ free lit. #122.

SOUND IN A VACUUM

Drawmer is set to introduce the 1962 digital vacuum tube preamp. Two low-noise preamps and two integral 24-bit analog-to-digital converters are provided in the 1962. The inclusion of a variable Tube Drive section allows the user to add the precise amount of tube warmth desired, while a switchable "zero-overshoot" transparent limiter enables the full dynamic range to be utilized. The 1962 sports processing features which may be switched into the signal path: variable high- and low-pass filters, fine tune equalization, and dynamic enhance are some examples. For the whole story, contact Drawmer, 25 South St., Hopkinton, MA 01748. Tel: 508-435-4243. Circle EQ free lit. #123.

HAVE YOUR READ

Be certain to drop by **Yamaha's** demo room 3D02 in order to check out the new 40-input 02R digital recording console that you read about in our last issue. You'll also see the newly formed Studio Products Group demonstrate examples of integrated systems for all levels of project production (Tel: 714-522-9011)...**JBL Professional** will be releasing the 6208 nearfield monitor. The biamp reference monitor combines optimized electronics with an 8-inch, two-way speaker system on a multiradial baffle (Tel: 818-997-3514)...**Rolls Corp.** is announcing a new division called **Bellari** that will focus on efficient yet cost-effective audio devices that utilize the latest in tube technology. Look for the RP220 two-channel tube mic preamp, the RP282 two-channel tube compressor/limiter, and the ADB3 stereo tube active direct box, all under the new Bellari name. (Tel: 801-263-9053)...In late-breaking news, **Sony's** booth #144 will be brimming with a bunch of new products including the DAE-D5000 digital audio editor for the PCM-9000 master disc recorder, the DPS-V77 multiple digital effects processor, and the TCD-D8 portable DAT unit. Also, be on the lookout for Sony's new wireless receiver and transmitters, and what's this they're saying about a new digital console? (Tel: 800-635-7669)...If you're in the market for a console, **Sascom Marketing Group** may have just what the doctor ordered. They'll be showcasing consoles from **Raindirk**, **LaFont**, **Optifile**, and **TL Audio**, plus lots more (Tel: 905-420-3946)...**AKG Acoustics** is pulling a vanishing act at this year's AES. Its new MicroMic II series of miniature condenser mics, including clip on mic models and a new head model, offers realistic sound in a package that virtually disappears (Tel: 818-997-3514)...For the micro-ophile in everyone, **beyerdynamic** will feature its MCE 83 cardioid condenser mic especially suited for instrument miking. And if you dare to go wireless, there's the U600 UHF wireless system that features a PLL-synthesized receiver, 64 frequencies, MUM frequency toggling, and GRIP pilot tone control (Tel: 516-293-3200)...**BSS Audio** will be keeping it in the family with its second generation DPR-901 II. Used to add density and definition to instruments, voice, and programs, the new version has a 4-band parametric EQ that feeds discrete compressor/expander sections, as well as dual inputs for split band operation. (Tel: 818-997-3514).

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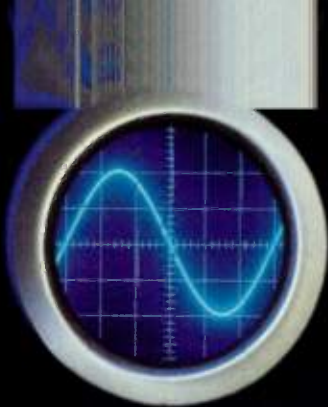


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CIRCLE 76 ON FREE INFO CARD

EQ SEPTEMBER 23



AUDIO INTEGRITY

You are busy trying to create the perfect mix, so we'll get right to the point. The new Sony DPS-V77 is a single rack powerhouse —

a digital multi-effects signal processor that combines the best of

our DPS Series, for an impressive array of effects including reverb, delay, modulation, dynamic filtering and more. The V77 also offers balanced and unbalanced analog and digital I/Os, with high resolution 24-bit A to D, 20-bit D to A converters and Sony's proprietary 32-bit digital signal processing. Result: great sound in, better sound out.



DUAL EFFECTS ARCHITECTURE

With 50 effects per block, the dual block architecture of the DPS-V77 makes it extremely flexible, since it allows for various serial and parallel configurations. Each block is equipped with a switchable

IT'S A SIGNAL



IT'S A GARBA

pre or post effect EQ. You'll find 198 user presets in addition to 198 factory presets. You'll also discover several new, ear-opening effects, from intelligent pitch shifting to irregular delays, to mono/stereo conversion, and three-dimensional spatial placement. The most important feature, however, may be what this unit *doesn't* come with.

MORPHING

Nietzsche once said, 'get rid of the junk you don't need.' Or something like that. Anyway, sound philosophy for life is sound philosophy for signal processors. So, that annoying drop-out you get switching

USER FRIENDLY

Take a good look: nice, big LCD display and "jog/shuttle" knob. Numeric key pad, descriptive icons. Assignable direct access keys, located where they ought to be. Call up a preset and up to 6 of your most frequently used parameters are there instantly. All this, plus full MIDI

L PROCESSOR.



control. So work flows quickly, smoothly, easily.

As easy as calling

GE DISPOSAL.

1-800-635-SONY, ext. DPS, for more information.

between effects? It's history. Eliminated. Toast.

Imagine. No more fumbling, grumbling, mumbling with a whole rack of trouble. No more extraneous junk. It only the rest of your problems were this easy to get rid of. You know, turn the water, switch and whoosh.

Seamless transition – say, between the tail end of a reverb into a chorus – is now reality. With this 'morphing' function of the DPS-V77, a new effect (like a chorus or flange) can begin while a current effect (like a reverb or delay) is decaying, giving you from 0 to 10 seconds transition time.



SONY

E-mu Darwin Hard-Disk

E-mu enters the hard-disk recorder market with an evolutionary model

BY STEVE LA CERRA

While computer-based, hard-disk recording systems are nothing new to pro audio, the self-contained hard-disk recorder (HDR) is still making its way into our studios. Over the past year or so we have seen stand-alone HDRs from companies such as Otari, Vestax, Akai, Fostex, Roland, and now E-mu, which introduced the world to Darwin — its first 8-track hard-disk recorder — at the Summer NAMM show. Darwin (which had been code-named Buckeye) is a stand-alone HDR with tape transport-style controls priced competitively with ADAT and DA-88 multitrack recorders. At a suggested retail price of only \$3795, including a 1 GB hard drive (or \$3195 without hard drive), Darwin fits right into the budget of studios that might be looking for a hard disk alternative (or supplement) to the ADAT or DA-88.

Darwin interfaces with the analog

audio world via 12 balanced rear panel connectors. There are four analog inputs and eight analog outputs all on 1/4-inch TRS connectors. Inputs and outputs can be separately switched for either -10 or +4 dB signal levels. Darwin can operate in three different input modes: 1-Bus, 2-Bus, and 4-Bus. In 1-Bus mode, a signal inserted to input one is routed to all eight tracks. In 2-Bus mode, input one is routed to the odd-numbered tracks and input two is routed to the even-numbered tracks. In 4-Bus mode, input one is routed to tracks one and five, input two is routed to tracks two and six, input three is routed to tracks three and seven, and input four is routed to tracks four and eight. Studios that have the need to record more than four tracks simultaneously can plug E-mu's four-input expansion card into a port in the rear panel bringing the total number of analog inputs up to eight. The rear panel also offers digital I/O via S/PDIF ports and a 50-pin SCSI port for external disk storage.

As you might expect from any digital multitrack recorder, Darwin has a wide assortment of features designed to make studio life a bit easier, including a 10-segment LED meter (with a red indicator and peak hold) for each track, a jog/shuttle wheel for precise

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BY THEM DOWN.

Timing steps don't

nt, in the order you

es. Naturally, the TSR-24S has plenty

5. Plus, multiple modulation effects

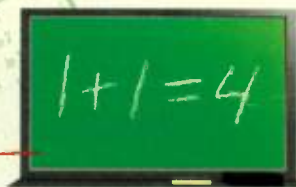
EFFECTS

OVER 75 EFFECTS

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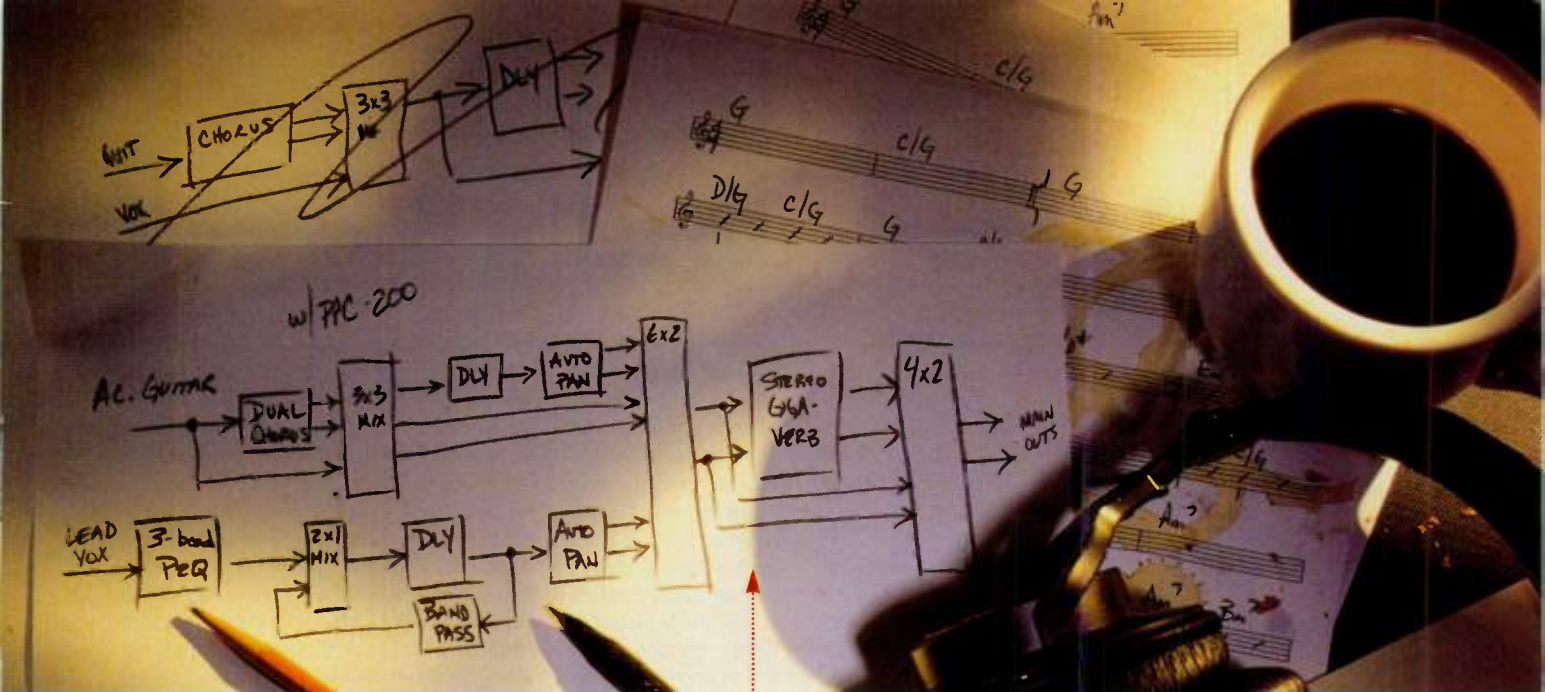
STEREO

...s, and you get a lot
...s, quad out; mono
... you count 'em.



SURVIVAL OF THE FITTEST: E-mu is positioning its Darwin hard-disk recorder at a p

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CIRCLE 23 ON FREE INFO CARD

Bryan Adams "...Loved a Woman"

The secrets behind
Bryan Adams's latest
romantic hit

BY DAVID FRANGIONI

Ron Obvious is the technical director of Bryan Adams's Warehouse Studios in Vancouver. He also supervised the layout and construction of Bryan Adams's "mobile studio," which was utilized in the recent recording of Bryan's number-one single, "Have You Really Ever Loved a Woman?" Ron co-engineered the song with noted engineer/programmer Olle Romo.

EQ: Tell us about the conditions and location in which the song was recorded.

Ron Obvious: Bryan rented a beautiful house in Ocho Rios, Jamaica overlooking the ocean. It is on a few acres of property, so that we can make some sound and not bother the neighbors. It's a rather large house with seven bedrooms, so any number of musicians can come and go at any time. Most of the studio itself is based in a large living room/dining room space. The space is approximately 40' by 30' by almost an 18' high ceiling. So it's a rather large, semi-live space.

When we first went into the house, Bryan asked me what I thought and whether we could set up a control room in there. I said that we would have to deaden down the sound in certain areas and change some furniture around to bring some of the standing waves up in a live room. So by doing that and hanging some of the appropriate blankets in

certain areas, I think we got a really natural-sounding control room. At least you can get so-called accurate monitoring at the mixing position through a pair of Yamaha NS-10's.

So you got this rather large house, and what did you bring into it to turn it into a recording studio?

What we brought in was basically a full-fledged studio. We call it the Mobile Unit, and it's centered around a 56-channel Mackie console. It's all been placed in a custom road case, so that the studio can go anywhere. We have a 48-track Sony digital tape machine (PCM 3348). We have all kinds of outboard gear.

Most of the things were recorded through Neve 1081 EQs. We also have a complete rack of outboard gear with all kinds of modern and vintage pieces of gear (Pultec, Sony reverbs, UREI LA2A's, LA3A's, etc.).

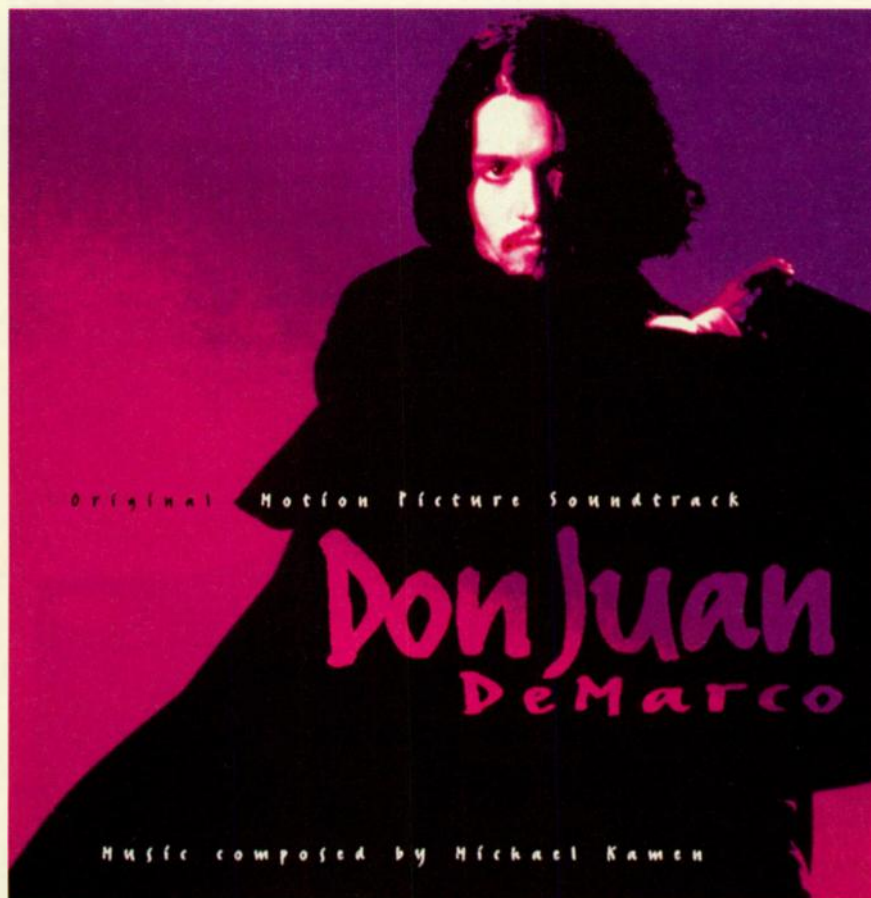
What was the signal flow for Bryan's vocal?

The chain of most of the situation would be that we would use a rack of eight 1081 Neve modules (the microphone preamp EQs). Most of the stuff — guitars, vocals, drums, bass, and most of the keyboards — would be run through these modules, then through a companion module, which is a Neve 1883 (an 8 x 4 bus module) that was built into the rack.

What we have is a mini-Neve console. We go through that, through the console, and through the patchbay to whatever appropriate processing device. Then it goes directly to the 48 track tape machine.

For some of the instruments, the Mackie is great-sounding enough so that in large grouping situations it's simpler to just go straight through the Mackie directly onto the tape machine. And, obviously, because we've got the proper Neves, most of the stuff was done on the 1081 EQs — including guitars.

How many days did it take for the whole process to put this song down? The process of this song was similar to the demo that was originally done by



DEPP IN LOVE: Bryan Adams's #1 ballad can be heard on the soundtrack to *Don Juan DeMarco*.

[composer] Michael Kamen. I believe the original melody came from something that Bryan and Michael sang over the phone to each other. Michael sent the demo to them in Jamaica, and [producer] Mutt Lange and Bryan finished the song arrangement and lyrics and played it over the phone to Michael to get his approval. They quickly polished off a demo to send to the movie people (the song is from the *Don Juan DeMarco* soundtrack) to get their approval on the song. So once that was approved, Bryan was very happy with it. A lot of parts that they did on the demo they decided to keep, since it was done on the 48-track anyway, and change it into the real thing. What they did is bring down Mickey Curry (Bryan's drummer). He came in and we set the complete drum-kit upstairs with the full microphone complement and put it through the 1081's, and some of it through the Mackie console. He played to the demos and the rough little drum machine that was on tape.

Then the bass parts were added. Some of the electric guitars they were already happy with, and they had the glorious opportunity to get one of the best Flamenco guitarists in the world, Paco DeLucia. He added the final touches to the acoustics. When he came, most of the track was finished, including vocals. He put sort of the shining piece on it.

There were a few last minute background vocals added to it and one last piano or synth part, and the track was completed. It was then brought back to Bryan's studio and mixed by Bob Clearmountain.

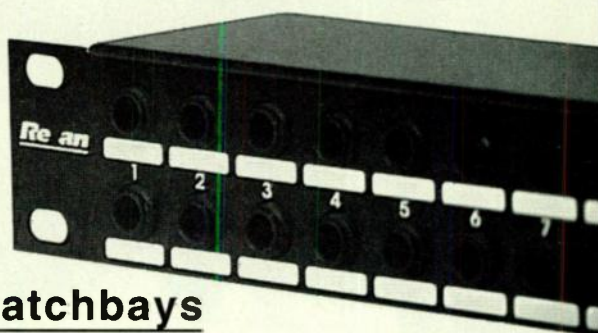
What did you find it like recording in an isolated location like Jamaica? The biggest challenge being in Jamaica is obviously the power requirements. Our whole studio is powered off of three Furman AR-Pro Power Conditioners, and this allows us to move anywhere in the world, and whatever comes out of the wall is kept at a constant 120 volts, AC. This allowed us to be basically impervious to the notorious lightening storms and brown-outs that we had in Jamaica. Without the Furman AR-Pro's, I don't think that the studio would have worked. **EQ**



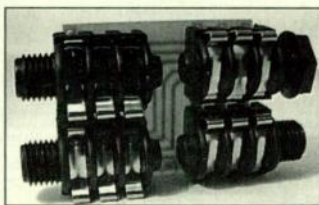
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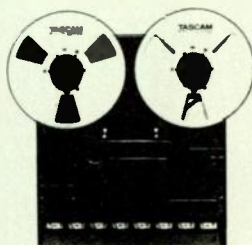
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CIRCLE 08 ON FREE INFO CARD



for CD pre-mastering. When interfaced with the new Sony DAE-D5000 digital audio editor, it delivers better sound and more control than ever before. The DAE-D5000's capabilities include non-linear editing, copy editing, and automated fader/crossfade/level controls. It also delivers features like signal processing (i.e., EQ and dynamics), integral PQ generator, and Error Rate Reporting. Digital audio resolution of up to 24-bits can now be maintained at every step of the music editing process.

MINIDISC is being discovered for varied applications in radio & TV broadcasting, live sound/theater, and business and industry. There are unlimited uses for this small, affordable digital audio format that allows up to 74 minutes of stereo digital audio storage, instant random access, easy editing, and limitless re-recording. ■ Radio stations, TV broadcasters and cable networks are rapidly adopting MiniDisc as the digital successor to the NAB cart. The Sony MiniDisc MDS-B3 Recorder and MDS-B4P Player have the features that broadcasters need for on-air applications, including random access, instant start and cueing functions for rapid playback, single cut or continuous playback modes, auto cue and End-of-Message function. ■ MiniDisc is everywhere. TV and post houses use the format for fast production of sound effects and playback. Theater sound designers use MiniDisc for effects and house music playback. Airports, department stores and theme parks now play high quality digital audio (music and public address) throughout their environments via this cost-effective, high-fidelity, 2 1/2-inch MO format.

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What do you like best about your DA-88?

"Built-in headroom. It makes a big difference when you're trying to track quickly."

"The TASCAM unit is clearly more dependable."

"I like having the A/D and D/A converters on an interface card because you can drop in a new card without having to disassemble the whole machine."

"MIDI syncing is so easy and clean. It's hard to know where the virtual recording ends and the taped recording begins."

"I've had a lot of experience with TASCAM... the dependability and the value. It was a no risk investment for us."

"With the sync card it's so easy to synchronize our audio both to video and other audio reels, including our DAT reels."

"It sounds great. Especially in the upper frequencies."

"The 108 minutes of recording time means we can do something we never could before — get an entire performance on a single piece of tape."

"Bouncing. I can bounce forever, it seems. The DA-88 just doesn't distort like other digital decks."

"The sync card has built-in SMPTE, video sync and Sony 9-pin. Perfect for our video house."

"We really like the convenience of the Hi8 format. You don't get tape stretch, you get much more time per tape, and it's really cost-effective."

"Our DA-88 ended up in a pile on the floor after the earthquake. I put it back together, turned it on, and it worked fine. It's earthquake proof."

"The Hi8 format is a superior recording medium, and it's a TASCAM."

"I can't help but notice the difference in the sound. Unbelievable."

"It locks up a helluva lot faster than our other digital multitrack recorder."

"It's trouble free. All I have to do is clean the heads. I'd call it the stress-free modular digital multitrack!"

"I needed over an hour and a half recording time. The DA-88 is the only digital recorder to offer that."

"The frame accuracy is so fantastic, I can edit voice-overs and guitar parts as small as two frames using the Absolute Time capability."

"Punching in and out is so simple. That fact alone made it worth buying a DA-88."

"The punches are very clean and accurate. A dream."

"I've been on the DA-88 nonstop for three weeks now. The transport is phenomenal."

like the size, the editing abilities, and the price. like the way it looks."

"I just finished scoring two movies on it. Unbelievable machine."

"Two things. First, the DA-88 gives me a full one-hour and fifty minutes of record time. Second, the wind times are so wonderfully tight and quick... it takes my other digital recorder a day and a half to rewind."

"I like the auto-locator and rehearsal modes, and of course we're doing our next album on it."

"I can now offer my customers digital recording at analog prices."

"It's just faster. Speed counts. Time is money."

"It just feels better than any other recorder in its price range."

"We love the jog/shuttle wheel. It's working out great."

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CIRCLE 57 ON FREE INFO CARD

Alone Again, Naturally

Guitarist David Torn
does it all by himself
in his project studio

BY BRADLEY BAMBARGER

Mystical experience is often available via accidents," guitarist David Torn says by way of characterizing the motif for his solo album, *Tripping Over God*. That statement could apply just as well to the recording process for the album, which saw Torn channeling the ghost in the machines within the LooPool, his backyard project studio in Bearsville, NY.

Torn has contributed his droning textures and serpentine solos to albums and film soundtracks by Mark Isham, Jan Garbarek, Michael Shrieve, and David Sylvian, among others. Recording under his own name for ECM in the '80s, Torn has since worked mainly with the German label CMP. Prior to releasing his new solo record, CMP issued several fine albums featuring the guitarist, including the ambient-jazz project *Lonely Universe* and the power-trio album *Polytown* with bassist Mick Karn and drummer Terry Bozzio.

A low-budget project ("A good bit less than most jazz records," Torn says), *Tripping Over God* sounds more expensive than many high-cost studio products — even though it was the first production issued from Torn's studio and the first album on which he played and recorded everything himself. Most of the record's six-week completion time was consumed by Torn finding his way. "It took me four weeks to figure out how to use the studio and software — to just learn to use a microphone by myself, really — and just over two weeks to write, record, and mix the whole album," he says.

IN THE LOOP

Starting out by tracking improvised guitar and rhythm loops onto a TAS-



TORN FREE: Working alone, David Torn finds himself more willing to experiment.

CAM DA-30 DAT machine, Torn then developed compositional templates by cutting and pasting the loops. The original elements of the track "The Entire Wish Spent Timing" stemmed from just one 11-second guitar and voice loop transfigured in Digidesign's Sound Tools into a four-and-a-half-minute piece. "It was an experiment in

composing from a loop by orchestrating the basic material, elongating, reversing, and repeating short sections," Torn says. For other tracks, he played live to the loops, overdubbing themes and textures.

So his musicality wouldn't be overcome by option anxiety, Torn limited himself by disallowing program-



dio favorites. These units also incorporate 20-bit A/Ds and feature Super Bit Mapping (SBM) processing which converts the 20-bit signals to 16-bit signals with less quantization noise and higher sound resolution. ■ The compact TCD-D10Pro II weighs less than 4.5 lbs and was built for remote recording with all the features a recordist needs in a portable DAT machine. ■ Timecode DAT is the most universal audio-for-video two-track format and Sony's PCM-7000 Series is the world timecode DAT leader. With 9-pin serial interface to virtually any video editor and synchronizer, it provides a "plug and play" solution. Sony's highly-evolved software enhancements assure the PCM-7000 Series its preeminence as the most full-featured, flexible and cost-effective timecode DAT solution.

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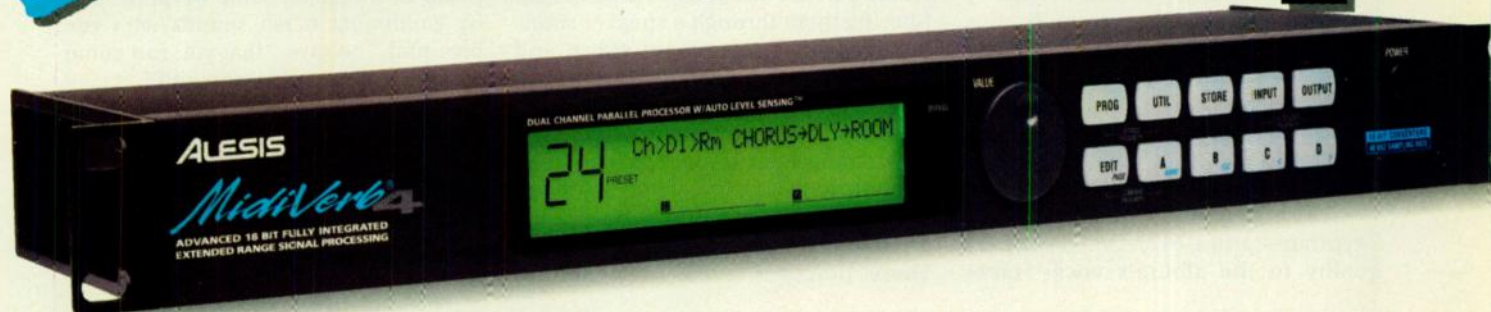


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CIRCLE 04 ON FREE INFO CARD
World Radio History

ming punches. "It was whole tracks or no tracks," he says. Only one song required 14 tracks, with most taking up two to nine tracks. Besides using his Macintosh Centris 650 with Sound Tools to manipulate musical segments, Torn also relied on the Logic Audio sequencer as an arranger and transposed loops in time and pitch with Lexicon's PCM 42 and Jam Man.

The peculiar picking-up-an-Egyptian-station-over-the-shortwave quality to the album's vocal tracks

came from Torn distorting his voice through various Prescription Electronics fuzz boxes and a DigiTech DHP55, filtering them through a speaker simulator for the "megaphone" effect, and adding chorus and echo effects.

Along with using distortion, backward recording, and other methods to put a strangely lyrical spin on his vocals, Torn throttled drum sounds with the DigiTech. He even printed most of his drum tracks through his guitar amp. These practices come as a natural

extension of his fondness for pushing amplifier tubes too hard and other pedal-to-the-metal sonic warping. "It's by combining harsh sounds with the beautiful," he says, "that you can come up with something meaningful."

TRIPPING TOOLS

Torn's setup at the LooPool allows him to record on up to 20 tracks: 16 via two TASCAM DA-88's (with sync card) and four via Pro Tools, plus the three minutes of stereo at 44.1 kHz available on his Roland S-760 sampler. "If I need more than that," he says, "I'm either doing something very wrong or I'm being very ambitious." He mixed the album on his Mackie 24•8 board without a patchbay, and with only one reverb unit. He monitored the proceedings with self-powered two-way Genelec 1030-A's.

Much of the noise Torn makes comes courtesy of his guitar effects rack, which comprises a Mackie 1604 mixer with all sends modified to pre-fader and an array of Lexicon devices, including a Vortex, Jam Man, PCM 42, PCM 80, and LXP-15. Torn's main axes are Klein custom electric guitars and an Ithaca Guitar Works custom acoustic/electric guitar with built-in pickups and mic. His bass is a Steinberger fretless. He also plays a Kotar, a homemade instrument concocted from a "\$5 guitar" and a koto bridge. He utilized a Subharmonic synthesizer for boosting the bottom end on bass and hand percussion tracks.

Torn's primary amp is a Rivera M100, which feeds a dry signal through his rack of effects out to an additional stereo Rivera setup for creating effects and loops. For microphones, Torn uses an Equitek E-200 large diaphragm condenser, Shure SM57's, and a "saltshaker" mic. And Torn says his ergonomically designed chair by Comfort Craft is what enables him to maintain his studio stamina hour after hour.

BEYOND TRIPPING

Besides the fact that Torn wrote, arranged, performed, and recorded *Tripping Over God* truly solo, what makes the album an exceptional accomplishment is that he suffered an acoustic neuroma a few years ago. The trauma of the nonmalignant tumor on his brain stem and acoustic nerve robbed him of the hearing in his right ear and left him with recurring bal-

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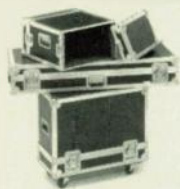
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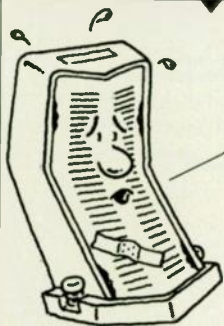
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Photo by Bradley Bamberger

LOOPPOOL-A-ZOOZA: Torn sits and strums amidst the gear in his project studio.

ance problems and severe headaches.

His facility and productivity have been remarkable following many months of surgery, recovery, and therapy. Not only has Torn recorded the best work of his career with *Tripping Over God* and *Polytown* — as well as toured in support of those projects — he has taken the time to produce solo albums by *Polytown* partner Mick Karn and former New Bohemian guitarist Wes Martin.

Recently, Torn completed recording a song at the LooPool for an ambient compilation released by the Woodstock, NY-based label Aural Gratification. On that bewitching track, "Pewter Bird's Môle," Torn created a rhythm vamp using drum tracks recorded through guitar effects with amp noise and room ambiance. He next added his characteristic loops along with tones from an old Yamaha synth played through guitar amps, then injected cool jazz guitar chords as a break between the gauzy beats. The track also features a moody spoken-word recital from Karn's wife, Rossina Gomez.

Realizing that many people were taking advantage of his distinctive guitar loops without proper permission and remuneration, Torn has released to the public the sample-ready *Tonal Textures*, a disc of his loops, available in both mixed-mode CD-ROM and audio-only CD forms through the Salt Lake City-based Q-Up Arts.

Looking ahead, Torn aims to develop projects "outside the strictly musical world," as he terms them, including an "ear saver" of interactive sonic loops that would be the audio equivalent to the screen savers for

computers. "The audio that comes with computer programs is so far below the visual stuff," Torn says, adding that in his conception a user could tune the pitch and cycle times of the ear saver's musical loops as desired.

STUDIO FEVER

Although *Tripping Over God* started out with Torn often recording with his youngest son in the room doing his homework, it became just "me sitting in a room by myself for a month and a half," he says. "Near the end, I couldn't even get any of my family to come in here."

To maintain focus and not go stir crazy in the studio's 22 x 16 feet space, Torn "left the room a lot," he says. "I divided up my day into different tasks. I'd do business stuff in the morning, eat lunch, and then start listening to loops and stuff I did the previous day. Then I'd start recording, really kicking it in from about 8 or 10 at night to 3 or 4 in the morning. And I'd always mix a track as soon as I was finished recording it." Torn adds, though, that he "cut all the screaming guitar stuff during the day so as not to disturb the family."

For Torn, recording by himself helped create a special intimacy with the material. "Having an engineer in the room would compromise not the recording quality but the personal quality," he says. "With the social pressure of someone else there, I wouldn't have taken the time to listen to things endlessly and experiment as much as I did."

"It's as though I were meditating," he adds. "And I wouldn't want to invite someone to be inside my head while I was meditating, would I?"

EQ

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THE SAMSON MARKETING GUYS GET HIPPED TO THE NEW SERVO 500.

Just when we were sitting around trying to figure out why our Servo amps were selling so well, the phone rang.

"Omar Hakim is on line one," our receptionist cooed. "Shall I put him through?"

"If you don't, you're toast," we responded. "He's only the hippest drummer-composer-producer in the western hemisphere!"

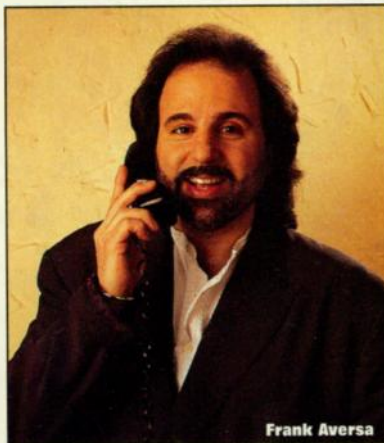
"Omar, my man, what's up?"



"Uh...guys, just wanted to let you know how impressed I am with the Servo 500. It's really transparent, with lots of detail in the midrange and top end. And there's always plenty of headroom."

While we were recovering from Omar's comments, the intercom kicked in again. "Frank Aversa on line two."

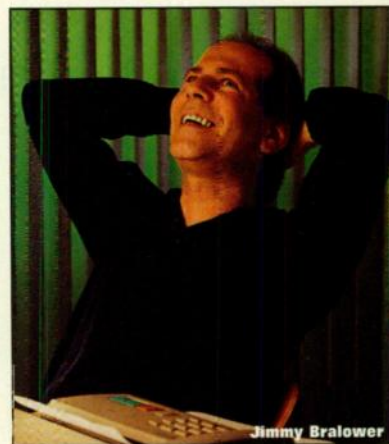
"What's the deal?" we wondered. "Frank's one of the hottest producers in the biz — he's done everything from the Spin Doctors to Burger King and Budweiser."



"I need another Servo 500, fellas," Frank said. "I already have seven, but I can't get enough of these. They sound so musical. Reminiscent of a tube amp, really smooth."

At that point, it was beginning to smell like a setup. "All right, which one of those engineering geniuses is pulling our chain now?" Just then, Sparky the marketing assistant flew into the room.

"Jimmy Bralower just faxed us about the Servo 500! Check it out: 'It really made my system come to life. I never realized my monitors could sound this good.'"



"Get outta here," we shot back, "this is too much. Jimmy's worked with people like Winwood, Clapton, and Cyndi Lauper — he even co-wrote Celine Dion's hit single, 'Misled'!"

SOUNDS GOOD, BUT WILL ANYBODY BELIEVE IT?

At this point, Sparky piped up, "Hey, I've got a way cool idea. Why don't we use these guys in an endorsement ad for Servo? What better way to tell people how great these amps sound."

"Never work, Sparko. Nobody will believe you can hear the difference in a power amp — unless your name is Fido," we laughed.

"Your loss, guys," he said on his way out the door. "Doesn't matter to me anymore. I just got a great offer from this new dinosaur theme park in Tasmania."



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If you want our side of the story about the Servo 500, Servo 240 and Servo 150 power amps and the growing Samson Audio line, please call us at (516) 364-2244, fax (516) 364-3888 or write to us at: Samson Technologies Corp., P.O. Box 9031, Syosset, NY 11791-9031 © 1995 SAMSON

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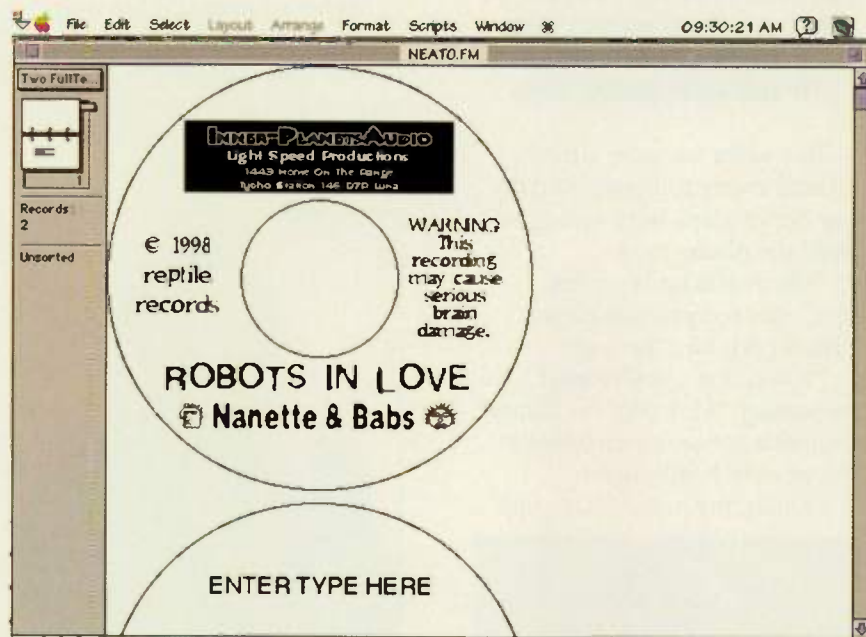
Studio Business Software Roundup

Here are some software programs that will help you manage the "less-creative" side of your business

BY RUSSELL CARDWELL

I never bargained for this. I got involved with recording because the music hooked me. But between the time-cards and the taxes, the invoices and the inventories, I'm beginning to think I deal with more red tape than magnetic.

Nonetheless, documentation is a necessity. You need to know which client needs what when. How many hours did a project take? What instruments are where? Plus, it's a crime to



spend so much time on a project and then not document it properly. CD replicators and mastering houses say documentation is the weakest link for the project studio. Many houses complain that sometimes tapes come in to them without any address or phone number, let alone proper indexing and track numbering.

OK, so we know we need to document. Still, if, like me, you'd rather be behind a console than a calculator, here are profiles of several software tools designed to help you get away from the recording business — and return to the business of recording.

OFFICE MANAGER AND ON ACCOUNT

Manufacturer: White Crow Software

Price: \$149.95 for Office Manager and \$149.95 for On Account

Contact: White Crow Software, Inc., 19 Marble Ave., Burlington, VT 05401. Tel: 802-658-1270. Circle EQ free lit. #124.

Office Manager (a paperwork/contact/list manager) and On Account (for handling studio finances) can function independently, but On Account comes with a utility that links them together. Once linked, Office Manager incorporates On Account's features into a single program. Together, they occupy 2.2 MB (plus additional space as you accumulate documents and records); they require Macintosh System 7.x and at least 4 MB of RAM. While this program suite would be useful to many small businesses, it originated in the front office of a commercial recording studio. (Note that White Crow offers several other linkable accessory programs.)

The combined program is deep. There are other programs on the market that will help you organize your information, but this takes it to the next level by automating many of the mundane tasks that keep you chained to the front desk. Because of the intelligence incorporated into it, you will need to spend a good bit of time up front, teaching the program how you do business. Many features are not obvious, but the manual is well written and even interesting to read.

Once you've finished setting it up, this program gets down to business. It

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Schedule

Enter booked: 1/1/98 Job Date: 1/1/98
 From: 4:00 To: 4:00
 Unit: 1/1/98 Term: 1/1/98
 Replied By: [Name]

Client Info
 Client: [Name]
 Address: [Address]
 City: [City] State: [State] Zip: [Zip]
 Phone: [Phone]
 Fax: [Fax]

Personnel
 Engineer: [Name]
 2nd Eng: [Name]
Quoted Hourly or Block Rate
 Hourly Rate: \$ [Amount]
 Block Rate Terms: [Terms]

Setup
 Drums: ☐ Coffer ☐ Base ☐ Floor ☐ Load Yes
 Pns: ☐ Synths ☐ Elec Pns ☐ Drum Mch Mch
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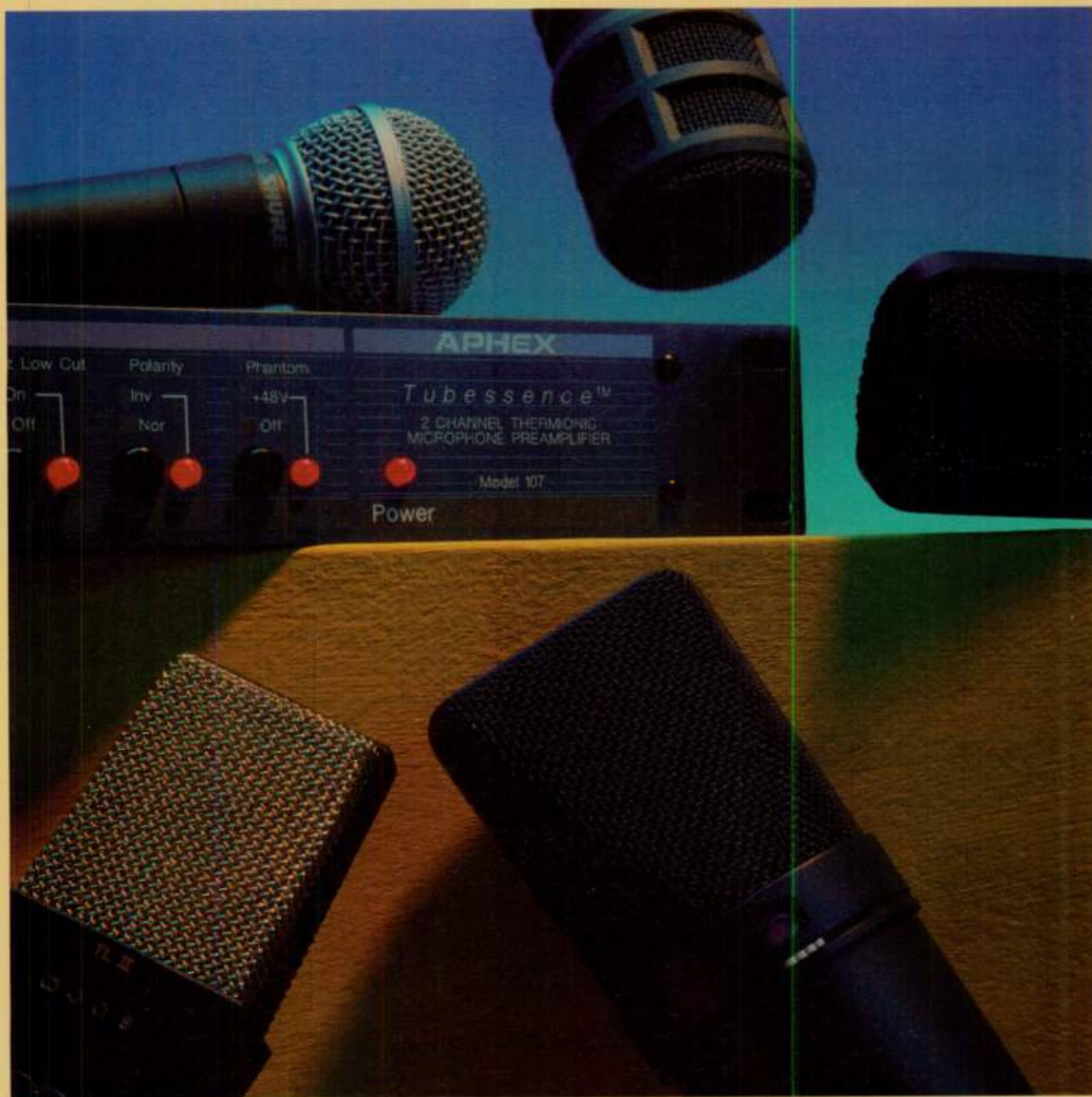
Equipment/Transfers
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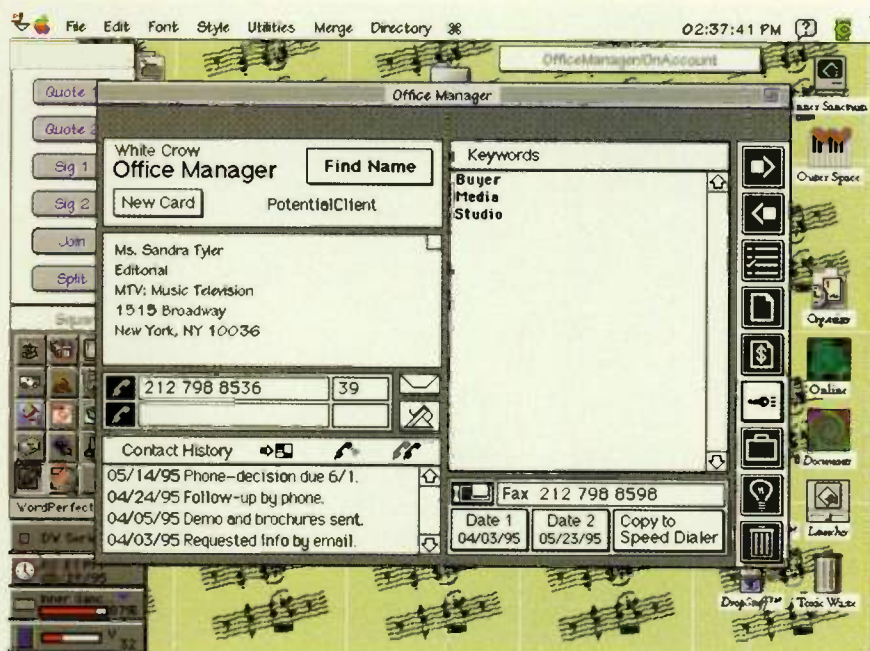
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DESKTOP SECRETARY: Keep your eye on your business with the help of Office Manager.

sorts your contacts into definable categories and groups them with multiple keywords. You can maintain contact histories and notes on phone conversations, create indexed idea files, project files, and to-do lists. Other functions let you automatically print invoices, log payments, track inventory, deposits, discounts, create credit memos, packing lists, sales reports, state and local sales tax reports, and export financial data to your spreadsheet program. You can create an

indexed bank of frequently used letters or documents and merge them with info from your contact files. These can be set to automatically launch your favorite word processor with your addressed letter on your letterhead, ready for you to edit and print. It will dial your telephone, send faxes, print labels and envelopes, and log time and expenses spent on a given project.

The intelligence of this program shows in its attention to details. The contact entry fields automatically cap-

italize names and addresses. It memorizes the prefixes of local calls, automatically adds long distance dialing codes, and logs the name, number, time, and date of all long distance calls.

You can think of Office Manager/On Account as a virtual secretary. Once you have taught it the ropes, it can take much of the routine office work off your shoulders so you can concentrate on rolling tape. Now, if only it would start the coffee...

NEATO CD LABELER

Manufacturer: MicroPatent

Price: \$79.95

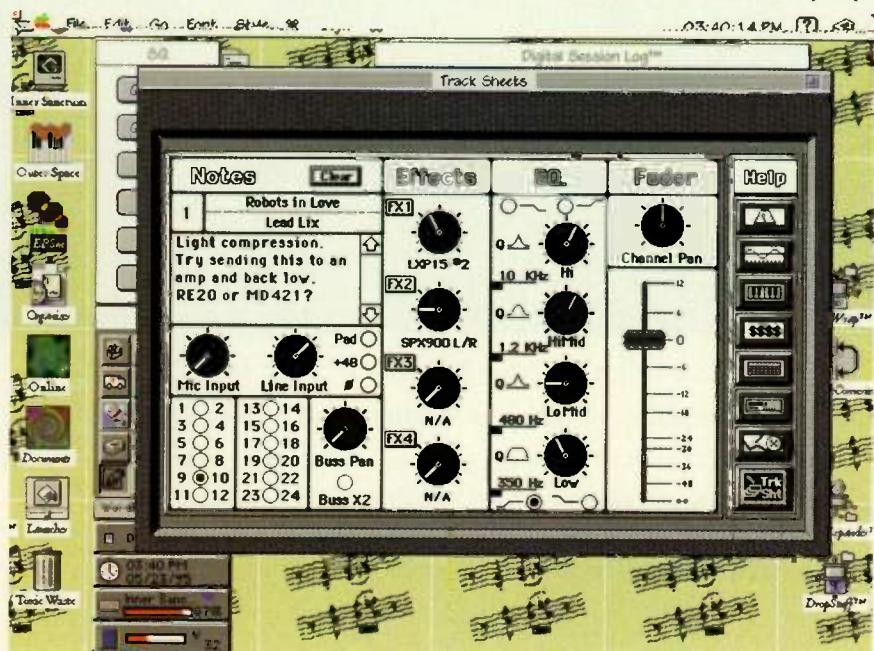
Contact: MicroPatent, 250 Dodge Ave., East Haven, CT 06152-5054. Tel: 203-466-5055. Circle EQ free lit. #125.

Just bought a CD-R machine? Then you may need the Neato CD Labeler, which lets you create your own CD labels for affixing to blank CDs. The package consists of a ring-shaped plexiglass base, a cone for positioning CDs, a starter set of 100 CD labels, an instruction booklet, and disks for Macintosh and Windows computers. The disks include label templates for Quark Xpress, Aldus PageMaker, FileMaker Pro, and CorelDRAW. You need one of these programs and a printer to do your labeling.

To use a template, open it within one of these programs and replace the dummy text with your own text and graphics. Insert a label sheet into your printer and choose Print. I got best results by first removing any other paper from the paper tray. Otherwise, the label sheets tended to veer sideways. Also, the glossy label stock did not hold ink-jet ink well; laser printers work much better.

Applying the labels is easy once you get the hang of it, but practice on some junk CDs first. Place the label face-down on the base, and the CD on the positioning cone's shelf; lowering the cone through the hole in the base automatically centers the label on the CD. Note: If you peel the label away from the backing, it will curl and won't lay flat on the base. Instead, place the label face down on the base, and while holding it down, peel the backing away from the label. You won't want to waste labels — at \$60 per 300, they aren't cheap.

Some of the software programs supported are expensive, high-end



DO YOU RECALL: Never forget a setting with Session Log.

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AMEK AUDIO

MEG provides the audio quality and standards which made AMEK world famous. Superb equalization, dual path modules, multiple aux and output buses and stereo inputs with MS decoding provide an incredible combination of facilities.

The 28-input version provides 56 mono and 4 stereo inputs with 4 stereo FX returns; the 44-input version provides 88 mono inputs and 4 stereo inputs with 4 stereo FX returns.

AMEK SUPERTRUE

The world standard in console automation. Running on a 486-based PC, SUPERTRUE captures and replays faders, mutes, solos and automated switches to 1/4-frame accuracy - ideal for music recording, video and audio post and broadcast production.

Superb timecode-based off-line editing facilities include the Cue List, which can trigger both console and external MIDI Events, and the Mix Processor, which includes Repeat, Merge, Shift, Erase, Trim, Swap and Copy operations on mix data.

AMEK RECALL

Stores the positions of non-automated knobs and switches - up to 10 console surfaces can be stored in each Title. Selective recall and auto-scan provide rapid identification of only those controls you wish to reset. Graphic displays and AMEK's unique talking Voice Prompt guide you rapidly through the Recall operation.

AMEK VIRTUAL DYNAMICS

VIRTUAL DYNAMICS provides powerful and extremely flexible gain control on each channel. One from a choice of nine devices can be selected - 3 compressors, including a dual-slope compressor with expander, 3 gates, including the Supergate with hysteresis and peak hold functions; Limiter, Expander and Autopanner. Screen graphics present each virtual device as a familiar piece of rack-mount hardware, but the controls are operated with the trackerball and settings are saved - and automatically reloaded - with the mix.

AMEK VFX (Visual Effects)

This incredible new programme will be released in SUPERTRUE during 1995. Outboard effects devices by many of the most famous manufacturers - such as Eventide, Lexicon, Roland and TC - can be controlled directly from the console via MIDI. AMEK's graphics templates simplify operation by presenting multi-level menus in the form of knobs and switches, allowing instant access to all programmable parameters.

AMEK MMC

MIDI Machine Control is now implemented within SUPERTRUE and allows operation of popular recorders such as ALESIS A-DAT and TASCAM DA-88 with many sophisticated locator facilities such as auto drop-in/out, pre- and post-roll and multiple locate points.

big
by Langley



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Date Booked: 07/19/95 Job Date: 08/27/95
From: 4:00 am pm To: 4:00 am pm
Cust. P.O. # Terms: Net 30 Days
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Client Info:
Client: Nanette Parsley
Producer: Sandra Tyler
Artist: Nanette & Bios - Robots in Love Dem o
Address: 17213 NASA Rd. 1, #815B
City: Houston State: TX
Phone: 713 869 0501 Zip: 77571
Pager:
Fax: 713 869 0592

Personnel:
Engineer: Ty Walker
2nd Eng.: pending

Quoted Hourly or Block Rate:
Hourly Rate: \$ Block Rate: \$ 1195
Block Rate Terms: overnight rate

Tape: (Will also need HI-6)
Qty needed: 1" ☐ 1/2" ☒ 1" ☐ 2" ☐
Brand: 458 Speed: 15 Alignment:
Client's tape ☐ In-house ☒
In-house reel #s: Work Reel X14

Setup:
Drums ☐ Guitar ☒ Bass ☒ Piano ☐ Lead Voc ☐
Perc ☒ Synths ☒ Elec Perc ☒ Drum Machine ☐
Computer ☒ Synchronization SMPTE 30hd
Setup Notes: Use baby Neumanns on Congas.

I'M JUST A BILL: Studio Business Forms also ensures that your invoices are right on.

tools not very common in recording studios. It may have been better to support Microsoft Word, the ubiquitous Works programs, and some popular draw programs. It may also have been preferable to have transparent labels rather than the silver, gold, cream, and white labels offered. These minor quibbles aside, this is a simple and effective tool. If you make more than a few CDs, it will save you some time and headaches.

DIGITAL SESSION LOG

Manufacturer: Northstar Productions
Price: \$199

Contact: Northstar Productions, 13716 Southeast Ramona, Portland, OR 97236. Tel: 503-760-7777. Circle EQ free lit. #126.

Digital Session Log will not mic a drumkit or untangle your cables, but it covers nearly everything else. This program is designed for the control room, not the office. It features calculators for many studio tasks such as BPM to milliseconds, time to tape length, samples to beats, pitch to frequency, and many others. You can track your tape stock and your bank balance, and organize information on all your gear. And, of course, it stores your clients' addresses and phone numbers.

System requirements include Macintosh System 6 or better, Hypercard 1.25 or better, 1 MB of hard-drive space, and 1 MB of RAM. (However,

this is the kind of program you'll want running during a session, so consider the RAM requirements of all the applications you'll be running concurrently.) Documentation is decidedly skimpy, but there is plenty of online help, and most features are self-explanatory.

The hub of this program is the Client Card. From here, you can clock in and out on a session (or stop the clock for a break) and track the client's charges for time, materials, and other costs. But the soul of the program is the Session Log. Selecting a title from the client's track list takes you to its track sheet. This holds information about the song, such as reel, tape speed, and noise reduction, and has fields for notes on each track. Clicking on a track opens a window containing a fader, trim pots, EQ pots, effect sends, and bus selectors — everything normally found on a console channel. I found the rotary knobs difficult to use — they seemed to respond erratically at times — but the ability to store and graphically display all the information needed to recreate a mix is extraordinary.

This is a super collection of tools for the control room. Although it is underpowered in the accounting department and suffers from the clunky, aging Hypercard interface, its track sheets and session logs are the next best thing to flying faders.

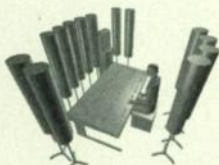
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CIRCLE 89 ON FREE INFO CARD

STUDIO BUSINESS FORMS

Manufacturer: Patten Sound

Price: \$32.95 (Macintosh disk or hard copy)

Contact: Mix Bookshelf, 6400 Hollis Street #12, Emeryville, CA 94608. Tel: 800-233-9604. Circle EQ free lit. #127.

Studio Business Forms consists of the most common forms needed in the studio. These are available as hard copy (preprinted forms collected in a three-ring binder) or as PICT files on 3.5-inch Macintosh DD disk (with instruction booklet). Expanded, the complete package takes 1.2 MB. Realistically, once you've chosen the forms you plan to use, you can delete the rest to regain most of this space.

The forms are grouped into four categories:

- Business has forms for office organization: invoices, schedules, time sheets, client and booking info, inventory, etc.
- Recording includes setup and track sheets for studios of different sizes and some charts to help synchronize delay times to song tempos.
- Film/Television offers spotting sheets and frames-to-BPM conversion charts.
- Templates include j-cards and labels for cassettes and tape boxes of various sizes.

PICT files are compatible with most graphic programs (I opened and edited files with Super Paint, MacDraw Pro, Canvas, and Claris Works). Most of the forms include space to add your logo or the name and address of your studio, so customizing them is simple.

Printing these forms turned out to be a little more complicated. Their margins are very narrow, and my HP DeskWriter cut off the edges. Setting the reduction size in the Page Setup dialog box to 96% solved the problem.

These forms are well-designed and have a professional look. You could hire a graphic designer to produce better custom forms, but at a much greater cost.

This package is inexpensive and very easy to use. If you're doing most of your record-keeping on paper, this is a quick way to enhance your studio's image and get your paperwork together. **EQ**

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HFC	FREQ	6.2kHz	RATIO	3.20:1	-15.0dB
1st	FREQ	6.2kHz	THRESH	-15.0dB	
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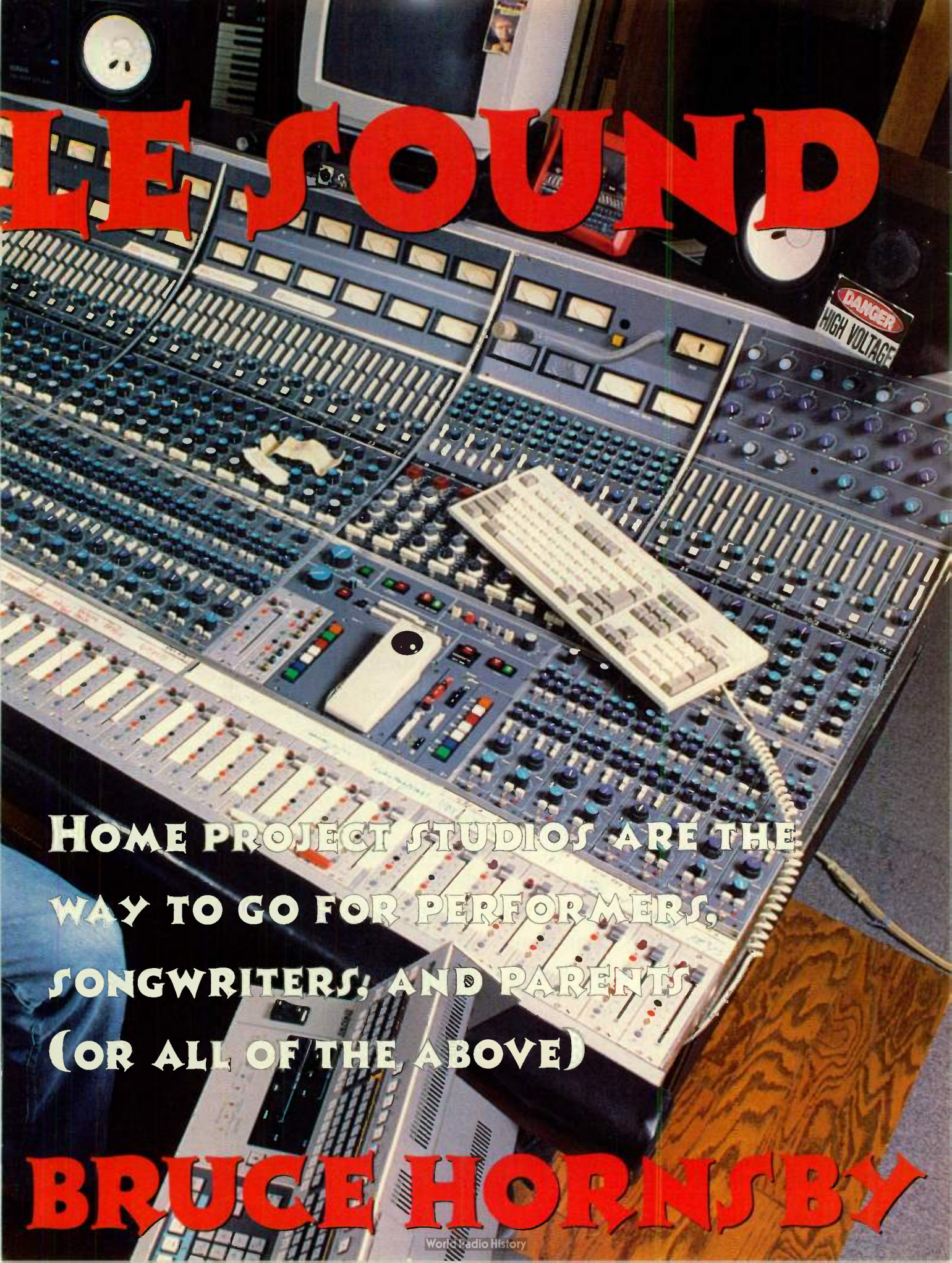
CIRCLE 36 ON FREE INFO CARD

EQ SEPTEMBER 51

HOMESTY

A man with short brown hair, wearing a white t-shirt with a colorful graphic and blue jeans, sits in a black office chair. He is smiling at the camera. The background is a radio studio with wooden desks, racks of electronic equipment, and a large mixing console. A young boy in a blue shirt is on the floor in the foreground, looking down. The word "HOMESTY" is written in large red letters across the top of the image.

BY



LE SOUND

HOME PROJECT STUDIOS ARE THE
WAY TO GO FOR PERFORMERS,
SONGWRITERS, AND PARENTS
(OR ALL OF THE ABOVE)

BRUCE HORNSBY



NOT JUST A MEMBER: Bruce Hornsby owns this "Hair Club for Men."

I have just gotten back from attending a party. Not a big, fancy record company party, but an end-of-school-year pizza party for my three-and-a-half-year-old twin boys, Keith and Russell. They are one of the main reasons why I built a project studio in my home. I never wanted to be an absentee father and miss out on spending time with my family. And my family is the main of four key ingredients that make up my life's activities — the other three being touring, writing, and recording music.

The studio is approximately 30 feet away from my house, and I love that. Another reason I built the studio is for creative freedom. I never liked the pressure of watching the clock in commercial studios. It's restricting, and I feel that they are not the best creative environments. Recording in your own studio, your own element,

brings on a whole new feeling of relaxation, and it works great for me. I've become much more prolific since I built the studio three years ago. After having a studio, I can't imagine ever going back.

THE HAIR CLUB FOR MEN

That's the unofficial name of my stu-

dio. Mainly because all of the key people involved with it are not so well endowed up there, if you know what I mean. There's the mastermind who designed the facility, Ross Alexander (who also designed John Mellancamp's project studio in Indiana), my brother, Bobby Hornsby, who built the place, and my engineer, Wayne Pooley. Even my drummer, John Molo, is losing it upstairs, and I am not that far off either.

But anyhow, I wanted this studio to keep me grounded, and it has. In the planning stages, we knew that we wanted certain things and Ross did a good job of giving us what we needed. One particular thing that I requested was a good-sized keyboard isolation room because I knew I was going to spend a lot of time in there practicing and recording. We also wanted a window looking outside of the control room. Here on our land we've got some nice woods and just outside the control room is a creek. It's much different from the dark and confined conditions commonly found in commercial studios.

We're not just cutting demos here either; this is a fully functional

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methods of synthesis within the same program.

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CIRCLE 43 ON FREE INFO CARD

FOR THE RECORD

Wayne Pooley, Bruce Hornsby's engineer, tells how Hornsby's latest album, *Hot House*, was recorded.

Bruce likes to have a performance-oriented feel to his sessions. When we tracked his latest album here at The Hair Club for Men, the entire band was recorded live for the most part. If you can stop and try to envision this — there were seven parts being played at once. The keyboardist's Leslie cabinet was in the bathroom, the bass amp was in the amp closet (a.k.a. the equipment room), and the two horn players were in the garage. Back in the main studio were the drums, the bassist, and the keyboardist and his rig, while Bruce's two pianos were in the piano room. It was totally maxed out.

When recording in a less than optimal recording environment, such as the bathroom, you can offset it with a nice blend between a DI and cabinet. This is the setup we used for most of the basic tracks that featured the band.

We had an interesting arrangement for the recording of this album. Rehearsal and recording occurred simultaneously. They'd be listening to their headphone mixes that were derived from a separate part of the console. This allowed me to listen to a soloed hi-hat for ten minutes straight without disturbing the band's cue mix. Our Neve is a 40-input console. We set up channels 25–40 to record and used additional API mic preamps to augment the Neve mic preamps. These channels went unprocessed, and were recorded straight to machine "A," one of our two Sony 3324 24-track digital tape machines. The tape returns from machine "A" were routed to the line inputs 1–24. Channels 1–24 were recorded on machine "B," and were processed with compression, EQ, and all that fun stuff.

By using this method of syncing the "dry tape machine" with the "processed tape machine," two purposes are achieved. For one, it gave the musicians a taste of a "finished product" because although they were fed from the unprocessed 25–40 channels, they heard the full 40-channel output — effects and all. Secondly, it protected us from being limited later during mixdown because we had those dry signals to work with. So even though there were wet and dry signals simultaneously happening, they always remained as separate entities.

Just this past spring, we acquired Digidesign's Pro Tools III software, and we're using it for premastering applications. For the last album, using the Pro Tools III, we took all of our mixes and mastered them to 2-track. This allowed us to bring a preassembled DAT complete with edits and spacing to the mastering house as opposed to bringing in a whole bunch of unorganized mixes. (A good way to save some bucks!)

A fairly extensive MIDI routing system is maintained throughout Bruce's studio. We are using an Opcode Studio 5 to pump out MIDI to all the various parts of the studio, and it makes it easy for us to, for example, start and stop drum machines and record MIDI data from synthesizers. Also, Bruce's piano is outfitted with a MIDI controller called the Gulbransen KS-20. Using this and Opcode's Studio Vision, I'm able to record microphones and MIDI data from the piano simultaneously.

studio. In fact, we cut my new album, *Hot House* [RCA Records], here. The console that we're using is an old Neve 8068 that we bought from Unique Recording Studios in New York. I'm sure that board has seen many interesting recording sessions. We retrofitted the console with the Neve Flying Faders. For now we have

fader and mute automation, but still have to document the EQ the old-fashioned way. But it's been great nonetheless. We can leave our mix up on the board for days, hit the road, do a gig, then come back, and get a good perspective on the mix. You could never do that in a studio that wasn't your own.

INSTRUMENTAL SET UP

The piano is my instrument, and it plays a big role in all of my recordings. In planning the studio's design, I knew that I'd want to have a separate live room dedicated to my Baldwin and Steinway pianos (the Baldwin is a MIDI piano), particularly for situations when I play live with the band — which is quite often. John Molo, my drummer, plays real strong — in fact, he plays loud as hell and I can't be in the same room as him or all you'll hear are drums on the piano tracks. In any case, we usually use some great old Neumann U67's to record my piano. I've used some AKG 414's and C12's, but we've had the best luck with the Neumanns. I am interested in the Barcus Berry piano pickup as a means to mic my piano for live gigs, and it's an avenue that we will explore in the future.

Being the lead singer and the piano player of my band brings on a whole other variable to recording. How to record vocals and piano simultaneously is the key question, and I do it both ways. During a session, my vocals usually serve as guides. It's common practice for me to kind of talk the band through a song and primarily focus on my playing. When I've got the instrument tracks down, I'll cut the vocals and overdub them in on the mix. I don't follow the standard format of going into an iso booth to record my vocals. I record my vocals right there in the control room all alone, sitting at the board. I put on my headphones, turn the control room speakers down, and that's my isolation. I punch myself in and out as desired, and I've gotten pretty good at it. I've tried all different kinds of vocal mics, and I have found the best success with a Sanken CU41 mic.

GOING LIVE

For situations that require a different means of isolation, we've got a total of three live rooms: a big room, a small room, and a piano room. Actually we have an "unauthorized" other live room — my garage. The band and I were just experimenting one day and found that the garage had a really bright, strong sound to it. The horn players were just dying to record out there. So there's my other "live" room. It's adjacent to the studio, and we've

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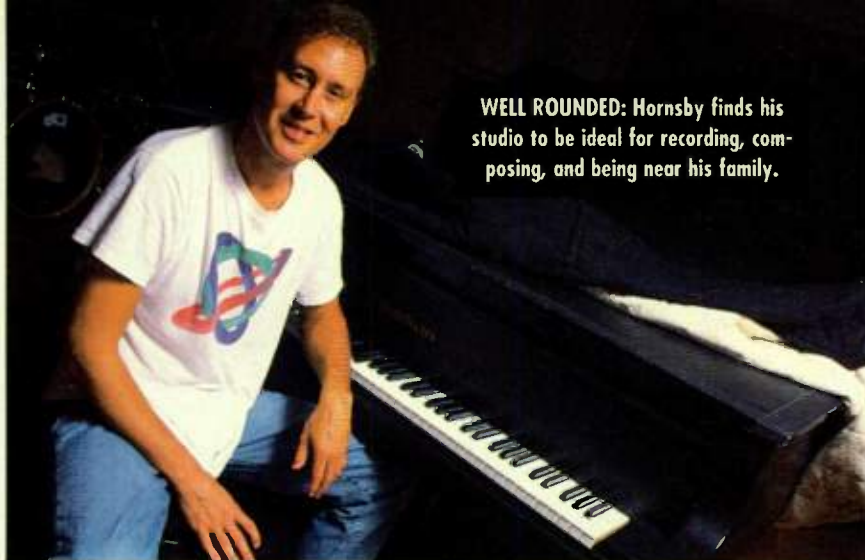


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CIRCLE 22 ON FREE INFO CARD

World Radio History



WELL ROUNDED: Hornsby finds his studio to be ideal for recording, composing, and being near his family.

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World Radio History

recorded some horn tracks there that have made it to the record. Being that it is situated so close to the control room, there was no need for any kind of special tie lines; we run the cables just like most guys do. The sound in the garage has that "live" ambience to it — the horns sound great coming from there.

I WRITE, THEREFORE I AM

When I write my songs, I don't use any kind of sequencing software. Even though we do use Digidesign's Pro Tools III in the studio for certain applications, songwriting is not one of them. Sometimes I write the lyrics first and then put the music to them. Other times I write the music first and then the lyrics. If you listen to my albums, it's obvious when I've done one or the other. For example, the music on a track will be noticeably more complex if I wrote the lyrics second. If I've written lyrics first, then the music will be simpler.

I've also been known to sing and play piano into a boom box. In fact, I do that a lot when I practice. When I'm ready to present material to the band, I'll lay down a drum machine track, overdub my piano, and then a scratch vocal. This will all be recorded on the Sony 24-track. The use of a drum machine plugged into a small amp puts me into a groove that I might not necessarily get from playing solo piano, and further assists my songwriting process. Other times I could be driving in my car and find myself in the process of creating a song. And I always carry a notebook with me on the road because you never know when a lyrical idea can pop into your head. There are so many different ways to write songs, and that's what gives them their stylistic variety.

EQ

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The 3630 offers dual mono or linkable true stereo operation, so you can process your stereo signal (or two mono signals) from a single unit. Its flexible interface lets you choose between RMS and peak compression styles as well as hard knee or soft knee compression curves to customize the 3630's response for any source material. The 3630 also provides dual 12-segment LEDs that allow you to meter gain reduction and display input and output levels.

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World Radio History



CIRCLE 03 ON FREE INFO CARD

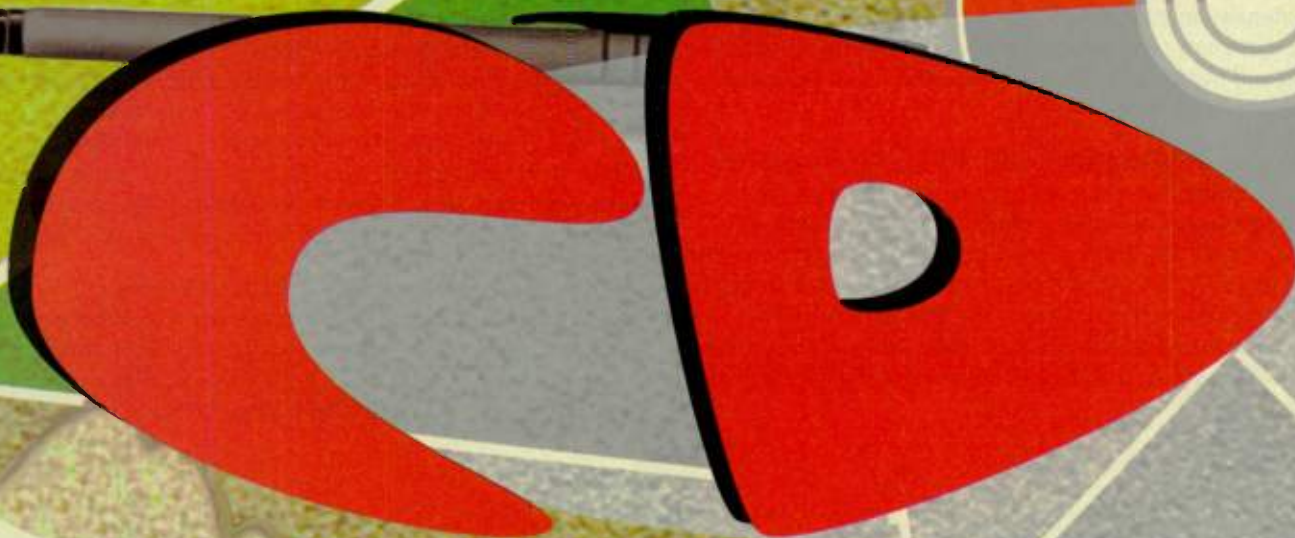
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The Rainbow Books Explained Easily

More than you ever wanted to know about writing CDs for fun (and profit)

BY BILL MUELLER

The world of compact disc (CD) has grown far and fast since its introduction. The first implementation of CD was as a storage medium for audio. The specification for Compact Disc-Digital Audio, or

CD-DA, was established in the Red Book. Soon it became obvious that CD would also be a good, inexpensive medium for storage and distribution of computer data. Discs of this type were dubbed CD-ROM for Compact Disc-Read Only Memory, and they

were specified in the Yellow Book.

Once CD-ROM became accepted, the natural progression was to find a way to store data and audio on a disc so that you could have music playing continuously while displaying images. This led to the Green Book specification, which defines a stand-alone table-top system for playing Compact Disc-Interactive (CD-I) discs. Green Book was leveraged into a standard for discs and drives known as CD-ROM eXtended Architecture or CD-ROM XA. CD-ROM XA allows for creation and playing of CD-I-like discs. An important point to make here is that CD-I discs can't be played in XA drives and XA discs can't be played in CD-I players.

Soon, a need for a way to make small quantities of CDs in any format was realized. The Orange Book was developed as a standard for writable CDs. The intention of this article is to explain the high points of all of these specifications, clear up confusion that I've noticed in my conversations with folks who are becoming players in the CD game, and to provide a general basis for understanding the changes yet to come in the world of CD.

RED HOUSE

In the beginning, God created heaven and earth. Sometime later, circa 1980 A.D., Sony and Philips created the Red Book, and everything CD related evolved from it. The Red Book is the specification for the creation and playback of audio CDs. It defines the data format, data encoding, error correction, and rules for playback that all of the succeeding CD formats are based on.

At the lowest level, PCM (Pulse Code Modulation) data that is derived from sampling of audio data is converted to 24-byte symbols consisting of left-channel and right-channel audio information. These symbols make up what is called the Main Channel data.

Cross Interleaved Reed Solomon Code or CIRC is added to each symbol for error-correction purposes. If a symbol is in error and cannot be corrected by CIRC, it will be either interpolated or muted by the player. Next, Subchannel information is added to the symbol. The Subchannel will be discussed later.



Illustration by Jill Becker

Project Studio Paradise



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World Radio History

Readback devices for CDs interpret the edge of a pit as a 1 and the area in between as a 0. So, writing the data as 8-bit bytes would require a very high density of pits (some right next to each other in cases where there were two 1's in a row). To avoid this, the 8-bit bytes are converted to 14-bit bytes, each of which having at least two and not more than ten 0's in a row. This is known as Eight to Fourteen Modulation or EFM. Merging bits are added to each 14-bit byte to minimize the Digital Sum Voltage. DSV equals the number of 1 bits minus the number of 0 bits. Keeping DSV near zero minimizes instability in the read servo system.

Sync bits are added to complete the formation of an EFM Frame. A CD player acts on data one EFM Frame at a time. The player strips the Sync and merging bits, demodulates the EFM byte, reads the Subchannel information, CIRC decodes the data, and sends the PCM data to the players output stage.

The first thing that a player encounters on a CD is the Lead In. The main channel is all 0's in the Lead In. The Table Of Contents (TOC) for the disc, as well as some other information (next section), is encoded in the Subchannel. A player reads the TOC to find the starting addresses of the tracks on the disc.

After the Lead In is the Program Area. This is where the music or speech information is encoded in the main channel. The Subchannel information is described in the next section.

The last area on the disc is the Lead Out. This is essentially a landing zone at the outside of the disc (the information on the disc is in a spiral from the inside to the outside of the disc). The main channel is all 0's. The Subchannel is, you guessed it, described in the next section.

SUBCHANNEL

Ninety-eight EFM Frames are strung together to form a Block which has 98 bytes of Subchannel data (P-W). There are 75 of these per second, and it is the smallest addressable unit. Therefore, we will refer to this Block as a FRAC (FRACtion of a second).

Only 2 bits (P&Q) of each subcode byte are currently in general use. The

P channel going low indicates the start of an audio track. It can be asserted for any amount of time before the start of the track as long as it goes low at the start of the track. A value of 00 in the index field (Q channel) and assertion of the P flag results in an audio pause.

The Q channel information is identified by Mode numbers. Mode 1 is mandatory in all areas, but it is

ber (00-99), time within the track, and the absolute time.

Mode 2 is optional and contains the Catalog Number for the disc.

Mode 3 is optional and contains the International Standard Recording Code (ISRC) for each track on the disc. Mode 3 is only defined for the Program Area.

MELLOW YELLOW

Once the Red Book was established and they (whoever they is) discovered how to make CDs at a low cost, they (see above) said, "Maybe CD would make a good low-cost medium for distributing computer data." So Philips and Sony got together again, developed the standard for CD-ROM, and put a yellow cover on it.

The 24-byte EFM Frame is too small for most data applications, and it is not addressable. The FRAC is the smallest addressable unit and is therefore used as the basic CD-ROM data unit.

Since CD-ROM is primarily used to store data, not audio, it requires a higher degree of error correction. You don't want to interpolate and you can't mute data. But it was also felt that sometimes you would store information that would not require this additional error correction (audio or perhaps video). So, to meet both of these criteria, the FRAC defined in the Red Book was refined as shown below.

—	SYNC	—	HEADER	—	USER	DATA	—
AUXILIARY DATA							

The SYNC pattern indicates the start of the FRAC. The Header contains the FRAC address and the Mode number. The Mode will be one of the following:

Mode 0: Where the User Data and Auxiliary Data areas contain 0's. This is the case in the Lead In and Lead Out.

Mode 1: Where all of the User Data area contains data and the Auxiliary Data area contains Error Detection Code (EDC) and Error Correction Code (ECC). Since it incorporates this 3rd level error correction above the 2 levels of CIRC, Mode 1 is used for CD-ROM data applications.

Mode 2: Where all of the User Data and Auxiliary Data areas contain data.

TRACK STRUCTURE

Several FRACS are tied together to form one or more data tracks. Yellow



defined differently in the Lead In than it is in the Program area and the Lead Out. In the Lead In, Mode 1 contains the TOC; that is the number and start time of each track on the disc. In the Program Area and the Lead Out, Mode 1 gives the track number, index num-

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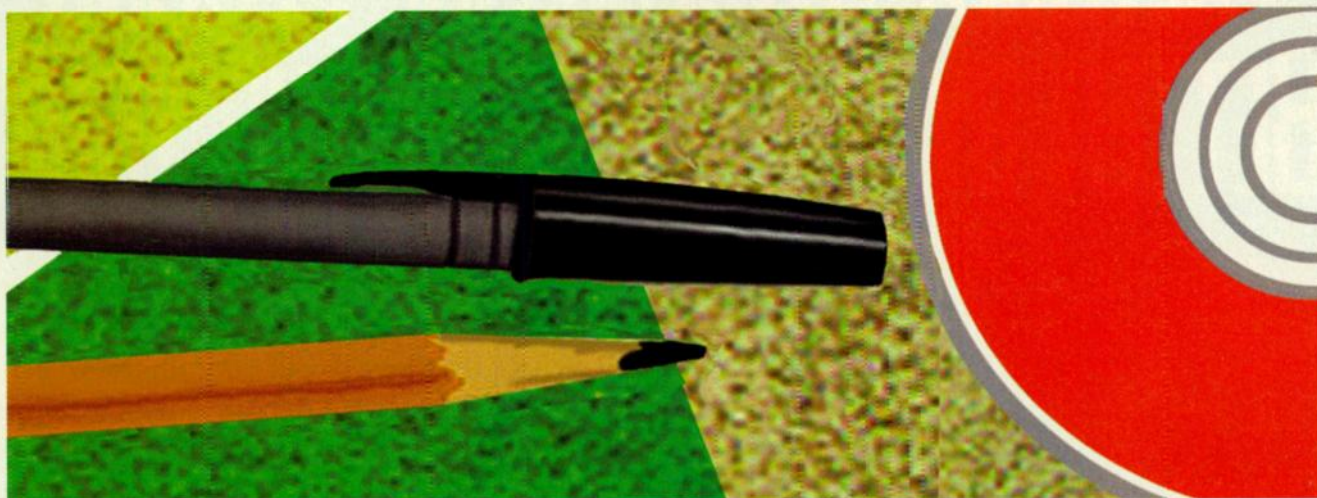
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Book allows for Mixed Mode discs, which means that Audio, Mode 1, or Mode 2 tracks can co-exist on the same disc. If a data track is preceded by an audio track or if the Mode of the data track is different from the preceding track, the data track starts with a pre-gap.

The first part of the pre-gap is a minimum of one second long and is encoded like the preceding track. If the preceding track was audio, the pre-gap will be encoded as audio silence. The second part of the pre-gap is a minimum of two seconds long and is encoded like the rest of the track.

If a data track is followed by an audio track, or if the Mode of the following track is different, the data track ends with a post-gap, which is encoded the same as the data track. The minimum length of the post-gap is two seconds.

There is no user data in the pre-gap or post-gap. These are areas in which the reader is allowed to adjust to the Mode change before the user data is encountered.

FILE STRUCTURE

As anyone who has ever done any work with a computer beyond playing video games knows, data is stored in a family tree arrangement referred to as the File Structure.

Yellow Book specifies a TOC but this only tells the start address of the tracks on the disc. Yellow Book does not give a path through the files. To make up for this, several standards have been developed that define file structures for the different host operating systems. The ISO 9660 File Sys-

tem specification was developed for DOS/Windows systems. The Rock Ridge Interchange Protocol was added to the ISO 9660 File System specification for UNIX-based systems. Apple's Hierarchical File System (HFS) was adapted for CD-ROM use on Macintosh computers. In all cases, the file structure is stored at the beginning of the program area on the disc.

GREEN BOOK AND CD-ROM XA

Green Book and CD-ROM XA were both developed to define systems for the creation and playback of CDs that contain images and real-time audio. The block structure is the same for both of these, as is the file structure. Since there are so many similarities between the two specifications, they are grouped together here.

Shortly after CD-ROM products became available, someone (no relation to them) decided there would be a market for a dedicated desktop system to play multimedia titles. The Green Book specification defines a complete hardware and software specification for this system. Including circuitry for decoding of ADPCM (Adaptive Pulse Code Modulation) audio, a type of compressed audio that is commonly interleaved with video. Also, the Green Book specifies a file directory structure for the disc, which conforms to ISO 9660.

Then someone else (no relation to someone mentioned above) decided it would be good if Green Book features were available in a nondedicated system that could be connected to your basic computer. The CD-ROM eXtended Architecture or CD-ROM XA

specification includes several features of Green Book as well as a file structure consistent with ISO 9660. The XA standard covers several operating platforms (Mac, DOS/Windows, etc.). To accomplish this, the standard requires a start-up directory on the disc for the particular system it is to be played on.

The FRAC definitions are the same for both Green Book and CD-ROM XA. The Mode 2 form from Yellow Book is modified to create Mode 2 Form 1 and Mode 2 Form 2.

— SYNC —	HEADER	SUBHEADER	—
USER DATA	— AUXILIARY DATA —		

The SYNC is the same as defined in Yellow Book as is the Header with the exception that the Mode byte is always 2.

The subheader contains the following information:

- File Number, which identifies all sectors that belong to the same file.
- Channel Number, which facilitates ordering of several pieces of information from an interleaved file at playback.
- Submode, which defines the global attributes of a FRAC as Video, ADPCM or Data, and Form 1 or Form 2, as well as if the sector is End Of File or End Of Record.
- Coding Info, which defines the details of the type of information (ADPCM, Video or Data) located in the user area of the FRAC.

If this is a Form 1 FRAC, the User Data field contains data. If this is a Form 2 FRAC, the User Data field con-

continued on page 146

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CIRCLE 62 ON FREE INFO CARD

Revelation Products ZIP CD-R Review

If you need speed when writing CDs, put a little ZIP in your life with this new system

BY ROGER NICHOLS

Attention power users! Do you want to have the hottest CD production center on your block? Well, look no further. Revelation Products has a CD-R system package called Zip CD-DA (list price: \$5495) that is a must for the serious CD recordist. Zip-CD is a half-height, 5 1/4-inch, 4x Yamaha CD writer with a 512k memory buffer. If you didn't

notice the LED on the front panel that says WRITE, it would look like a Yamaha CD-ROM player. It can spit out a one-hour long CD every 15 minutes.

I have been cruising the computer magazines looking for a vendor that carries the Yamaha CDR-100 CD recorder. I found vendors who sold the drive, but I couldn't find the software for producing CD-ROMs and audio CDs. It reminds me of the early '80s

when you could find CDs but you couldn't find a CD player. I have a friend who found out the hard way that it is also important to get the correct version of firmware in the drive to correctly record audio CDs for use as a CD duplication master. The firmware version has to do with how the laser treats the space between cuts. Most of the vendors I talked with knew nothing about firmware versions.

In my searches I found Revelation Products in Valley Forge, PA. They not only supply the Yamaha CDR-100 recorder, but they supply all of the necessary software, verify that all of the units will support audio recording correctly, offer a 15-month warranty (with a Return Authorization Policy to replace the CDR-100 if it is defective), have a BBS (dial-in bulletin board service), and have a technical staff that knows about audio CD recording requirements. The Yamaha drive is installed in an external case that has room for a SCSI hard disk. A dedicated hard disk turns out to be a good idea. With a 4x CD recorder, you are better off building an image file that can be spooled directly to the CDR-100. The disk must be defragmented and have enough room for 750 megabytes of data.

The software that Revelation bundles with the Yamaha drive is Astarte's Toast CD-ROM Pro. With CD-ROM Pro you can produce every kind of CD imaginable. You just pick the type of CD you want to record, select the hard disk that you want to copy to the CD, press GO, and sit back for a few minutes and watch.

The choices for writing audio CDs is rather limited in Toast CD-ROM. If you want control over the space between cuts, want index marks during tunes, or want continuous audio between cuts, you need another software package. Conveniently, Revelation Products also carries Astarte's Toast CD-DA, which is specifically designed for audio. I also tried Digidesign's Masterlist CD with the CDR-100, and it performed flawlessly.

The CDR-100 has some advantages over other CD recorders. Because the CDR-100 can write audio CDs without turning its laser off between tracks, you can produce a master CD that can be used by the CD plants for manufacturing. Another advantage is the 4x speed of the CDR-100. Besides the fact that you get your

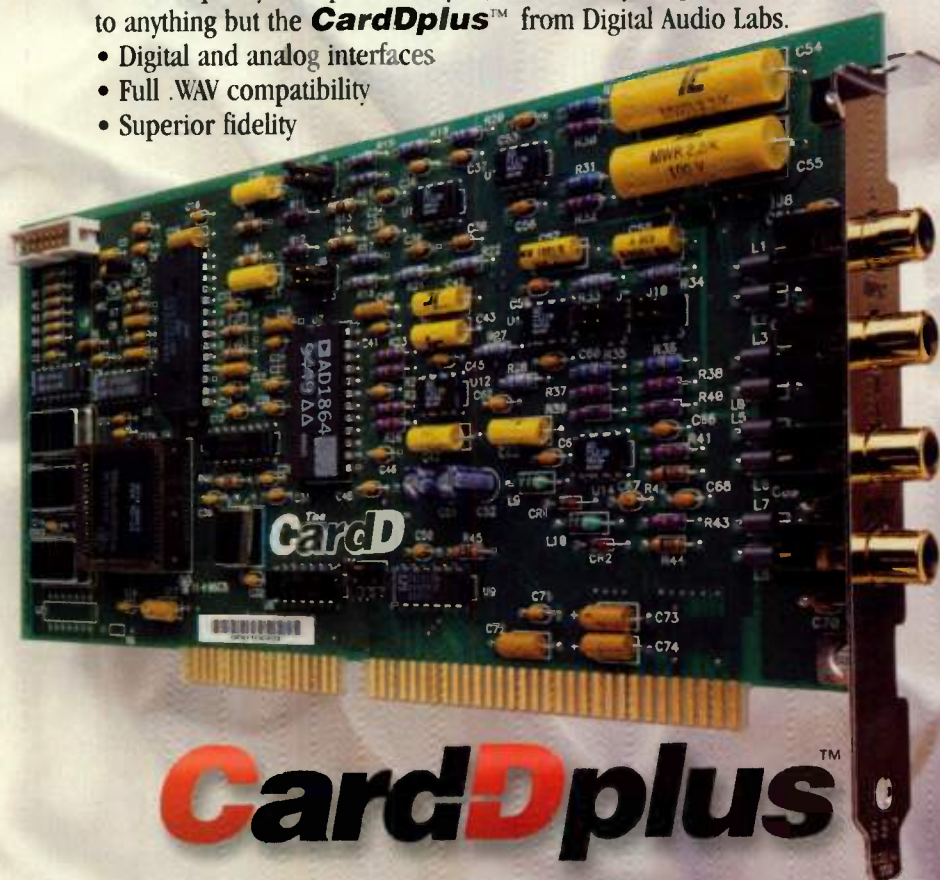


PROLIFIC WRITER: Included with the Revelation system is a 4x Yamaha CD writer.

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CIRCLE 32 ON FREE INFO CARD

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finished CD more quickly, the CDs produced at the higher speeds are actually better for CD masters. Why? For one, there is more inertia at the higher speed, and, therefore, better rotational stability for improved positioning of the pits written by the laser. Also, because the laser does not have to be turned on as long, the power delivered by the laser during the writing of each pit is also more consistent, which means that there is less chance of writing errors.

For high-speed CD writers, you need specially certified media. Regular CD-R discs can be used at 1x and 2x, but when you get up to 4x and 6x you need media that is capable of being written on at the faster speed. Yamaha, of course, has media that is designed for the CDR-100. I have been using the Kodak CDs with great success. Yamaha has not technically certified the Kodak discs for use with its machines, but Kodak and other manufacturers have verified that the Kodak media, which is designed to be used on Kodak's 6x recorder, performs excellently. I use the Kodak discs on all of my recorders with no problems. Revelation Products can provide you with 4x-certified Mitsui or Yamaha blank discs that will work with the CDR-100.

Don't forget that CD-R recorders also work well as computer back-up devices. Up to 750 MB of data per disc, and nobody can accidentally erase it. Since so many software programs come on CD, I started building install CDs with all of the disk images from various software packages. Instead of carrying around dozens of high-density disks to reinstall crashed programs, I now have everything on a couple of CDs.

What else can you say about a 4x CD recorder that works perfectly every time? I found out a long time ago that manufacturer/dealer support is often more important than the product. When you are spending the kind of money that it costs to support a recording operation, a good company profile becomes as important as a good product review.

For more information, contact Revelation Products, 1220 Valley Forge Road, P.O. Box 2225, Valley Forge, PA 19482-2225. Tel: 800-836-1823. Circle EQ free lit. #128.

Pinnacle Micro RCD-1000 Review

Pinnacle Micro brings affordable CD recording into the project studio with its latest writer

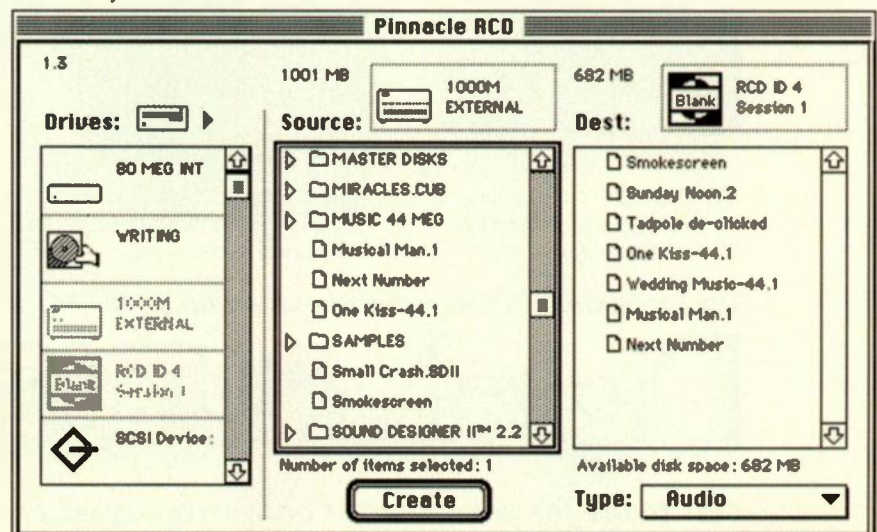
BY ROGER NICHOLS

I have had my Marantz CDR-610 audio CD recorder for about three years, and, of course, all I wanted to record were CD-ROMs. Foiled again. I just couldn't justify the cost of having two CD recorders — until the Pinnacle Micro RCD-1000 came along. At a list price of \$1695, a CD recorder becomes a reasonable choice for backing up large hard disks that get cluttered with sample files. I have a lot of sample CDs that I have purchased for Sample Cell, but, as usual, there are only a few samples on each CD that I regularly use. I transferred my favorite samples from the various CDs to an empty partition on my hard disk, arranged them the way I wanted, made instruments for Sample Cell, and then copied the whole mess to one CD with the RCD-1000. Now when I have a new project, I load my custom CD-ROM into the Mac CD-ROM drive and I'm in business. If you don't have a CD-ROM

drive, keep in mind that besides recording at 2x normal speed, the RCD-1000 will also provide 2x playback of existing CD-ROMs.

The RCD-1000 comes with software for creating discs in HFS, ISO 9660, disk image, file image, or audio (CD-DA) formats. The RCD-1000 will also produce multisession discs, but not the same type as produced by audio recorders such as the Marantz. The RCD-1000 will write the table of contents after the first session and finish the disc. Any subsequent data is written with an auxiliary table of contents at the end of the first session. Multisession software that reads this type of disc will place each session as a new icon on your desktop.

There is a limit to the number of files that you can write to the RCD-1000 in one session. I thought that a 12,000-file limit would not be a problem until I tried to back up a 700 MB hard disk. The file count soared



EASY PICKINS': You can easily choose the files to place on disc with the RCD-1000.

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CD FUN



THE WRITE PRICE: At about \$1500, the Pinnacle RCD-1000 brings CD writing to the project studio populace.

beyond 21,000. I had to back up to two separate CDs. I later found out that the way around this is to build a disk image that is copied to the RCD-1000 without regard to the number of files involved.

The RCD-1000 has 1 MB of buffer memory, which is very important when writing CDs. Once you start the writing process, you cannot stop without ruining the CD. If the hard disk has a little trouble getting to the next sector, the data keeps writing to CD from the buffer memory. If the buffer is small, chances are that the buffer may empty (underrun) before the computer can catch up. Having a large buffer increases the chances that your CD will be written without problems.

After the novelty of storing everything on every computer I ever owned to CD, I calmed down enough to tackle writing some audio CDs. For this review I used the same material I used for the "Record Company in Your

Basement" article (see *EQ*, April 1995). Each CD was about 46 minutes long. One of them had 11 tunes, while the other one had 10 tunes. I started the RCD-1000 software, opened up the folder containing the audio files to record (Sound Designer II format), and dragged them to the audio track window in the order I wanted them to appear on the CD. I selected audio CD from the Format menu and clicked Create. It only took 23 minutes to make a 46-minute CD.

You must select the amount of time between cuts on an audio CD with the RCD-1000. The choices are .5, 1, 1.5, and 2 seconds. You cannot write an audio CD on the RCD-1000 that has continuous audio between cuts. If this is a must, then there will not be a start ID between these cuts. I also found out that the tunes are written to the audio CD in alphabetical order and not the order in which you placed them in the audio tracks window. To get the cuts in the right order, I just appended the cut number to the front of the file name and wrote

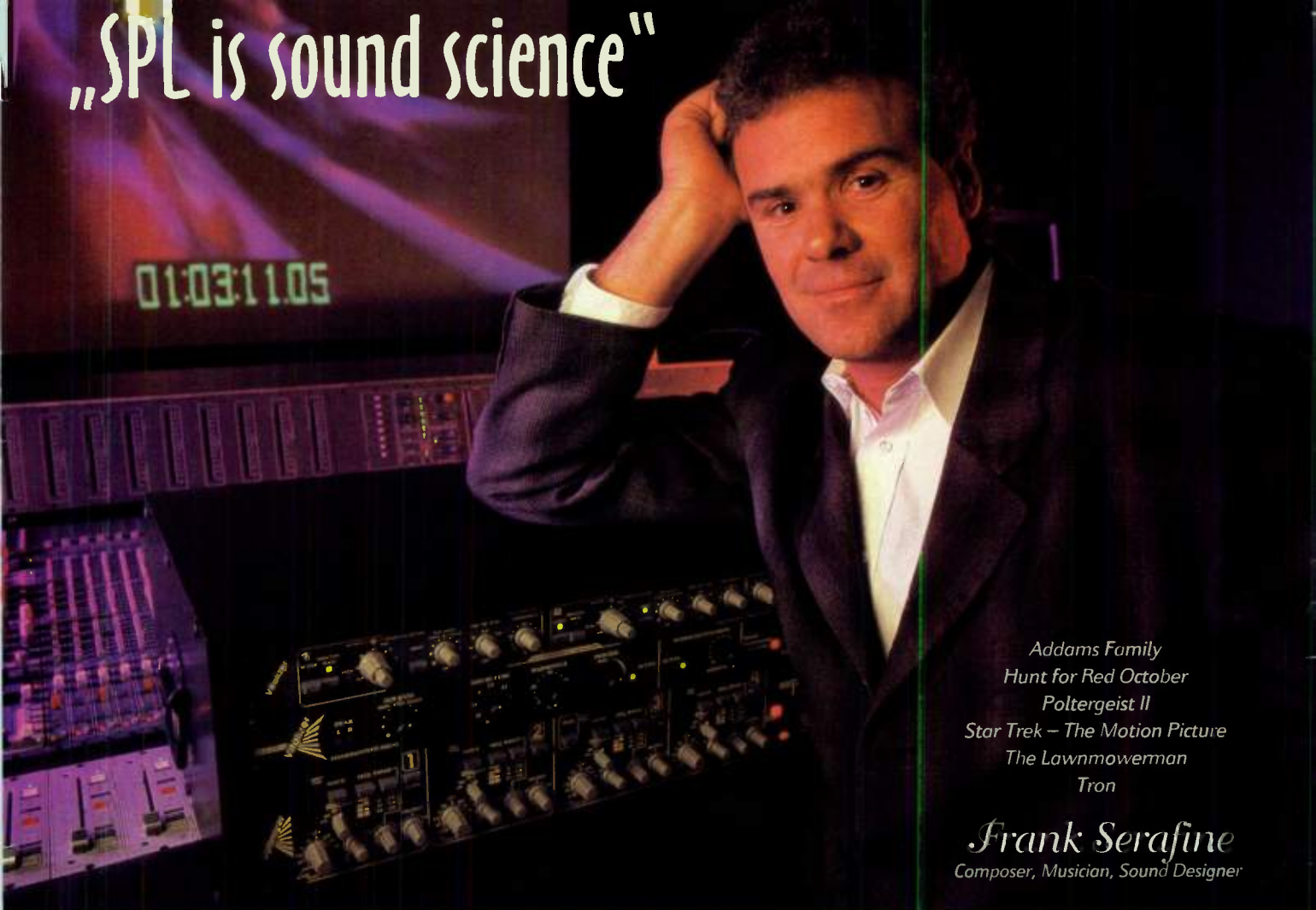
another one. Perfect the second time.

The CD-ROM disc that I submitted to *EQ* for the "Record Company in Your Basement" article was made on the RCD-1000. I have cranked out about a dozen CD-ROMs, and they have read on every CD-ROM drive I could get my hands on. The audio CDs also have played back with no problems.

Blank CDs are now cheaper than DAT tapes or computer backup tapes. For an archiving medium that is hard to beat, and audio CDs that you can produce twice as fast as a DAT copy, consider a Pinnacle Micro RCD-1000 as your next project studio purchase. For all of you members of the Gear Sluts Club, at a street price of around \$1500, that's almost the same as being free. So there is no reason to wait, right?

For more information, contact Pinnacle Micro, 19 Technology, Irvine, CA 92718. Tel: 714-789-3000. Circle *EQ* free lit. #129.

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TANNOY AMS-10A AUDITION

THE STUDIO MONITOR provides the recording engineer and producer with their only window into their work. The clearer this window is, the better they are able to control all of the variables and achieve the final results they expect. A good studio monitor must be robust enough to handle a kick drum soloed at high volume and yet still be capable of revealing all of the beauty and blemishes of the recording. There are many fine studio monitors available that meet these requirements, including a range of notable units built by Tannoy.

Tannoy's pioneering work in the development of the dual-concentric loudspeaker over the past 50+ years has resulted in a range of excellent studio monitors. The Tannoy AMS-10A (\$5995/pair) is their first active version, and improves on its current monitors by optimizing the important external variables in the loudspeaker system.

I auditioned these high-priced monitors in my project studio that includes two listening rooms, one small room (10' by 12') and one larger room (17' by 20'). After carefully adjusting the output volume from each pair with the Tachron TEF 20 acoustic analyzer to achieve very accurate level matching, I compared the AMS-10A to a number of other loudspeakers. Relatively small differences (1 dB) in overall volume between loudspeakers can often be mistaken for tonal changes. I borrowed a pair of Tannoy DMT-10 II monitors that are basically the passive version of the AMS-10A, as well as using JBL Control series monitors and my Quad Electrostatic Loudspeakers for comparison. All of the comparison loudspeakers used passive crossovers and were powered by a Hafler P3000 amplifier.

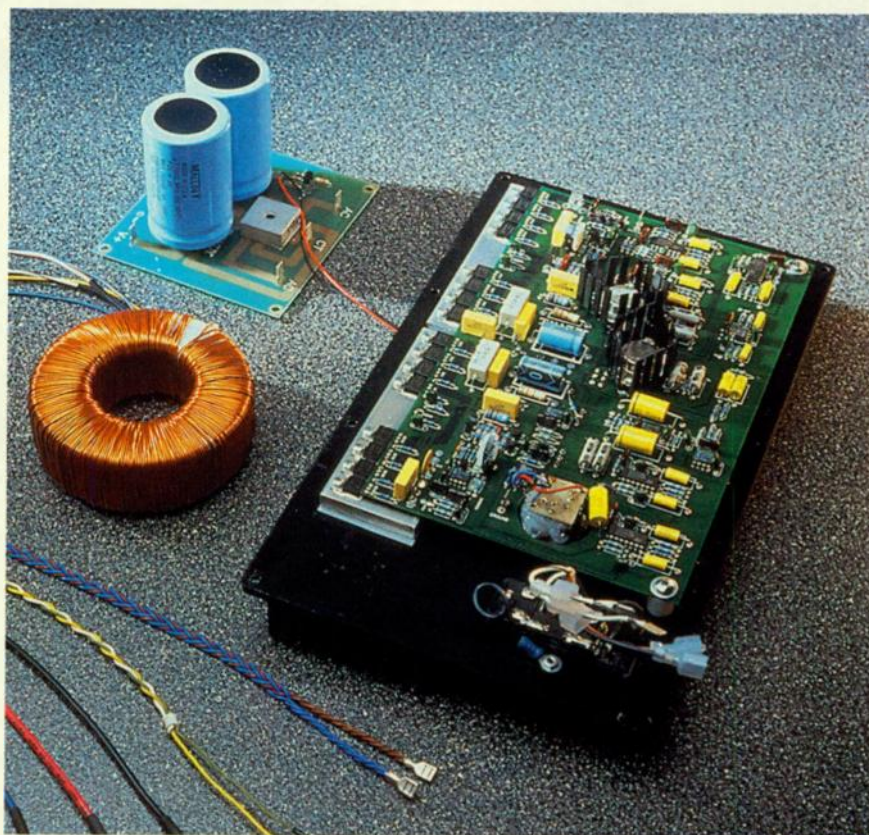
HEAR, HEAR

In listening to the AMS-10A it was clear that great care had been taken to make the crossover match the behavior of the dual-concentric loudspeaker. Not only is the amplitude response

flat and well-behaved, so, too, is the phase response throughout the audio band. Phase response is often ignored in favor of frequency response, but an advantage of the dual-concentric design is that both can be optimized without resorting to massive filters. The AMS-10A is therefore allowed to

have a minimal crossover and offers an extremely transparent view of the audio world. The 1-percent tolerance of the internal components provides exceptional matching between loudspeakers, which in turn contributes to their superb stereo imaging.

The AMS-10A does not sonically leap out in comparison to the other loudspeakers; its linear response and well-behaved low end made it disappear, leaving only the music. All of the other loudspeakers gave away their presence with changes in tonal color, low-end resonance, or sibilance. On CDs I have recently recorded, I was able to hear details I had heard while standing in the studio, but not through the large JBL monitors or the old Tannoy NFM-8's I had used in the control room. On percussion instruments, like the Bodhran or sampled drums, the attack was clean even at levels exceeding the live instrument in the room. Guitars, even the sonorous Dobro, were reproduced with all the character of the instrument/microphone intact. These are great loudspeakers for comparing microphones, offering a clear distinction between old favorites like



SEE WHAT YOU'RE GETTING: Inside the AMS-10A's lurk high-performance materials.



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TANNOY AMS-10A AUDITION



KEEP ITS COOL: The heat-sink fins on the rear of the unit keep the AMS-10A's from showing stress.

the B&K 4007, Schoeps CMT-226U, and the noticeably metallic AKG C451. I found that the AMS-10A had just a little more low-mids than I am used to, but I quickly became accustomed to the touch of warmth this offered.

GETTING BETTER ALL THE TIME

The improvement over the Tannoy DMT-10II is remarkable. Even though the DMT-10II is a very good monitor, the AMS-10A was entirely more pleas-

ant to listen to and offered a much better balance of low-to-high mid frequencies. There are also mechanical differences, including the larger AMS-10A "Space Frame" cabinet, redesigned ports, and a new soft "tulip" wave guide. The characteristic peak in the passive DMT-10II at 13 kHz is gone, as is the feeling that they are a little too bright. I found I did prefer to use the HF Boost setting on the AMS-10A to achieve a familiar sense of air in

recordings, but this setting was never harsh or sibilant. The low-frequency performance is also improved over the passive 10-inch driver, with more punch and much better damping. However, if chest-pounding subbass is required, then a dedicated subwoofer should be considered for monitoring that bottom octave.

Reverb levels are easier to judge than on many nearfields that lack the AMS-10A's mid/high balance and excellent sense of depth. Orchestral music is given the full dynamic without stress or change in balance. Rock music is punchy and full without any hint of power shortage or limiting, even at high sustained volumes. Volume changed the sense of proximity, but never altered the tone or harmonic structure of the recording. The extensive heat-sink fins on the rear of the unit seem to prevent it from showing stress even when run at full power for extended periods of time. The lack of stress at higher volumes reduces the listening fatigue and may catch users of other powered loudspeakers unaware of the actual monitoring SPL the AMS-10A's are producing. A total of 16 FET devices provide the output power (eight for each band), and the large toroid power transformer allows very high sound pressure levels without any limiting or noticeable power compression effects.

NO LIMIT

Unlike many of the active monitoring systems available, Tannoy did not include limiters or high-level bandwidth reduction in the AMS-10A. Anticipating that these monitors would be in the hands of sophisticated users, the 6th-order filter slope and a thermal switch in the feedback circuit of the low-frequency power amplifier should be enough to ensure long-term reliability. The beautifully anodized amp-module, flush-mounted into the rear of the loudspeaker, has a series of toggle switches (see sidebar) to allow the user to select the boost of low-frequencies and boost/cut of high frequencies, depending on taste and proximity to walls or large (mixing console) surfaces.

SUMMARY

The AMS-10A is the first in this new active monitor series from Tannoy.

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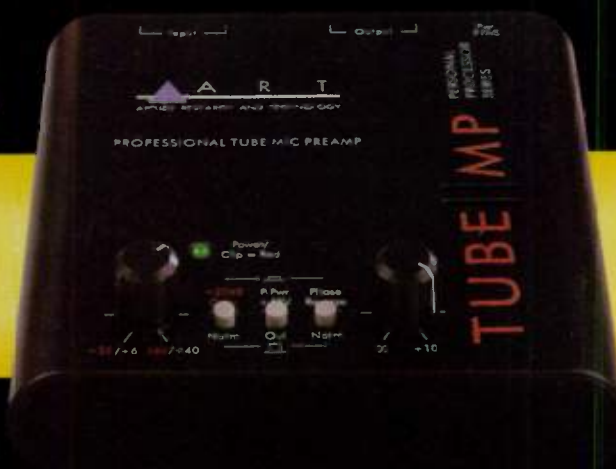
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TANNOY AMS-10A AUDITION

Although, the cost may seem high for a set of nearfield monitors, when compared with buying the loudspeakers, an active crossover, and two stereo power amplifiers, the other advantages may just be a bonus. These powerful 10-inch dual-concentric loudspeakers will soon be followed by the AMS-210A, an active dual 10-inch subwoofer; the AMS-8, an active 8-inch dual-concentric; and the AMS-12A, an active 12-inch dual-

concentric. The enhanced range of user-selected tone controls and smooth transparent sound of the active Tannoy monitors may win over many new believers in the advantages of a point-source monitor system. The stately slate finish of the AMS-10A sets it apart from the current Tannoy monitor line, and the blue LED power indicator is a distinctive sign that the AMS-10A is no ordinary studio monitor. **EQ**

MANUFACTURER'S SPECIFICATIONS

Frequency Response: 35 Hz to 25 kHz
Low-Frequency Cutoff: -3 dB at 35 Hz
Free-Field Frequency Response: 35 Hz to 19 kHz
Phase Response: less than 90 degrees 200 Hz to 19 kHz
Maximum Peak Output per Pair: 126 dB @ 1m
Maximum Continuous Output per Pair: greater than 110 dB @ 1m (115 dB typical)
Low-Frequency Amplifier: 160 W continuous
High-Frequency Amplifier: 160 W continuous
Slew Rate: 40 V/microsecond
Bandwidth: 150 kHz
THD @ 50 W: 0.05%
Signal-to-Noise Ratio: 100 dB
Operation Voltage: 110 or 220 V @ 50 or 60 Hz
Power Consumption (Idle): 55 W
Power Consumption (Maximum): 250 W
Input: Neutrik Combo-Connector XLR-3 / 1/4"-phone jack
Input Impedance: 10 kohm
Input Voltage for 100 dB SPL @ 1m: 0.07 V RMS (+4 dB sensitivity setting)
Electro-Acoustic Crossover Slopes: 24 dB/oct
Treble Contour: +2 dB, -2 dB, flat
Bass Contour: +2 dB, +4 dB, flat
Dimensions: 22" high, 14.5" wide, 15" deep
Footprint: 14.5" by 11.5"
Weight: 65 lbs

For more information, contact Tannoy/TGI North America, 300 Gage Avenue, Kitchener, ON, Canada N2M 2C4. Tel: 519-745-1158. Circle EQ free lit. #130.

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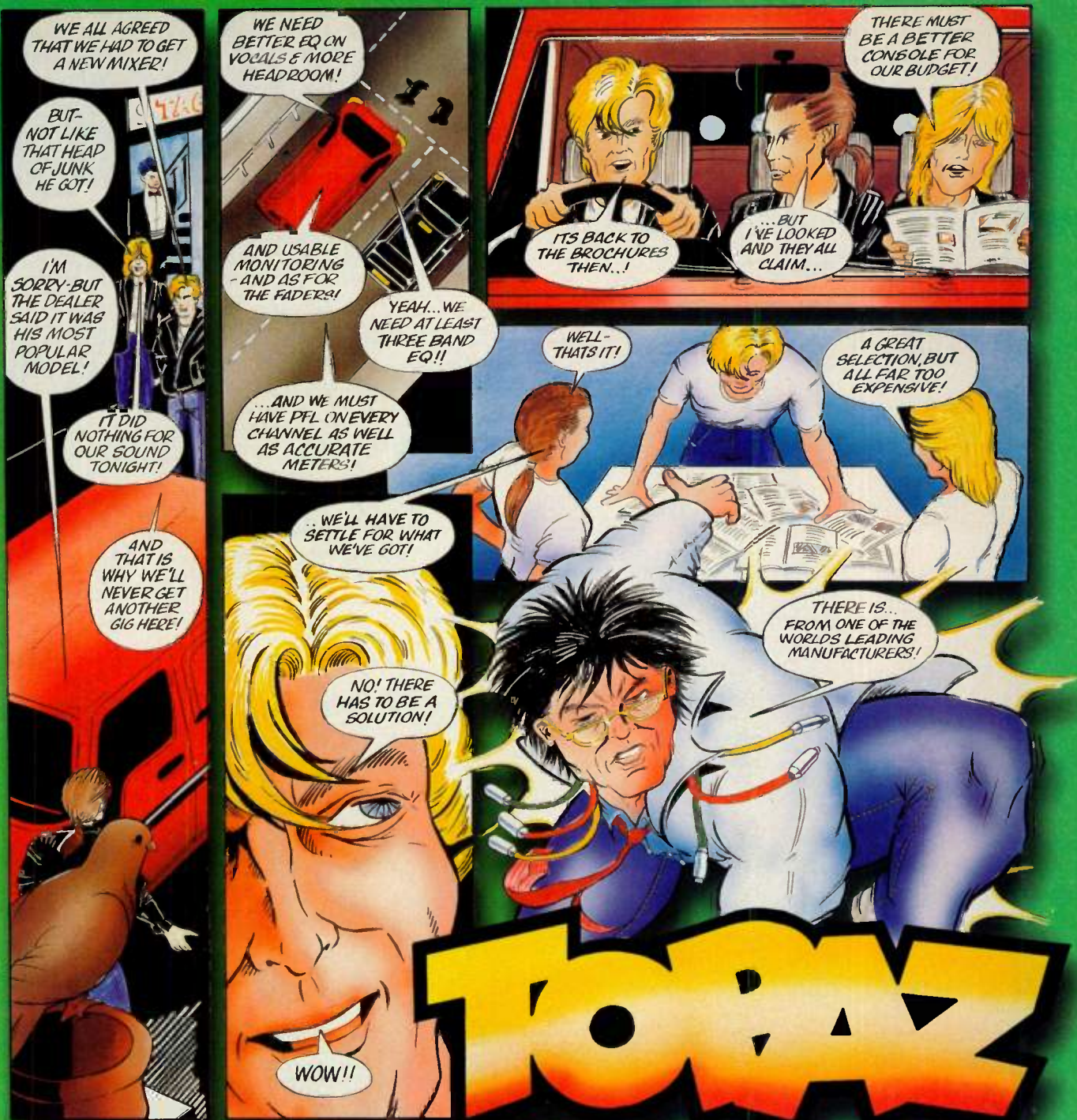
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The Topaz Macro - mixing on the move.



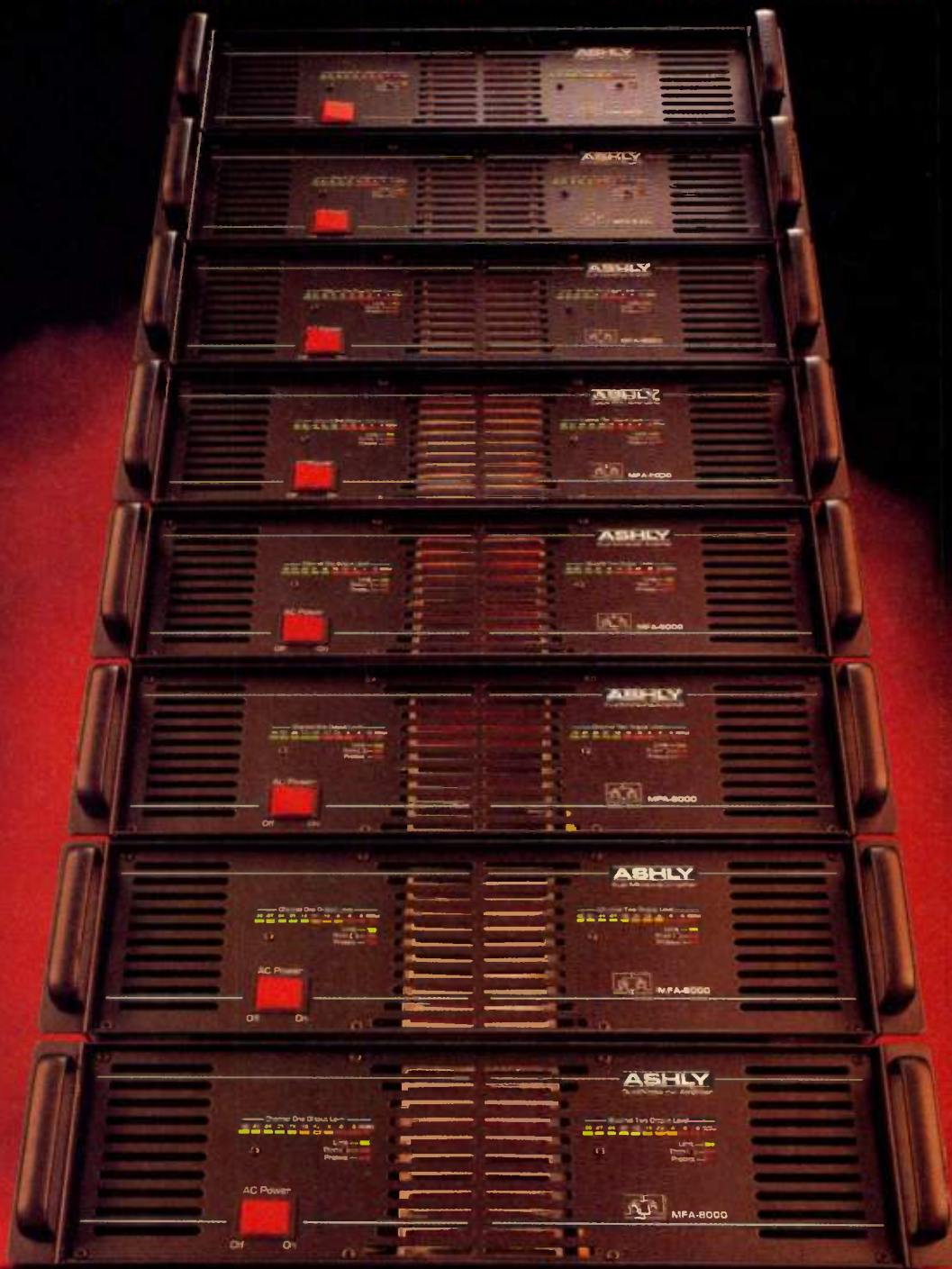
The new Topaz Macro - Live and stereo recording done!

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EQ LIVE

JOEY RAMONE'S
UNSIGNED
PAGE 92



JBL EON SYSTEM REVIEW



JBL'S MUCH-ANTICIPATED TURNKEY SYSTEM HITS THE STREETS. IS IT THE SIMPLE ANSWER TO YOUR SOUND-REINFORCEMENT NEEDS?

BY ROBERT SCOVILL

ROBERT SCOVILL ON THE JBL EON

WHEN *EQ* magazine caught up with me while on break from the current Tom Petty tour, they asked me about penning a review of the new JBL EON™ turnkey system. I must confess that an air of skepticism entered my brain: "Why me?" I thought. I know it's difficult for some of you who know me to believe this, but I don't frequent many karaoke bars and I would not hang out in many lounges like the ones in the movie *The Fabulous Baker Boys* unless I was 100 percent sure that Michelle Pfeiffer was going to be there. Even then, well, she would have to buy the drinks.

With all this in mind though, I decided to check my ego at the door and step into "Club EON" just on the chance that I might have to

impress Ms. Pfeiffer with the ease of using a turnkey sound system.

I guess the first thing to understand is that this is an audio system for people who cannot afford the luxury of hiring overqualified and underpaid, high falutin' engineers (or is that underqualified and overpaid?). Well, at any rate, this system is for the many folks out there who want to concentrate on performing, or speaking, to lots of other folks while not having to even know of Ohm's law, let alone worry about breaking it. It is "the PA system for the rest of us," to paraphrase an early Macintosh commercial.

I HATE MANUALS

Speaking of that Mac com-

mercial, do you remember it? During the commercial you see an 8-inch-thick manual for the competitor plummet through the screen and land with the subtlety of an A-bomb on a desk top. The thought of having to read it is...well, unthinkable. Next we see the Macintosh manual float gently through the screen and land ever so delicately on the desk top. This manual is about 1/2-inch thick.

The irony of that commercial would not be lost on the EON system manual. The manual is about the dimension of a good road map, with huge diagrams showing potential wiring schemes — in five different languages no less. The whole thing is

about a 1/4-inch thick and, get this, there is not one mention of 3 dB-down points, total harmonic distortion, or even any trumped-up response curves or polar plots to let us see what we think we are hearing. What a nice change. Everything that jumps off the page is in lay terms and in block diagrams. Yes friends, it's done with pictures and icons, not technical jargon. Basic technical specs, as well as a schematic-style block diagram or two, are included if you want to read them, but they are set back so as to not intimidate the desired reader. High marks from the "He-Man Manual-Haters Club."

Obviously the idea here is to sell a high-integrity sound system to someone with little or no audio experience. And with that inspiring philosophy in mind, I think I will save the left brain review for another article. Let's have some fun and talk in the macro for a moment about what this system is and what it is not.

What EON certainly is, is a solid replacement for the very annoying "DJ" system that is setting new standards for distortion by blasting the live radio broadcast to the faithful in the parking lots of the local concert venues across this nation. Guys, please step right up, you are giving PA a bad name. In your case, PA should stand for "Positively Appalling." I think your motto should be, "Hey, it doesn't sound very good, but at least it is way too loud."

EON is a comprehensive system for the club and lounge performer who relies on his or her singing



TAKE TEN: The 10-channel MusicMix 10 mixer is easy to use.

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US\$ List 379.⁰⁰



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SYSTEM COMPONENTS

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- **EON 15** — Incorporates a high-excursion, 15-inch speaker with a 1.75-inch high-frequency driver. Total weight is less than 36 lbs.
- **EON Power 15** — Incorporates a high-excursion, 15-inch speaker powered by a 130-watt amplifier and a 1.75-inch high-frequency driver powered by a 50-watt amplifier. Total weight is less than 40 lbs.
- **EON PowerSub** — Incorporates a 15-inch, extended low-frequency driver and 250-watt discrete-component amplifier.
- **EON MusicMix 10** — Ten-channel mixer offering high & low impedance mic inputs, balanced outputs to drive left, right, sub, and monitor sends. RCA in/out for recording and playback.
- **2-JBL E50S** — Dynamic pressure gradient vocal microphones with hypercardioid polar pattern, die-cast metal body construction, integrated windscreen, matte black finish, low impedance, and balanced outputs (connect to low or medium impedance mic inputs by a two-conductor shielded cable). JBL states the frequency range as 80 Hz–20 kHz and the weight as 7.4 oz.
- All necessary cabling to make the system functional.

proWess, acoustic guitar, keyboards, and the occasional drum machine. It will also excel for: the guest speaker in a conference room, business luncheon and advertising meeting room; for vocal and portable musical reinforcement for houses of worship; karaoke lounges; and mini cinemas.

What EON is not, is a PA for the metal or rock band where overt power and air movement is the goal. These bands rely on way more than strictly vocal reinforcement, and the transient response of this genre of music alone would give this system more than it could handle. "Full bandwidth in yer face," as well as numerous inputs, is the issue for these acts. I don't believe this system would

cut it based on the mixer that is provided as part of the turnkey system.

SOAP BOX TIME

Now, I don't want to get off on a tangent here and review the marketing scheme of the EON system, but there are a couple of things that kind of made me nervous. JBL should be careful about advising its dealers, as it does in the EON brochure, that, and I quote, "...being lightweight and easy to use, EON is the perfect sound system for churches, schools, and all performers who can't afford roadies..."

Does that exclude anyone? I am sorry guys, but this may be an invitation to certain types of dealers to sell this system as a do-all, cure-all for every sound

reinforcement situation.

That certain type of dealer (not all dealers fit this mold, certainly) can be summed up in one little joke:

What is the difference between a retail audio salesman and a car salesman? *The car salesman knows he is lying to you....*

Please JBL, understand who your target market is and is not. If the EON is sold for situations for which it's inappropriate, there could potentially be quite a few disgruntled bands out there.

HOW'D IT SOUND?

The review system contained two EON Power15's, the MusicMix 10 mixer, the two JBL dynamic microphones, and all appropriate cables. It all comes in one box and, if I understand the philosophy, this is the core system. I hooked it all up at MusiCanvas Studios (the official name of my project studio — thanks to all the EQ readers who sent in suggestions) in Scottsdale, AZ, and ran it through the normal paces of CD program material. This included both music and test sweeps, as well as vocal, plugging in a drum machine, acoustic guitar, and some distorted electric guitar directly off of a preamp. I must tell you, I had some fun.

The EON system was extremely easy to hook up and get going, and, I must admit, it was pretty punchy. (I would, however, like to hear the system with the subwoofer.) Although the system is not a "Smart" system, i.e., the crossover does not contain some type of aural enhancement processor and equalization, during initial listening sessions EON's sonic quality led my ears to believe that it did. My ears also told me that the crossover point seemed pretty high, possibly as high as 3 kHz, but it is actually at

1.5 kHz. I suspect these sonic parameters are tailored toward vocals and light instrumentation, and that is why things such as vocals, keyboards, and acoustic guitar sounded so pleasant through the system, while, conversely, electric guitar left a lot to be desired.

In reference to the vocal sound, one thing to note is that, overall, the system seemed shelved a little too much toward the low end. This was not overly noticeable when using the included JBL microphones, but when I used other vocal mics, such as the Shure SM58, Audio-Technica 873R, Milab LC25, and E-V 757, it required considerable signal processing surgery in the bottom end. I tried not to be overly left brain (technical, analytical side of the brain) in my evaluation. It either sounded good and was easy to use or it was not. The result? Good and easy.

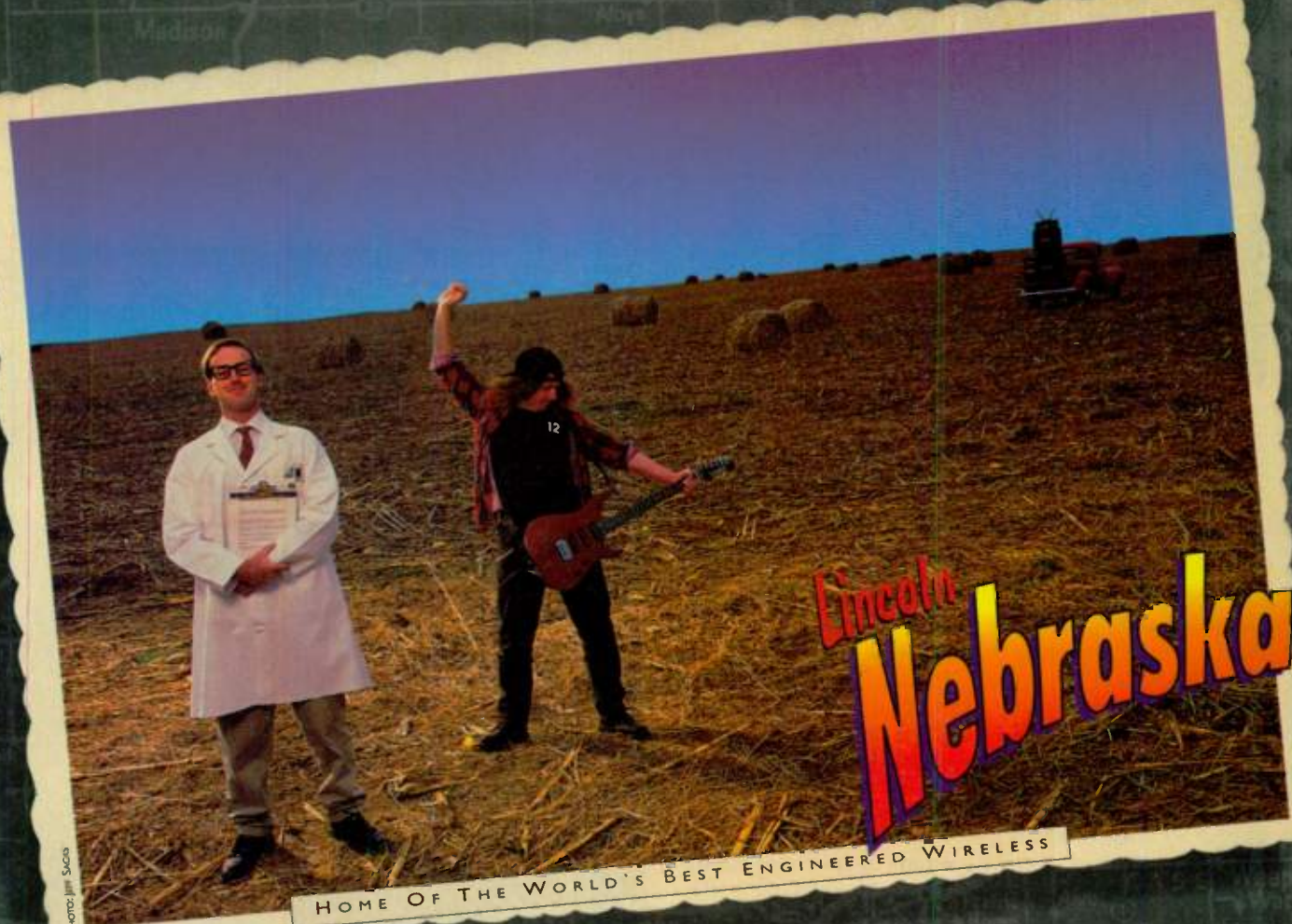
JBL's concept for the EON is an admirable one in any day and age: Build and sell a stand-alone system that is powerful and extremely lightweight and includes all the parts you need in one package. One-stop shopping, if you will. They certainly appear to have put considerable thought and effort into this system. The packaging is the thing here, folks.

Let's discuss a few examples of the positive aspects of this ideology and then discuss some of the trade-offs. Remember what Mom and Dad said, "There's no such thing as a free lunch — and don't you forget it, mister!"

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VOCAL HERO: The EON system comes with two JBL E50S dynamic hypercardioid mics that make the system respond differently than other mics.

15-inch/1.75-inch driver combination, plus the mixer, cables, and microphones. JBL has used some of its renowned engineering prowess to achieve this by using polypropylene and aluminum instead of wood for the speaker enclosure. The cabinet front is a single framework of die-cast aluminum that incorporates the speaker baffle, low-frequency driver basket, low-frequency ports, high-frequency 90° x 60° biradial horn, and finally the amplifier heat sinks. Add to that the use of Neodymium magnet structures and the patent pending Differential Drive™ voice coil (a very small magnet structure) on the speakers and you have a very integrated lightweight package.

The MusicMix 10 mixer is a 10-channel model outfitted with 6 XLR/1/4-inch mic/line inputs and two stereo channels with RCA and 1/4-inch connectors on them. The stereo channels would be used primarily for CD or cassette inputs used during the performance — or perhaps for drum machines or a keyboard submixer. There is a stereo fader for inputs 7&8 and 9&10 with high- and low-shelving-style EQ. The first six inputs have 3-band EQ

— shelving on lows and highs; peaking on mids. The mixer also possesses a pre-fade monitor bus as well as a postfade effects bus along with the pan pot. Stereo inputs 7&8 and 9&10 can be routed to these busses via a stereo bus pot as well. There is also a stereo effects return for reverbs, etc. All channels provide a single signal-present LED, but only the first six channels possess an overload indicator. The mixer is really as simple in operation as mixers can be expected to get, and for the target buyer that is a big plus. All components are surface mounted to a single PC board. The mixer enclosure is made of polypropylene and is certainly lighter in weight than any mixer I have used in recent memory...OOPS! Sorry, I lost my head for a second.

A few of the things I really like about the system are its simple and helpful features such as the power indicators on the front of the speaker. This is good because if you are going to plug a speaker into a wall outlet, you want to know if it is on or not. Everything on the mixer is laid out in soothing colors with a lot of rounded edges. There is not a single mention of dB or

frequency anywhere to be found on the mixer. I am sure this is all an effort to

avoid user intimidation (if only at the subconscious level) and, I must say, I

EON In Action

JBL designed EON as a sound system to be used not only by audio engineers and musicians, but also by public speakers (teachers, religious representatives, etc.) who want high-quality audio technology in an easy-to-use package. Mark Gander (JBL's vice president of strategic development) notes, "It is our job to make the highest possible technology accessible to the masses, and we developed EON as a solution."

A requirement of the EON design was that the system be able to stand up to road abuse and Mike Reeves (director of sales for JBL Professional, Asia) has an interesting story regarding the first EON demo in China. "The night before the demo we were setting up the system and I dropped one of the cabinets from a height of about six feet onto the stage. It broke half a dozen lights and landed on its face. I examined it and found a half-inch gap between the baffle and the enclosure. As I rushed to plug it in, the guards were demanding we leave the building. I played dumb and ignored them long enough to ensure that the EON worked and then left quietly. The next morning we arrived early to better assess the damage. We tightened a few baffle screws and the cabinet sounded great. The room capacity was 2000 people, and I was amazed at how well one EON system filled the room. I call the EON the Happy Meal System (à la McDonalds) because of its complete sound-system-in-a-box concept."

One of the first professional applications for the EON Power 15 biamped loudspeaker was in Tokyo at the Blue Note night club, which recently hosted Hiram Bullock, Will Lee, and Al McGinnis of Late Night With David Letterman fame. The Power 15 is used there to provide floor-wedge monitor mixes for musicians on stage. Blue Note house engineer Mitsuo Mashimo explained that many artists playing the club insist on JBL, and that everyone who has performed there so far has been pleased with the results from the EON system.

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think it is the right tact to take. Now, I know what you audio purists are saying, "How can anyone set up

gain structure or do EQ with out any labeling or metering?" Let's face it folks, there are a lot of highly paid

engineers who can't do it even with all the labeling and metering in the world. What do ya say we give the players and other nonengineers a break and let them have some fun?

I also loved the idea of having a stand-alone mic preamp built into the amplifier inputs on the speaker enclosure (includes

a gain control and a switch to choose between mic and line level). This is excellent for setting up a music system very fast. Plug your microphone, CD, DAT or whatever into the speaker and let 'er rip. (As soon as I saw this EON feature I flashed back to my earliest days in audio when a friend of mine had plugged a hi-z mic directly into a speaker cabinet and for the life of him could not figure out why it did not work. Dude, you are back in business!)

I also like the idea of the speaker doubling as an angled floor monitor depending on how it's positioned. In addition, it is ready-made for support stands and also has places to attach flying hardware for installs. Well done, champs.

CHECK PLEASE...

Okay, its time to pay for the free lunch. The first issue that comes to my mind is the repair issue. It's the old road dog in me, I guess. What happens when a drunk passes out, falls on the mixer, and his day-glo bracelet bumps the gain on the drum machine inputs all the way up and all of a sudden your woofers are not woofing and your horns are not horning any more? Well, you can't run down to Joe's Music and buy a new woofer because the basket is actually part of the speaker enclosure. So, the question is, do I send the speaker cabinet in to be reconed or do I just buy a whole new cabinet? Arrggghh! Maybe I have to buy the whole EON package again.

Also, I couldn't help but note the irony that the handle on the speaker enclosure is removable, therefore replaceable, but the speaker is not. [In fairness to JBL, we posed the

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above loaded question to them. Their response:

"First, we don't recommend that any end-user attempt to repair any JBL product on his/her own. That stated, the repair and reconing of the EON woofer is no more difficult than that of any other loudspeaker. The ease and straightforward nature of the procedure is exemplified by the fact that even the speaker leads can not be connected out of polarity. Warranty periods for the EON system are: transducers, 5 years; amplifiers, 3 years; all other parts, 2 years." — H.G.L.]

Speaking of handles, the one on the enclosure is great for carrying the speaker around like a briefcase, but it is virtually useless when stacking the enclosure or lifting it high enough to put on a stand. It would be of great help if there were two of these handles — one on each side. And speaking of stacking, there are two molded feet with catches for them so that you can stack the cabinets vertically. I, however, cannot in good conscience condone this stacking method unless JBL were to come up with some sort of hard catch to fasten them together.

My only knock on the mixer is a minor one really, and you can take it for what it is worth. It has been my experience that whenever you have regularly used I/O connectors that are physically mounted to a PC board, the life span before trace cracks appear is not all that long. When you couple this with the fact that the mixer is so light it can be literally tossed into the van, there is potential for that problem to be accelerated. I sympathize with JBL on this matter, though, because I am positive it is the design method used to get the mixer in the



DO SOME VENTING: The EON's speaker vents take the heat off the system.

system at the target price point. So, on this issue, "no blood no foul."

In reference to the microphones, they are made by JBL, not by AKG or another company as I would have thought. They are dynamic hypercardioid mics with an on/off switch and of adequate quality. They did, as I mentioned earlier, seem to make the system respond differently than other vocal mics that I tried. This difference I heard seems to be supported by the mic's specs, which show a 6 dB presence boost between 4 kHz and 8 kHz, right about where it should be for increased vocal intelligibility.

ONE MORE THING

I had a great time with

this system. It sounded killer out by my swimming pool. I got the collective thumbs up from the neighbors until I put on some music that was a little too aggressive in the guitar area and then I got the thumbs up from their kids. A very good sign indeed.

I have to give JBL solid points for very creative implementation of technology and space-age materials. Solid points also for making an entire system available for a lot less money than what some of us have paid for a single microphone. This system is a solid idea whose day has come. It definitely has its place in the wide world of PA, but

as comedian Dennis Miller would say, "Hey, that's just my opinion."

Robert Scovill has been on the road with Tom Petty, Def Leppard, and RUSH, and is a 3-time winner of the TEC award for Sound Reinforcement Engineer. He is also CEO of MusiCanvas Specialized Audio Group, Inc., Long Island, NY, and often wonders, "Why don't mic cables ever go bad when Jesse Helms is speaking into a microphone?" A question for the ages.... For questions or comments to Robert, send e-mail to MSAGIWest@aol.com.

UNSIGNED HEROES

JOEY RAMONE HOSTS A ROCKIN' EVENING OF MUSIC FROM SOME OF THE BEST UNSIGNED BANDS HE COULD FIND

BY STEVE LA CERRA

WHAT DO you do after you have become a successful musician in an internationally known band that has sold millions of records? Make more records? Go on tour again? Do the promo circuit? Or maybe try to help some struggling up-and-coming artists. Over his 20-year career as a member of The Ramones, Joey Ramone certainly has seen a lot of give and take in the music industry and recently decided to give a little bit back. On July 19, as part of the Macintosh New York Music Festival, the Prince of Punk and on-line magazine *Addicted To Noise* presented "Joey Ramone's Unsigned" at The Continental Divide (a.k.a. "The Continental") in New York City. The night was dedicated to showcasing new bands that, although they might have EP or single releases, have not had

exposure on a national level or major label releases. More than a dozen bands, all hand-picked by Ramone, performed at this showcase. The night climaxed in a performance by Joey Ramone & Friends, which included songs from The Ramones's newly released *Adios Amigos*.

INDUCTION OF PRODUCTION

The acts that appeared at Ramone's Unsigned included Spanky, Stop, NY Loose, La Vista Hotheads, Los Primos, The Independents, L.E.S Stitches, Hammer-brain, Los Gusanos, and Helen Love. In addition to Ramone & Friends, which included Daniel Rey, Adny Chernoff, Marky Ramone, Joe Sib, and Joe McGinty, special guests performing at the show included D-Generation and Manitoba's Wild Kingdom. Any concert that involves this many

bands had better be well-planned or the results could be catastrophic. For production manager, Ramone chose Mitch Keller, a longtime associate of The Ramones who, over his years with that band, has worked his way from drum tech to lighting director to production coordinator for all of Joey's special events.

When *EQ* asked Mitch how he went about arranging Ramone's Unsigned, he explained that in a show like this, "there is no room for error because the domino effect will occur. When working in this business there are two things to remember: Number one, the boss is always right. Number two, when the boss is wrong, see number one!

"Joey makes the rules, and every band must play by his rules or they are out. Each band was given a specific slot in the show and they had to check in with

me 20 minutes prior to their assigned time. The first three bands were given 10 minute slots, the next two were given 15 minute slots, and so on, up to about 30 minutes. Joey's band played about 45 minutes. There were less than 10 minutes for changeover between bands." Mitch stood at the side of the stage with a stopwatch timing each band and they would watch him for the cue to come off the stage.

While ten minutes sounds like an almost impossible time frame for a set change, Keller took steps to make sure that the production would run smoothly. He met with each of the bands ahead of time to define their equipment needs and made sure that The Continental was able to meet those needs. If two bands required three-piece drum kits, then those two bands were scheduled to perform back to back. This reduced the number of

LOOSE LIPS: Brijette West of N.Y. Loose takes the stage.

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drum kit changeovers and made those changes somewhat less involved. The club provided a backline with identical bass amps and guitar amps arranged on either side of the stage. Moving the amp rigs was unnecessary regardless of whether the band performed with bass at stage right and guitar at stage left or vice-versa. The only thing that needed to be moved was the bass DI. The "on-deck" band was in a ready room tuning so when a band came off, Mitch brought the drummer to the stage for the changeover and the other musicians literally needed only walk up with their instruments, plug in, and play.

KEEPING IT IN THE HOUSE

Vance Garcia is the house audio engineer for The Continental and describes the backline that was provided by the club: "We set up two Marshall JCM 800s' with 4x12 cabinets and two Ampeg SVT bass rigs. Most of the bands used only one guitar rig, but Joey wanted them to be comfortable — the guitarist or bassist could play from either side of the stage. We also provided a drum set and drummers brought their own snare drums and cymbals. Most of the work during changeover was at the drum set. One or two of the drummers were left handed and the kits had to be reversed, but it was not really a problem."

The house system at The Continental consists of a Yamaha MC1602 mixer, Crest DA-9 and DA-12 power amplifiers, two EAW JF200 cabinets (for the mids/highs), and a pair of Electro-Voice 1802 subwoofers. Garcia has the system biamped and crossed over with a Furman

unit at about 120 Hz and comments on the system EQ: "The mains are EQ'd with a Rane stereo 1/3-octave EQ that normally remains locked off. I shot the room using pink noise and an RTA with high SPL in mind, since a lot of what we do is loud music." Vance saw the Unsigned show as an eye-opener for a serious upgrade at the club. He states, "We are in the process of a renovation which includes making the stage a little bit larger, moving the drum riser, and getting a Mackie 24•8 console. I'd like to add another Crest DA-9 and DA-12 so that we can biamp the mids and highs of the JF200's and possibly add a pair of subwoofers."

The stage at The Continental is too small to accommodate a separate monitor console, so monitor mixes were done from front-of-house on the auxiliary sends of the Yamaha board. There is only one prefader send on the 1602, but Vance has a clever arrangement for getting the most out of the single mix. The output of the monitor send is split and input to the two channels of a stereo 1/3 octave EQ. The EQ output is then routed to the power amp input, running two monitors at the front of the stage and two at the rear. Although they are on the same mix, the EQ can be different for the speaker pairs, which helps in controlling feedback and improves on-stage sound quality. Since the bass and guitar amps were in close proximity to the musicians, monitor levels had to be cranked up loud and Garcia used dbx 166x compressors to help keep the

THE GREAT UNSIGNED

By Joey Ramone

My "Unsigned" show was something I had been thinking about for a long time. I like to create things that don't exist, and I get excited when I hear a new band doing something fresh and

unique. At this point in music, very few people are doing something unique. Every band sounds like Eddie Vedder. So, basically, I wanted to have all my favorite bands play for me — for my own enjoyment. And if they got discovered by some of the labels that were there, great.

Some of the bands that played that night I hadn't even heard before, although I knew some of the members from other bands. For example, I hadn't heard Los Gusanos, but I liked bassist Candy Del Mar from when she was in the Cramps. I knew some of the Devil Dogs, too, so I asked them to send me a tape. Of course, most of the bands I had heard before. When I saw Stitches live they blew me away. They had a distinct energy,

and they are one of my favorite New York bands. And the demos I heard of The Independents totally flipped me out.

I would say that it was a very successful night — not to mention a cool party. Spanky was great, NY Loose was great — I think the night brought out the best in all the bands. I was able to hang out, talk, and get feedback from the crowd. I'm sure we'll be hearing from a few of the bands again. In fact, Helen Love, who flew in from Wales U.K., met with Atlantic Records the day after the show.

I would definitely do another show like this. In fact, after the current Ramones *Adios Amigos* tour — which is our last — I'd like to open up my own club and have theme nights where unsigned bands and independent film makers can strut their stuff. After the performances, the artists can do Q&As with the crowd. I'll even have stalls set up where artists and craftspeople could sell their wares. It will be a unique club that inspires creativity. Basically, I've been all over the world and seen things I like in different places. This club will be the best bits and pieces from these places.

Of course, I've still got this tour to complete, and that's going to keep me busy for some time. And I've got some other projects I'm considering, including a solo record. But I think my club will be a great place for anyone who is looking to see something different and unusual.

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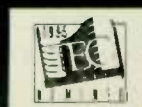
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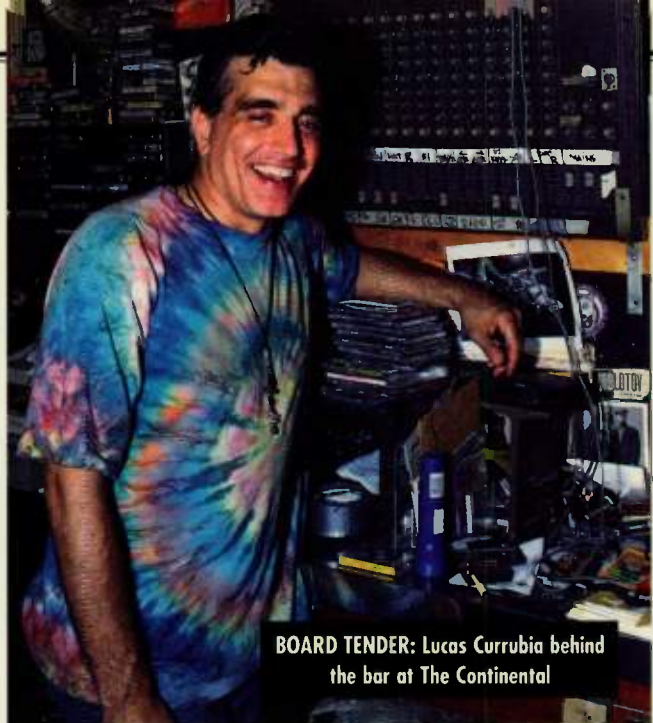
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SOUND CONNECTION  SOUND PERFECTION

CIRCLE 21 ON FREE INFO CARD



BOARD TENDER: Lucas Currubia behind the bar at The Continental

mix from getting out of control.

MIXING AT THE BAR

To mix this event, Keller hired Lucas Currubia who (among others) has mixed for Frank Sinatra, Liza Minelli, the Broadway pro-

duction of *Tommy*, the Andrew Lloyd Weber Concert Tour, and one of the original punks himself, Pete Townshend. Lucas handled all of the acts (except for D-Generation, who brought their own engineer to mix) and was surprised at the

MIGHT AS WELL FACE IT...

If you have a modem, check out *Addicted To Noise (ATN)* on the World-Wide Web. ATN is the Internet's first on-line rock 'n' roll magazine. ATN went on-line in September 1994, and by the time you read this, their ninth electronic issue should be available. Like a print magazine, there are columns, articles, and celebrity interviews with artists such as R.E.M., Primus, and Nine Inch Nails. Columns of particular interest to *EQ* readers would be "I Robot," which explores the effects of technology on music, and "The Producer," which spotlights exactly the kind of people you would expect.

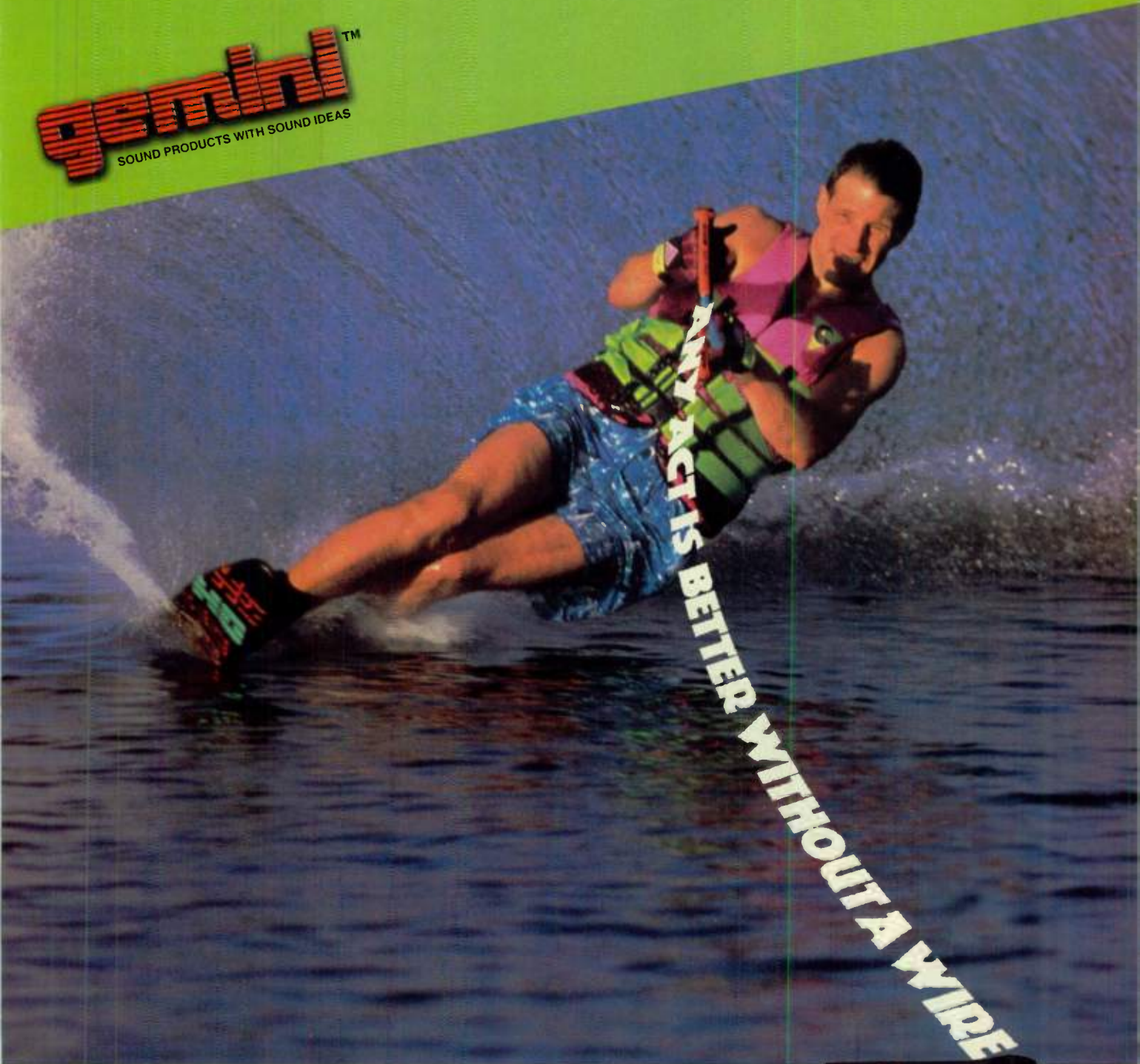
But *Addicted To Noise* differs from print mags in that it offers more than just monthly reading material. A typical album review includes three 40-second excerpts that can be downloaded in 16-bit stereo or 8-bit mono file formats, allowing you to hear the music in review. Feature articles usually include sound bites and short video clips that can be downloaded.

In addition to its monthly "publication," ATN also offers what could be the most up-to-date daily news in the music industry, "Music News Of The World." Each day, ATN's news tells what's happening in the music biz, including news items that MTV News viewers will typically see several days later (like Patti Smith's recent surprise appearance at Lollapalooza). ATN also provides new album reviews (with sound bites) every other day so there is plenty to catch up on in between the issues (which are available on the first day of each month).

Once an issue has been put on-line it stays there, allowing readers access to the issue weeks or even months later. ATN offers a master index of album reviews and an artist reference that can search the mention of a specific artist across all issues. But the best thing about ATN is that it's free of charge: the only cost is that of your web carrier. The address for *Addicted To Noise* is: <http://www.addict.com/ATN/>



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CIRCLE 33 ON FREE INFO CARD

World Radio History

Stick Your Pole Into a "Stubby-Sub"™

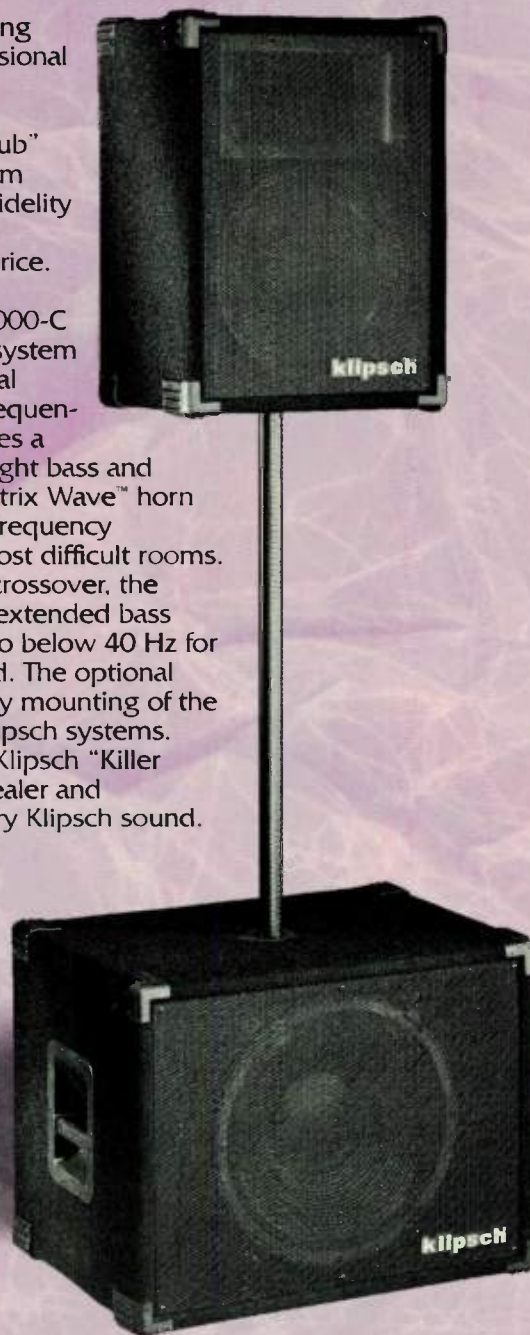
Perfect for the working musician, Klipsch Professional packages the full-range KP-2000-C with the KP-1000-C-X "Stubby-Sub" to create a flexible system that delivers incredible fidelity and low-end punch at a surprisingly affordable price.

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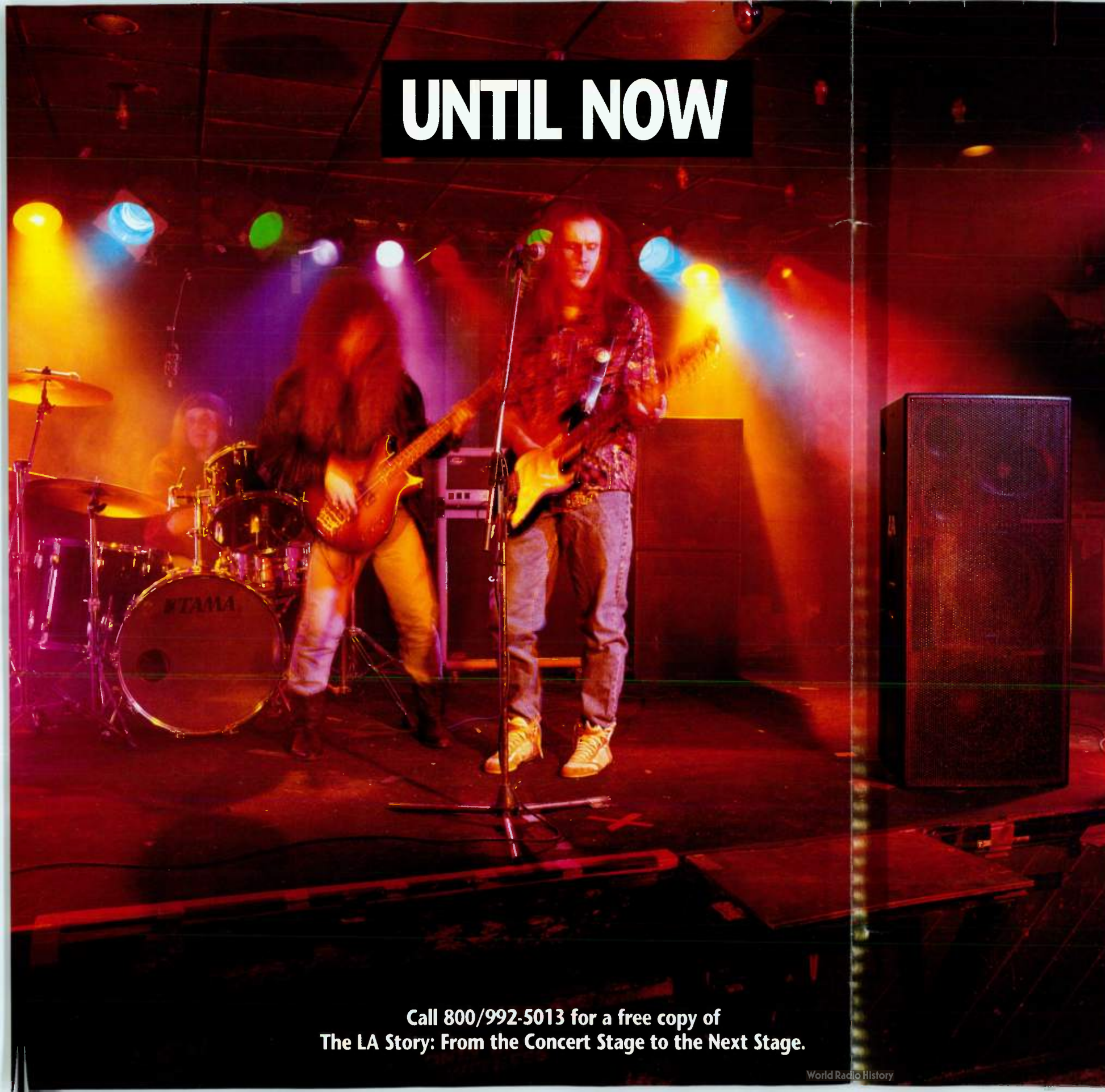
small size of the club's PA system. His main problem was getting the vocals loud enough because there was so much sound coming from the stage in relation to the size of the PA. "The backline had five times the power of the PA," he says, "and we pushed the JF200's beyond sensibility, but they held up. We told the musicians to turn down their stage volume and 90 percent of them were receptive to the idea. Once they resolved to do that, it was a lot more fun to mix the show. For this type of room and this type of music we could easily have used two or three times the PA system that we had."

Corrubia and Keller brought in their own microphones for the show, with the usual complement of Shure SM58's and SM57's. Drums were miked for kick, snare, toms and hi-hat, though the hi-hat mic was rarely used. The Marshall cabinets were miked with SM57's, and bass was taken via DI.

Certainly one of the biggest challenges for Corrubia was the location of the mixing desk in The Continental. The console is mounted on a wall behind the bar and in order to really hear what was happening in the room, Corrubia had to walk away from the board and out into the room. While this gave Lucas plenty of opportunity to stretch his legs, it also gave him newfound respect for the club's bartender: "The bartender here actually mixes the bands on certain nights. He has very good ears and knows how to get a good mix from where he is standing." In fact, for the first time, Corrubia learned the punk way of making a SIM® measurement: "Put your fingers in your ears and listen!"

EQ

UNTIL NOW



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The LA Story: From the Concert Stage to the Next Stage.

World Radio History



Welcome to LA

Linear Activation: The Next Stage In Sound Reinforcement

Linear Activation is an advanced approach to speaker design that draws on years of experience with professional touring systems. When you're ready to stand out from the crowd, the LA Series of Linear Activation loudspeaker systems is engineered to take you beyond the same old noise, to something no one else has ever really heard: your own sound.

Until now, the only place you could really hear the details that define your individual sound was the studio "sweet spot." The LA Series delivers studio monitor clarity to the entire audience. That's because the Linear Activation design process optimizes each LA Series system's total acoustic output to put high definition, high impact sound everywhere you want it. Simple idea. Took us over a year to make it a reality. There's a lot of our soul in these boxes – let us take you on a tour.



Why is this crossover so complex that it took a computer program to help design it? Because integrating five high performance transducers into a single acoustical unit is not as simple as wiring up a couple of capacitors and inductors.

The LA325's dual 6.5 in. cones are specially treated to dampen spurious resonances. We mount them in a line array subenclosure to direct acoustic energy away from ceilings and floors. This separate midrange system delivers the character of voices and instruments without the distortion that makes ordinary PA speakers sound harsh or "mushy."



You've seen waveguides on high end studio nearfields, but no one has ever seen anything like this: our Elliptic Conical Waveguide™. It works with the LA325's 2-in. exit compression driver (like the ones in our large touring systems) to project high definition upper octave detail in live sound nearfield applications (15 to 65 feet).

LA

Performance Audio Redefined

LINEAR ACTIVATION: A NEW APPROACH TO LOUDSPEAKER DESIGN

Any PA can fill a room with noise. The goal of Linear Activation design is to fill the space with high definition, detailed, studio monitor quality sound. Linear Activation design concepts apply the lessons learned in years of professional touring sound reinforcement to "near field" sound reinforcement applications.

THE NEAR FIELD: TWO DEFINITIONS

In the studio, "nearfield" means a spot where the direct output from the loudspeakers is the only factor determining sound quality. Room reflections arrive so late and are so much softer than the direct sound that they play no part in the listening experience. Studio nearfields are designed to operate at a distance of 1 – 4m (three to fifteen feet) and provide a reference to one or two listeners. Because the coverage area is so small (about one square foot, the size of the average human head) and reflected sound is not a factor, the only essential requirement for speakers of this type is flat on-axis frequency response. This can be achieved through the use of active or passive equalization. High SPL output capability is not required, since the listening distance is so short.

In typical live sound reinforcement applications such as clubs, corporate presentations, or worship services, "nearfield" means the entire listening area within roughly 15 – 65 feet from the loudspeakers. Much of the audience will actually be closer to the side or rear walls than to the speakers, so the reverberant field is a major part of the sound. The coverage area is hundreds or even thousands of square feet – extremely high output capability is required to provide "adequate" levels throughout such a space. Sound

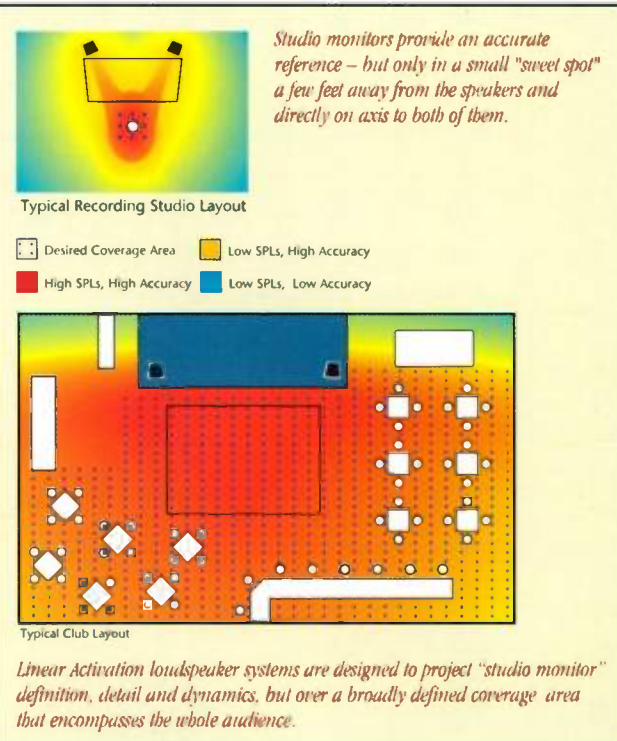
quality should be consistent throughout, so that all listeners can hear and appreciate the performance. When the reverberant field is very different in tonal balance from the direct sound, the ear is confused, intelligibility is low and the sound quality is perceived as "hollow" or "harsh." Hours of tweaking with equalizers cannot solve this problem, because equalizers cannot change the dispersion and coverage angles of the loudspeaker system.

TOTAL ACOUSTIC OUTPUT

Linear Activation design recognizes that it is the loudspeaker's total acoustic output that determines how it activates a given listening area. When total acoustic output is optimized, coverage is consistent, the spectral content of the reverberant field matches that of the direct sound field (as it would in an unamplified performance) and every member of the audience can have a satisfying listening experience.

One of the keys to Linear Activation design is the requirement that the dispersion angle as well as the on axis amplitude remain consistent throughout the frequency range. Consistent coverage angle must be designed into the system from the beginning – it cannot be added later with equalizers.

In the course of optimizing the total acoustic output of the new LA Series of Linear Activation systems, EAW engineers have developed innovations such as the Elliptic Conical Waveguide used to control high frequency dispersion. But these new technologies are only useful because they are integrated into professional loudspeaker systems that produce Linear Activation of a small to medium size venue.



**CALL 800/992-5013 for a free copy of
The LA Story: From the Concert Stage to the Next Stage.**

Linear Activation Loudspeaker Systems by Eastern Acoustic Works. One Main Street Whitinsville MA 01588 Tel 508/234-6158 Fax 508/234-8251



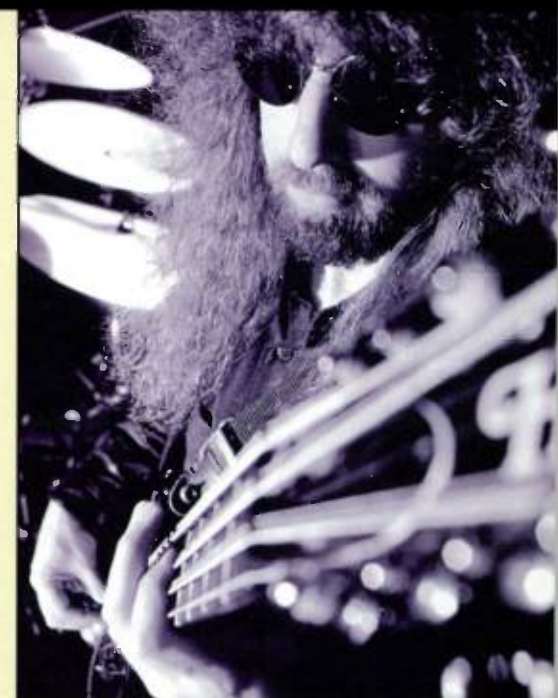
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IT TAKES A SPECIAL KIND OF DEDICATION TO FIND YOUR OWN SOUND. A SPECIAL KIND OF GUTS TO STAND UP AND MAKE THAT SOUND IN FRONT OF A CROWD. BUT NO MATTER HOW MUCH YOU PUT INTO YOUR SOUND, YOUR PA HAS BEEN PUTTING OUT THE SAME OLD NOISE.



LA

Performance Audio Redefined

GET YER BEER HERE



ROAD WARRIORS

BAND NAME: Beer For Dolphins

MEMBERS: Mike Keneally, vocals and guitar; Bryan Beller, bass; Toss Panos, drums

LATEST RELEASE: *Boil That Dust Speck*

WHERE THEY'VE BEEN: The "We Never Thought of a Name for the Tour" Tour has been hitting clubs all over California.

WHERE THEY ARE GOING: Beer For Dolphins will continue their dates in California for the next couple of months, though they really wouldn't mind getting out! But due to rehearsals, they stay close to their rehearsal studio, Joe's Garage.

HOW THEY GET AROUND: 1993 Ford Aerostar, owned/driven by road manager, Rich Lewis

SOUND ENGINEER: Strangers, whoever is at the club, and, on occasion, Bryan Beller will run the sound while performing.

CONSOLE: Whatever the venue has.

SYNTHESIZERS: They don't bring any because they take up too much room in the van.

EQUIPMENT: Keneally tours with his pedalboard, which contains a variety of antique sound modifiers. Bryan Beller has his own rig consisting of a Tech 21 SansAmp PSA-1 and pedal board.

AMPS: Rivera 100 watt and an SWR for Bryan and his bass cabinet

WORST LIVE EXPERIENCE: Keneally reflects: The very worst gig we had was in San Diego one week ago. We were playing at the San Diego Street Scene and no one knew how to work any of the equipment. It was an acoustic show and we're a three-piece band, so all you heard was bass and vocals, and we cut out after three songs.

BEST LIVE EXPERIENCE: Keneally continues: We were playing in San Diego at the Wikiup Club. It was a big room with

high ceilings, and the reverb is probably still bouncing around. There are just some nights that a band is prime, and this was one of them. We played great. We were hungry and wanted to play. This show was musically perfect — the way a show is supposed to be.

TOUR NOTES: Keneally continues: Back in 1991 I was still going through the trial and error phases of stage amplification — it's an ongoing journey for any guitar player. That's when I was introduced to the original Tech 21 SansAmp pedal. In 1992 I recorded my album *Hat on Immune Records* using solely the SansAmp Classic; I didn't use any standard amplification. None of the guitars were miked, they were recorded direct to tape through the SansAmps. The sound that we got was very clean and very up front, and that album was probably the first widely released

album to use all SansAmps. I don't think that I will ever record an album without using the SansAmp to some extent.

Because I had such a good experience recording with the SansAmps, I used them in a live application at the most recent Winter NAMM in Anaheim, CA. Both Bryan and I used PSA-1 units plugged directly into the console. I was getting a very authentic amp signal on stage, and I was able to play with the sustain and feedback coming from the monitors. We had no speaker cabinets on stage because it was determined that it was going to be too loud in the room. So my entire rig for that performance was my pedalboard, the two PSA-1's, and the monitor. It was a rockin' sound, and 'til this day it was probably the most fun show that I've done with my band. It took me hours to come down.

EQ

NEW GEAR FOR YOUR NEXT GIG

TAKE A LOOK AT WHAT'LL BE IN YOUR RACK NEXT YEAR WITH THIS AES LIVE-SOUND PRODUCT PREVIEW

LET'S ROCK

Bag End's Red Rock speaker series is ready to rock. The series of 12-inch speaker systems is specifically designed to provide what many guitarists are looking for — classic overdrive tube distortion. Red Rock speakers are the first Bag End drivers to offer a "wooly" cone break-up sound in a semiopen-backed enclosure. In addition, the speakers are covered with deep red carpet. The Bag End Red Rock series includes three cabinets: the S12R single 12-inch box, the D12R double-12, and the Q12R, which includes four 12-inch speakers. The specs are: S12R — 75/150 watts @ 8 ohms, D12R —

150/300 @ 4 ohms, and Q12R — 300/600 @ 8 ohms. For more info, contact Bag End, P.O. Box 488, Barrington, IL 60011. Tel: 708-382-4550. Circle EQ free lit. #131.

EVERYBODY ROTATE

DigiTech's RPM-1 vacuum tube rotary emulator offers the classic sounds of a rotating speaker from a single-rack-space unit. Front-panel controls, which include drive control, horn speed, rotor acceleration, spread, speed, and brake bypass, offer complete flexibility of sound. The RPM-1 includes a three-but-



The DigiTech RPM-1

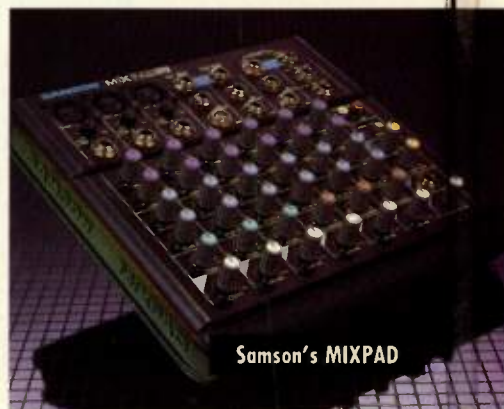
ton footswitch that connects to the continuous controller input allowing the user to sweep the rotational speed up or down. The unit offers a dynamic range of greater than 90 dB, "A" weighted, and will be available at a retail price of \$569.95. For more details, contact DigiTech, 8760 South Sandy Parkway, Sandy, Utah 84070. Tel: 801-566-8800. Circle EQ free lit. #132.

HAPPENING PAD

Samson will introduce the new MIXPAD 9, a "laptop-sized" nine-channel professional audio mixer. The MIXPAD 9 includes three balanced XLR mic/line inputs, three stereo inputs, two aux sends per channel for flexibility in mixdown, and stereo effects returns to left and right main outputs. An independent 2-band EQ is standard fare on each of the nine channels. Mic input trims allow optimization of signal-to-noise ratio at the inputs. Constant-level pan controls (mono channels) and balance controls (stereo channels) allow seamless panning and balancing of the mix. A balanced stereo output enables the MIXPAD to be connected to power amps and other gear. For more information, contact Samson Technologies Corp., P.O. Box 9031, Syosset, N.Y. 11791. Tel: 516-364-2244. Circle EQ free lit. #133.

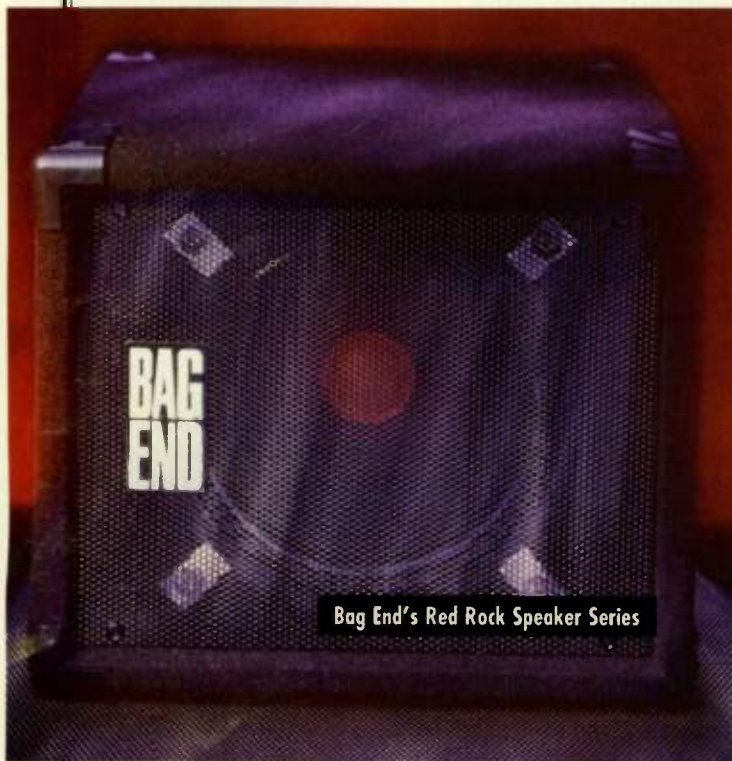
TOTALLY AUTOMATIC

Shure's SCM810 automatic mixer is an 8-channel device and is compatible with any professional mic or level signal. To minimize poor audio quality, the SCM810 is equipped with IntelliMix circuitry, which automatically activates only those mics in use. Other features include an automatic gain adjustment, adjustable EQ for each input channel, and linking capabilities for up to 400 microphones. Occupying a single rack space, the SCM810 is additionally



Samson's MIXPAD

equipped with 48 volts of phantom power/channel, RF resistant chassis and circuitry, LED indicators displaying channel activation and clipping, and advanced logic capabilities such as cough buttons, remote status LEDs, and loudspeaker muting. For all the details, contact Shure Brothers, 222 Hartrey Ave., Evanston, IL 60202. Tel: 800-25-SHURE. Circle EQ free lit. #134.



Bag End's Red Rock Speaker Series

assurance standard. No wonder N/DYM® Series III microphones offer the best sensitivity, highest output and the widest frequency response of any microphone in its class.

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CIRCLE 26 ON FREE INFO CARD





LEADER OF THE PACK

As part of its PRSII in-ear monitoring system, Garwood Communications will be launching the M-Pack, a belt-pack monitor system that incorporates a preset compressor/limiter. Instead of a wireless belt-pack unit receiving a radio signal, the M-Pack belt-pack is connected by cable to any line-level mix source. The M-Pack comes with such safety features as artist-controlled volume settings and integrated protection circuitry. To find out more information, contact Garwood Communications Inc., P.O. Box 1505, Newton, PA 18940. Tel: 215-860-6866. Circle EQ free lit. #135.

SPEAKER UP

Peavey Electronics will feature its PR 652S, a two-way magnetically shielded enclosure that features a combination of a foam edge 6 1/2-inch woofer and a 19 mm titanium tweeter with built-in diffusion cap. The internal passive crossover has a 12 dB/octave slope to ensure good power handling while providing a frequency response from 60 Hz-18 kHz. The black-molded plastic cabinet is weather resistant, and a curved black metal grille protects the speakers. Integral threaded inserts are provided for mounting hardware and screw terminal inputs. The PR 652S offers an unobtrusive appearance, good for

use in video control rooms, background music, paging systems, meeting rooms, churches, and restaurant requirements. For more of the story, contact Peavey Electronics, 711 "A" St., Meridian, MS 39301. Tel: 601-483-5365. Circle EQ free lit. #136.

POWER PLAY

EAW will unveil its FL103 speaker system. This three-way system incorporates a 15-inch woofer in a vented enclosure, a vented 6.5-inch midrange, and a 1-inch exit compression driver on a WGP waveguide. The vented midrange enclosure reduces cone excursion and distortion at the low-frequency/midrange crossover, while increasing power handling for the midrange subsystem. The WGP provides a smooth power response transition between the midrange and the 1-inch compression driver. For the whole story, contact Eastern Acoustic Works, Inc., One Main St., Whitinsville, MA 01588. Tel: 508-234-6158. Circle EQ free lit. #137.



Peavey PR 652S

MIGHTY MOUSE

Tech 21 invites you to meet its MIDI Mouse, a portable and user-friendly MIDI foot controller. While it can be powered by a standard adaptor or remotely via MIDI cable, according to Tech 21, it is the only MIDI foot controller available that is operable with a 9-V battery. The simple design offers easy access to 128 patches of any of the 16 selectable MIDI channels. Its "stomp-box" format features three footswitches with smooth-action custom actuators. The Active/Search footswitch alternates between two modes. In Active, the footswitches change the patches sequentially and send the information through the MIDI Out port. In Search mode, you can scroll forward or backward to a desired location without sending any patch change information. Retail price for the MIDI Mouse is \$125. For more news, contact Tech 21, 1600 Broadway, New York, NY 10019. Tel: 212-315-1116. Circle EQ free lit. #138.

LOVE-GATE RELATIONSHIP

Behringer's XR1400 Multigate will provide four-level gating

in a user-friendly format for engineers and musicians. The Model XR1400 Multigate features four independent gates with an external key input. New features include an Ultra Transient Response (UTR) gate and a special IRC (Interactive Ration Control) program-dependent expander. Sweepable hold, release, and range parameters provide greater control in critical applications. For the inside scoop, contact Behringer distributed by Samson Technologies Corp., P.O. Box 9031,



Behringer Multigate

Syosset, N.Y. 11791-9031. Tel: 516-364-2244. Circle EQ free lit. #139.

TO BBE, OR NOT TO BBE

Joining the Sonic Maximizer is BBE Sound's new 362SW. It offers independent subwoofer control with a variable low-pass filter (30-1320 Hz) in one chassis. The 362SW is recommended for sub-frequency control when adding a subwoofer and power amp to any active or passive crossover full-range system. The 362SW has been designed to control the crossover point and output level of subsonic frequencies. The unit is inserted into the signal path directly between the EQ and/or the electronic crossover and power amps. It works by applying phase compensation to the low-, mid-, and high-band areas, as well as dynamically controlling the amplitude relationship between the same frequencies. For more info, contact BBE Sound Inc., 5381 Production Dr., Huntington Beach, CA 92649. Tel: 714-897-6766. Circle EQ free lit. #140.



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11 lbs.	580w x 2 @ 2Ω
PA-1400	350w x 2 @ 8Ω
2 rack space	650w x 2 @ 4Ω
16 lbs.	800w x 2 @ 2Ω
	1400w @ 4Ω bridged
PA-1800	450w x 2 @ 8Ω
2 rack space	775w x 2 @ 4Ω
17 lbs.	1050w x 2 @ 2Ω
	1800w @ 4Ω bridged



The Stewart PA-Series includes the PA-500, PA-1000, PA-1400, and the remarkable PA-1800.



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(another Stewart first), 7 stage Circuitguard protection, real 2 ohm stability, 21 step precision attenuators, and a Full Five Year Warranty, the Stewart Amplifier Line is not just the best, but the only choice.

For the location of the Stewart Professional Audio Dealer nearest you, and our complete product information kit, call us at 1-800-316-7626.

Stewart

ELECTRONICS

ALLEN & HEATH GR1 LIVE-SOUND ZONE MIXER



THE ALLEN & HEATH GR1 looks deceptively simple when first viewing the front panel. This unusual mixer was originally designed to suit the French sound installation market for those mundane tasks of mixing mics and prerecorded music in conference rooms, bars, restaurants, and paging systems. Why is this mixer being reviewed in *EQ*, you might ask? Well, anyone who must provide simple operation but needs to have the quality and features of a more complex mixer may find the GR1 useful.

There are many 1U keyboard mixers that provide both mono and stereo line inputs mixed to a stereo output. These mixers often compete on the basis of the number of their inputs. Signal processing and routing are usually minimal or require sharpened fingertips to adjust the little knobs. Those are good mixers in those situations where you are simply

combining the outputs from your rack of MIDI sound modules.

What if, however, you want to add in a phantom-powered mic or three and provide a little compression or high-pass filtering? Now you must add additional devices. What was a simple one-rack-space system is now growing into a processing rack of gear. On the other hand, the GR1 provides these features internally and can easily have these and many other features added in by simply moving a jumper on a header connector. The deceptively simple front panel of the GR1 hides a mixer that will allow considerable growth in your needs and the sound quality you would expect of the larger Allen & Heath mixers.

THE INS & OUTS OF IT ALL

The GR1 has three mono inputs with pan controls and three stereo inputs with balance controls. Each of the inputs can switch

between balanced mic and line inputs or unbalanced auxiliary inputs (except input One, which does not have a line input). The XLR mic inputs include selectable 48-volt phantom power and individual recessed gain trim controls on the rear panel and an internal jumper for a pad that handles levels up to +8

dBu. The line inputs are balanced 1/4-inch jacks internally selectable for nominal levels of -10 dBv, 0 dBu, or +4 dBu. The auxiliary input is connected using the sub-D 25-pin connector and allows multiple GR1's to be bussed together for applications where you need to create a matrix of inputs and out-

ROAD TEST

MANUFACTURER: Allen & Heath, 8760 S. Sandy Parkway, Sandy, UT 84070. Tel: 801-568-7660.

APPLICATIONS: Live sound mixing for conferences, A/V presentations, and onstage or house submixing.

SUMMARY: A powerful combination of routing and processing hidden behind a simple 1U front panel that allows simple operation and fiddle-proof configuration.

STRENGTHS: Wide range of features, including selectable inputs, remote input and output VCA control, comp/limiters, ducking, and three-bus output assignment.

WEAKNESSES: Users must open case and contend with internal jumpers when configuring features.

PRICE: \$995

EQ FREE LIT. #: 141

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puts between multiple GR1's. This offers the user up to 23 inputs assignable to the six level controls.

The Left, Right and Mono outputs are selected for each input by more internal jumpers and can include independent compression (ratios of 2:1, 4:1, and 10:1) and even sidechain assignment. There is also a ducking feature familiar to DJs, where inputs 1, 2, or 3 can drop the level of all other inputs by 6, 12, or 18 dB. The input that has the front-panel Priority button pressed will be the overriding input. The outputs can be fully independent (even the bussing outputs on the back-panel sys-link), and the mono output can also include the sum Left/Right signals. All of this (and more) is chosen by orienting jumpers inside the GR1. The unit also includes a front-panel headphone output with a volume control and button for selecting either the stereo or mono mix.

MAKING SENSE

Luckily, the user manual

makes all of this internal jumping about reasonably simple. Users that have never seen the inside of an audio device may find this a little intimidating, but most of the jumpers are clearly marked on the printed-circuit boards. This is, however, not for users who are unfamiliar with working inside electronic equipment. They should consider having a technician configure the unit to suit their application.

The real beauty of this mixer is that once configured, the unit is not intimidating to operate, even for people who have no experience with audio equipment. For live-sound system users, the GR1 can be configured to suit a tour or one-time rental application and then reconfigured for the next outing without any fear that the wrong compressor setting or bus assignment will be made on the front panel. In clubs, churches, or other fixed applications, the GR1 is perfect for handling routine mixing applications that would otherwise waste

valuable inputs on the primary mixer and intimidate someone who only wants to raise the volume of the CD player.

The GR1 also features the very handy VCA control. This allows the use of a simple pot (variable resistor) to remotely control any or all of the front-panel controls. Not only does this provide an inexpensive way of controlling levels from afar, but the front-panel controls are disabled when this feature is active. In applications where you need to restrict who can control what, this can be very handy. The only downside is that the input source selector switches cannot be disabled.

IN SUMMARY

The GR1 is an extremely

flexible unit. The internal compressor/limiter can be adjusted to prevent the sound system or tape recorder from overload, the simple three-segment LED metering is enough to know that you are happening, and the headphone output will confirm the status of the mix. Although it may not replace the major mixing console (especially as there is no solo bus for cueing), it can fit in where there is a need for operational simplicity and compact size. The nine color-coded knobs allow even first-time users to feel confident that they have control over the volume of an input, and the veteran can grab the volume for the preshow music without even looking!

EQ

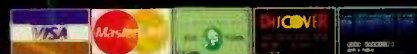
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CIRCLE 68 ON FREE INFO CARD

Westlake BBSM-6 Monitors



WORTH THE WEIGHT: At 55 pounds, the BBSM-6's do not belong on top of your console, but they will enhance your studio.

These speakers are
real heavy, man, but
how do they sound?

BY BOBBY OWSINKSI

The reputation of certain equipment manufacturers is such that upon hearing their names one immediately conjures up a sonic picture of quality. Neve is one of those manufacturers; and certainly Studer, Lexicon, and EMT are among the ranks. For me, I've always had that warm fuzzy feeling when someone mentioned Westlake monitors. The only problem was that I never had much experience with them since they always seemed so financially out of reach. So, when my editor told me that I would soon receive a set of their nearfield BBSM-6's, I was way pleased and excited. At last I would get my chance to spend some time with a set of the famed "Westlakes."

The Westlake BBSM-6's are part of that new breed of monitor that is too big to be what we traditionally call "nearfields" and too small to be what generally passes as soffit-mounted main monitors. They are true nearfields, as it turns out, since I found them to work much better for my purposes at close range.

The BBSM-6 is a three-way, medium power, phase-coherent monitor with an internal high-level crossover network. It features two ported 6-inch woofers, a 3-1/2-inch midrange in a separate, sealed, nonresonant enclosure, and a 1-inch dome tweeter. The crossover points are 600 Hz and 6 kHz. According to Westlake, the frequency response is 60 Hz to 18 kHz (± 3 dB), and the speaker has a nominal power rating of 80 watts below 600 Hz, 50 watts from 600 Hz to 6 kHz, and 30 watts above 6 kHz.

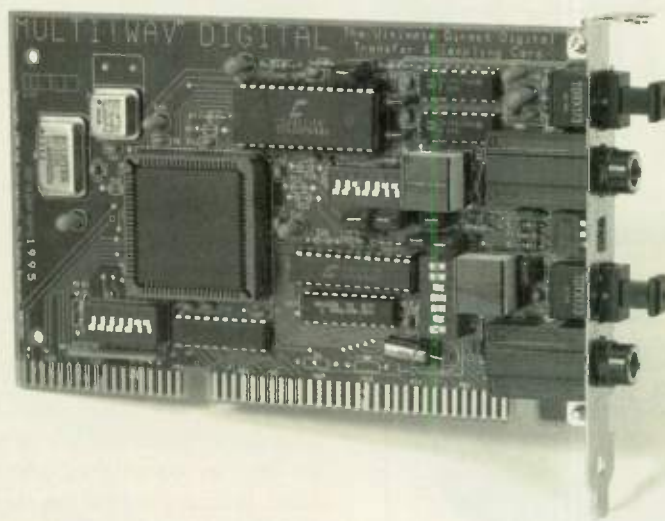
My first impression upon taking the Westlakes out of the box was that they were the heaviest speakers I had ever encountered in or around that size. I thought I was lifting some dense matter from a black hole. I mean, think of lifting a small block of concrete to get an idea of just how heavy they are

(55 lbs). Ah, but speakers are made to listen to, not to lift. So, with lifting over, now came the fun part.

I began a mix of avant-guard punk/metal band Aurora at the famed Village Recorder Studio B. I first put the Westlakes on stands directly behind the Neve V-60 console and couldn't get the hang of the sound no matter how hard I tried. So I held my breath and moved them to the console overbridge (which was reinforced). The sound came alive as the speakers came closer to me. Suddenly there was a sense of spaciousness and depth that you generally don't find in a monitor of any price. I was given a new dimension of depth, as I could hear deep into the mix. This turned out to fool me quite a bit in my mixes.

That first mix proved to be really guitar heavy, which meant that I had over-compensated with a bit too much upper midrange. I then mixed ex-Rolling Stone Mick Taylor's live album and found that I made the snare too bright and had too much definition on the guitars (again). I am usually not caught twice in a row with new monitors, since I remember what the problems are and then compensate accord-

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► Real-Time Digital Format Conversion	Convert Optical to Coaxial, S/PDIF to AES/EBU, or vice versa, in REAL-TIME!	YES	No
► Software Upgradable Hardware Design	Add NEW HARDWARE features from software updates, such as 24 bit audio & more!	YES	No
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► Shielded Digital Audio Transformers	Reduce common-mode noise and clock phase jitter.	YES	No
► Flexible Ground Strapping for Pros & Audiophiles	Achieve optimal ground configuration. Reduce common-mode noise and clock phase jitter.	YES	No
► I/O Overload Protection to 50 VDC	Protect against accidental misconnection of inputs and outputs up to 50 Volts DC.	YES	No
► 256/512 Bit Upgradable RAM FIFO Buffer Option	Improve performance by reducing sensitivity to hardware underruns & overruns.	YES	No
► LC Filtered Analog Supply	Improve receiver PLL performance by reducing noise.	YES	No
► Multi-Layer PCB	Improve performance by reducing "digital" noise.	YES	No
► 24mA Bus Drivers	Meet all IBM PC Bus requirements.	YES	No
► 64 Selectable Addresses	Eliminate hardware installation conflicts.	64	Just 2
► Professional Sample Rates	48kHz, 44.1kHz, 32kHz (software selectable)	YES	Yes
► Life-Time Warranty	Protection against manufacturing defects.	LIFE-TIME	1 Year

* Comparison performed May 1995 using Multi!Wav Digital PRO (rev A) from AdB International and Digital Only CardD (s/n 08009159 rev B) from Digital Audio Labs. Multi!Wav Digital PRO requires one 16-bit ISA bus slot; a computer that meets the hardware requirements specified by your Windows WAV editing software; and digital I/O cables. AdB and Multi!Wav are trademarks of AdB International. All other trademarks are the property of their respective owners. Made in USA.

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INTERVIEW WITH GLENN PHOENIX

"Test, test, and more testing," is the way that designer/president Glenn Phoenix describes what makes his Westlake monitors truly unique. "As a result, due to the stringent tolerances that we demand, we throw away many drivers and components that most manufacturers would accept," he continues. Other factors are involved besides eliminating sub-par components, as well. "We do a lot of other things that other manufacturers wouldn't even consider, such as building a whole separate internal enclosure for the midrange, handpicking drivers and crossover network capacitors so that both speakers of the pair are absolutely accurately matched, and even winding our own coils for the crossover since it's impossible to buy them in the 1-percent tolerances that we need."

And what of the weight? "We use a lot of extra bracing and there's three different types of isolation and dampening materials," states Phoenix. "Also, the whole back panel is covered with the components for the crossover network. The fact that there are that many components adds significantly to the weight."

All of the attention to detail and this anything-goes design philosophy comes at a price, however. "We're not as concerned about the cost of our monitors as much as we are the performance," says Phoenix. "We're dedicated to sonic accuracy for the listener, and we really feel that the customer gets what he or she is paying for."

—Bobby Owsinski

ingly, but the Westlakes proved to be the exception. Luckily, I was able to make some adjustments during the mastering process to tame the midrange down a bit (check out my mastering article in the April, 95 EQ).

The third mix I did was back to Aurora. The musings of its surrealistic DJ trying to get over the chainsaw guitars and heavily affected bass is a challenge under any circumstance; even more so with unfamiliar monitors. This time I brought the Westlakes as close to me as I dared, all the while picturing that their enormous weight would cause them to crash down and shear the controls off half the modules on the desk. But moving them closer seemed to do the trick, since all concerned were very pleased with the final result.

I left the Westlakes with Village's chief engineer, Jay Antista, to see if his opinion jibed with mine. "I like them a lot," he said. "I kept comparing them to the main monitors, which I'm very familiar with (and were just voiced), and they relate much better than a lot of the nearfields that we get in. The bottom end is a lot closer to the big monitors than I'm used to. They also had a lot of space and openness to them. With a lot of speakers the tracks sound right in your face, but these had a lot of depth."

I had more trouble adjusting to the BBSM-6's than I usually have with a new monitor. This doesn't mean, however, that I didn't like them or that they have problems. Actually, what it could mean is that they are more accu-

rate than I am used to and, as a result, I was unable to compensate. In fact, after a few tries I did get the hang of them and was satisfied with the result.

I think that anyone who can afford these monitors will like them quite a lot. At \$2500 a pair, the price is a somewhat prohibitive factor in getting more people to use them. Plus, the sheer weight of the units may prevent their use as a personal monitor by producers and engineers who like to bring their own (unless they really like having a hernia). The only other nitpicking that I have is that the input connectors are simple barrier strips on the rear of the speakers and were hard to connect to with large-gauge wire. These are probably used to maintain the airtight integrity of the rear speaker wall, but they sure are a pain to connect to.

So it turns out that there's really a good reason why the name of some manufacturers causes us audio types to bow in holy sonic reverence. The name doesn't make the product. The product makes the name! And in my mind, the name Westlake will continue to live on in the manufacturer hall of fame under the banner of "Quality."

Many thanks to the staff at Village Recorder for taking the time to listen with me.

*For more information, contact
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Circle EQ free lit. #142.*

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CIRCLE 38 ON FREE INFO CARD

Yorkville YSM-1 Monitor

A look (listen) at
Yorkville's competitively
priced nearfield speakers

BY STEVE LA CERRA

The YSM-1 from Yorkville is a compact two-way studio monitor designed for console-top placement. The cabinet is finished in black woodgrain with a removable black cloth grille, and the front-ported enclosure is small enough that it should be able to live happily on most console tops. The drivers in the YSM-1 are centered along the vertical axis of the front baffle so there are no left and right designations to the speakers. Although the company logo is readable when the cabinet is oriented vertically, the technical folks over at Yorkville informed me that the YSM-1 can be placed horizontally as well. The dome tweeter of the YSM-1 protrudes from the front panel by about the same thickness as the front grille (three-eighths of an inch). This appears to be an effort by Yorkville to avoid any diffraction effects which might occur from high-frequency wavelengths bouncing off the grille. Input to the YSM-1 is made with gold-plated, five-way binding posts mounted on the rear of the cabinet. These terminals are recessed into the rear panel, and the holes in the posts are large enough to easily accommodate your favorite monster-type wire.

I used the YSM-1's placed horizontally atop a console and angled slightly inward towards the listening area with the tweeters on the outside of the speakers. The first thing that I noticed is that these speakers produce a very solid, focused stereo image (not unusual for a compact monitor). I clearly felt a pinpoint sense of instrument placement that, surprisingly, remained at most listening levels. The speakers passed along a lot of the detail present in the source material. Hi-hat and percussion had the right amount of zip without sounding harsh and transient response was very fast.



YORKVILLE SPECIFICATIONS

Frequency response: 40 Hz–20 kHz (± 3 dB)

Woofer: 6.5-inch cone

Tweeter: 1-inch dome

Impedance: 6 ohms

Sensitivity @ 1W/1m: 90 dB

Power Handling Capacity: 70 Watts

Crossover Frequency: 2.5 kHz

Dimensions: 16" x 10" x 9"

Weight: 18 pounds

On one occasion I heard a hi-hat with a nasty edge, but it was more the instrument than the YSM-1. Ensemble string sounds were a little forward-sounding, indicating that there might be a slight bump in the speakers' response at the upper midrange (a frequency response chart of the YSM-1 does indeed show a small peak at around 4 kHz).

The YSM-1's sounded pretty neutral through most of the midrange frequencies. There is a coloration in the 400 Hz area that added a touch of chestiness to male voice and made some snare drums sound a little tubby. This quality (which added warmth to the mix) made the YSM-1 easy to listen to over long sessions and is representa-

tive of what listeners might hear in their living rooms. But be careful — this quality could cause your mixes to have too much high-frequency content when listened to over other systems.

Unlike most small monitors, the YSM-1 actually produces some usable bass response. No speaker this size is going to rock your world, but when tracking live drums you won't feel constrained by the levels this monitor is capable of producing. The YSM-1's can reproduce tight bottom-end with a pretty decent wallop for a small speaker. When you push the monitors past about 100 dB SPL they start to sound strained, especially in the bottom octave, but for close-field use in small

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YORKVILLE YSM-3

For project studios that have the available space in their control room, Yorkville also offers the YSM-3, a three-way monitor with a 12-inch woofer, a 5.5-inch midrange driver, and a 1-inch hyperbolic dome tweeter. The cabinet's large size (25.75" x 16.8" x 11.5") and weight (45 pounds) precludes these speakers from being placed on top of most consoles, but they could easily be placed upon pedestal stands situated behind the console. The YSM-3 is capable of handling a hefty 250 watts of program power (sensitivity is 89 dB @ 1W/1m) and bass response extends down to 35 Hz. Yorkville designed the YSM-3 for long-term listening with a linear phase response and accurate midrange reproduction. The YSM-3 comes in a black woodgrain enclosure with a removable front grille. List price is \$499 per speaker. —*SL*



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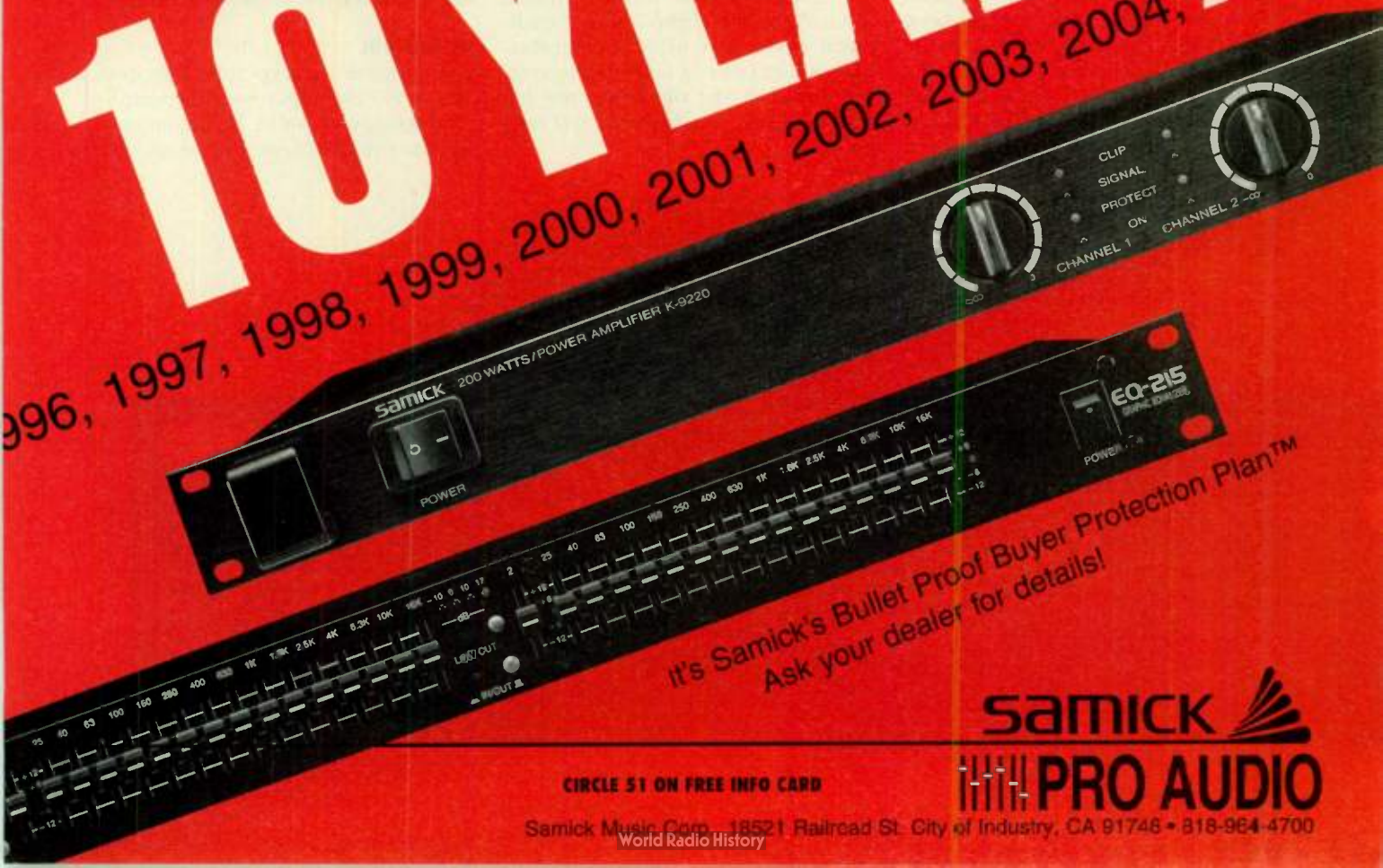
At \$280 per pair, the Yorkville YSM-1 is clearly aimed at project recording studios requiring quality reproduction on a limited budget. This speaker places Yorkville into an area of tough price competition with well-established offerings from several other manufacturers. If you are searching for a monitor in this class, the YSM-1 is worth an audition.

For more information, contact Yorkville at 4625 Witmer Industrial Estate, Niagara Falls, NY 14305. Tel: 716-297-2920. Circle EQ free lit. #143.



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ART MDM-8L 8 Channel Limiter



MANUFACTURER: Applied Research and Technology, 215 Tremont St., Rochester, NY 14608. Tel: 716-436-2720.

APPLICATIONS: Minimize recorder overload, increase punch, or treat the MDM-8L as eight individual compressors.

SUMMARY: When set up correctly, the MDM-8L can make gain-riding easier, as well as produce a "punchier" sound.

STRENGTHS: Cost-effective; makes level-setting less critical; lets you goose the faders in the heat of mixing with far less chance of going into the red.

WEAKNESSES: Indicator doesn't show amount of gain reduction; MDM mode may not be optimized for your application.

PRICE: \$599

EQ FREE LIT. #: 144

MDM-8L BASICS

The MDM-8L would typically insert between your mixer bus outputs and MDM inputs. However, since each compressor works independently, you could (as just one example) use two for mixdown on your main stereo tracks, two for headphone feeds for the studio, and four on MDM tracks that need compression.

Having eight processors for MDM applications matters only if you find yourself recording on many tracks simultaneously. For example, if a solo performer generally records one part at a time, a stereo compressor is all that's needed — patch it into tracks as appropriate during recording. However, the MDM-8L is more convenient when you're shuttling back and forth between tracks, especially since you can set controls as desired for a particular track and just leave them there.

IN CONTROL

Don't expect a vintage tube compressor for \$75 each, however, the component pedigree is solid: each compressor has two TL074 quad op amps (the

WE'VE ALREADY looked at one entry in the "you need eight limiters for your MDM" sweepstakes, the Symetrix 488 Dyna-Squeeze (see the April '95 issue of *EQ* for the full story). Like the 488, the MDM-8L is designed to let you print a higher average level on digital recording media, while minimizing the dreaded over-0 VU overload condition. However, the units are quite different. The 488 is a "set-and-forget" unit intended to

essentially become a part of your MDM, whereas the MDM-8L is slanted toward being eight compressor/limiters in a box, of which one application is using them with MDMs.

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CIRCLE 63 ON FREE INFO CARD

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The MDM mode
is supposed to be
foolproof — you
just set the inputs
and forget it.

lowest noise model of the TL0X4 line), THAT 2150 VCAs, a CA3046 array, and two 5532 dual op amps to drive the outputs.

Each compressor also has controls for input level, output level, and a bypass switch — no attack, no decay, and a fixed compression ratio (starting at about 1.5:1 and increasing with increasing level). The Input control influences the amount of compression; turn up for more squashing. There's a bypass LED and another LED to indicate when the signal is being compressed.

Seven of the compressors also have a link switch. You can link any compressor to the compressor to its left (this is the kind of linking that preserves stereo imaging in 2-channel applications). Furthermore, you can link any number of compressors together, which is handy if you're compressing a group of like instruments and don't want to have to tweak multiple controls every time you want to change the sound.

How the compressors work depends on the mode of operation: normal or MDM. The main difference is that, in MDM mode, the effect of the limiter (which floats above the compressor threshold) becomes more drastic to help minimize the impact of transients. Also, the outputs are disabled since the MDM input level is known (a rear-panel switch chooses between -10 and +4 levels).

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Inputs/Outputs: 1/4-inch phone, balanced/unbalanced jacks

Power: Internal supply, three-wire cord

Controls for Each Compressor: Threshold/Input (-40 to +20 dB), Output (-20 to +20 dB), active/bypass switch

LEDs for Each Compressor: Bypass and signal-over-threshold indicator



1/4-inch phone jacks. These are the TRS (tip-ring-sleeve) type, so they work as balanced +4 connectors or unbalanced -10 connectors. As with the Symetrix 488, there is no connector for direct interfacing with ADAT or DA-88 multipin connectors.

MDM-8L IN ACTION

Clearly, at \$600 for eight channels this isn't something for the golden-ear types (who are more likely to spend \$2000 for a 2-channel compressor). Nonetheless, the MDM-8L is effective — if used correctly, which is not as easy as it sounds.

Despite its ubiquity, compression is a poorly understood effect in the project studio, and that's precisely the market to which the MDM-8L aspires. Paradoxically, the better the compressor, the more likely it is to be misadjusted since at moderate levels of compression, many ears are not sensitive enough to consciously detect the sonic difference (ears are far less sensitive to level changes than pitch changes). So, the threshold gets turned down, the output gets turned up, and the result is a choppy and noisy sound — overcompression.

To help deal with this, the MDM mode is supposed to be foolproof — you just set the inputs and forget it. But you can still overload the MDM following the MDM-8L — it just takes a lot more effort to do it. I didn't really get into MDM mode that much, though, because I thought it ended up sounding too compressed if I kicked the meters up where I like (as close as

possible to distortion). Instead, I got exactly the results I wanted using the compressors in normal mode and using a more subtle amount of compression.

Even with less compression you still have a lot more slack with your faders; you can push the inputs harder to get the effect of the sound working against the compression without having to worry too much about going into the red. This is also really useful for getting a consistent sound with live recording, where you don't get a second chance. My take is that the MDM mode provides the "training wheels" to get you used to the concept, but you're better off working the controls.

Just remember, the bypass switch is your friend. Constantly compare the processed and straight sounds to make sure you don't end up compressing yourself into left field. Observe the MDM's VU meters; the peak levels of the compressed and bypassed versions should be the same. And the bypass switch's other use is its most important: use compression only when needed. Too much sounds highly bogus.

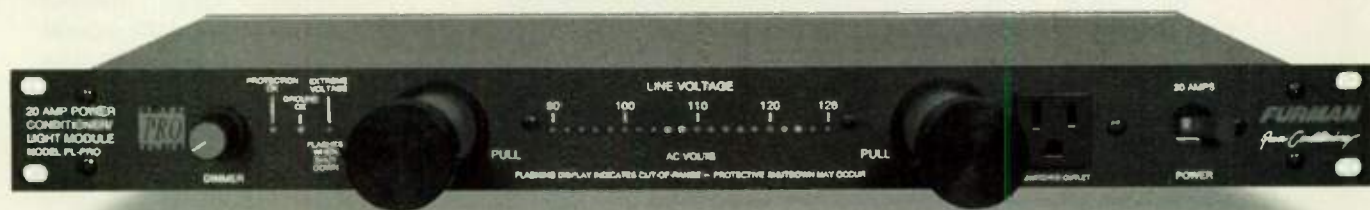
Unfortunately, with an octal processor it's easy to multiply the effect of misadjusting one compressor eightfold. But if you take some time to learn how the MDM-8L works, you'll have punchier, bigger tracks. Don't expect miracles, but the MDM-8L gives a satisfying, subtle enhancement when used correctly.

—Craig Anderton

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CIRCLE 82 ON FREE INFO CARD

Passport Alchemy 3.0



MANUFACTURER: Passport Designs, 100 Stone Pine Road, Half Moon Bay, CA 94019. Tel: 415-726-0280.

SUMMARY: Digital audio editing software for the Macintosh.

APPLICATION: A virtually indispensable tool for anyone who uses digital audio or works with samplers.

STRENGTHS: Acts as a "Swiss Army knife" for the graphic editing of digital audio data; includes excellent analysis, resampling, equalization, pitch shifting, time compression/expansion, enveloping, delay and sample rate conversion algorithms; enables digital audio data to be uploaded from and downloaded to many popular samplers.

WEAKNESSES: Cannot access files larger than the available RAM; owners manual not updated (addendum provided).

PRICE: \$495

EQ FREE LIT #: 145

AND NOW, ladies and gentleman, presenting The Program That Would Not Die. First introduced nearly a decade ago, Alchemy has built up an almost fanatical cult following among sound designers and users of digital audio

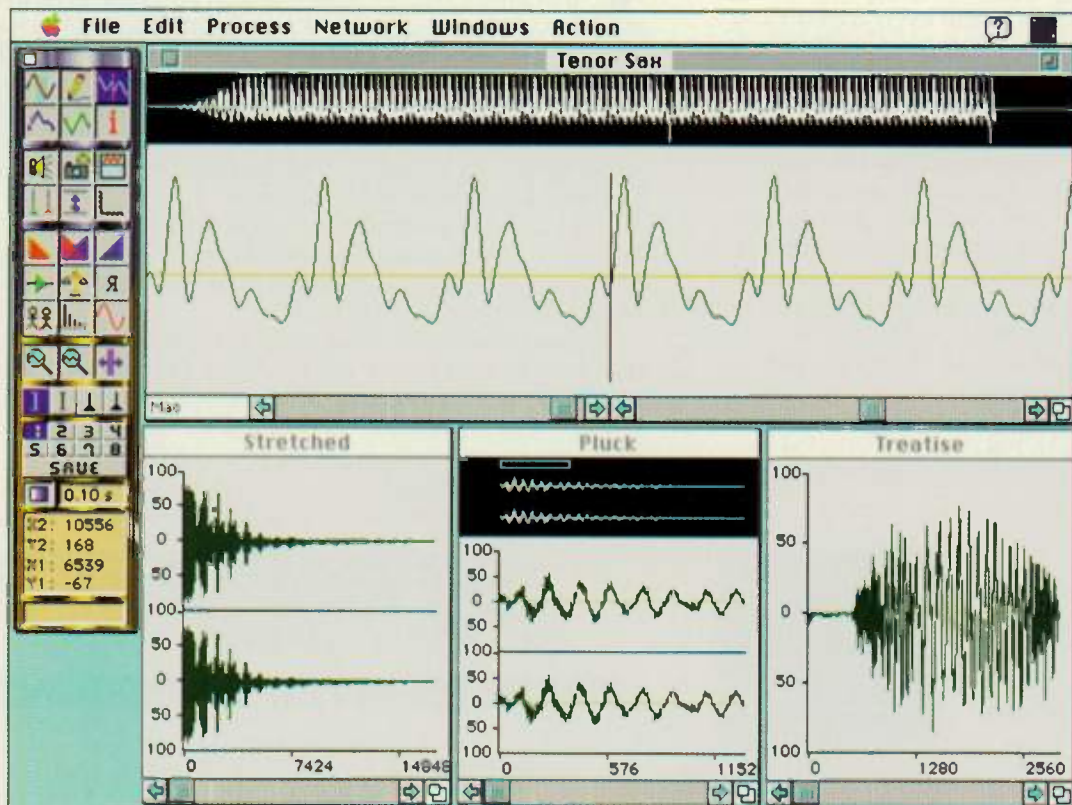
workstations and samplers. A couple of years back, Passport Designs snapped up the rights to Alchemy after its original publisher (Blank Software) went under, but after just a short rebirth, it was abandoned, causing its

disciples much wailing and gnashing of teeth. Bowing to public pressure—and snagging a public relations coup in the process—Passport used the recent NAMM show to announce the re-re-release of a newly updated Alchemy (version 3.0), and the sighs of relief are not only audible, but now highly editable.

Alchemy is important to users of digital workstations because it enables almost any kind of digital audio file to be edited in almost any way imaginable. Virtually all popular file formats are supported (including, in version 3.0, Windows .WAV files, when exported to the Mac via Apple File Exchange or similar translation utility), or data can be uploaded directly (via MIDI, SDS, SMDI, SCSI, or RS-422) from almost any sampler ever built. Once edited, the data can be saved in most common file formats (thus allowing format conversion) or downloaded to

the sampler it came from—or, for that matter, to any other sampler in your "network." Alchemy also accommodates the uploading/downloading of entire banks of samples and automatically takes care of disparities in bit resolution, sample rates, key mapping, memory capacity, etc., between different samplers.

The editing operations provided by Alchemy are formidable. They include basic operations such as cut/copy/paste, fade-in, fade-out, reverse, and manual waveform redraw, as well as many advanced functions, such as:



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Over the years, Apogee has focused its efforts on one goal: making digital audio better. The **Apogee DAT** carries on the tradition. It addresses all your concerns about using the DAT format in the professional world. Consistency. Minimal errors. Reliability. And above all, longevity.

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CIRCLE 83 ON FREE INFO CARD

JUST THE SPECS:

- Minimum system requirement: Mac Classic or higher; 4 MB of RAM; System 6.07 or later; hard disk.
- Sound file formats supported: Mono and stereo AIFF; Sound Designer II; SoundEdit/MacRecorder; Type 1 snd resources; 8-bit and 16-bit .WAV.
- Samplers supported: Akai S900, S950, S1000, S1100; Casio FZ series; E-mu Emax, Emax II, SP-1200, EIII; Ensoniq Mirage, EPS, ASR-10; Korg T1, T2, T3; Kurzweil K2000; Peavey SP, SX; Roland S-50, S-330, S-550; also supports MIDI Sample Dump Standard and SMDI.
- Sound cards supported: Digidesign Sound Accelerator, Sound Tools, Audio-Media, Pro Tools; RasterOps Media Time.

digital equalization/filtering; Fast Fourier (frequency) analysis and the ability to resynthesize data with user-designated frequency components; the ability to extract a frequency or amplitude envelope from a file and then edit it or even superimpose it onto another file; sample rate conversion (from any rate to any other rate, not just commonly used preset rates such as 44.1 kHz, 48 kHz, etc.); time scaling (which enables timing to be stretched or compressed without affecting pitch); pitch shifting (with an option to keep duration constant); and (new to version 3.0), the ability to add a multi-tap digital delay, with provision for creating and saving user-defined presets. There are also a number of tools to facilitate looping, such as wave inversion and user-defined crossfade looping durations.

Other major features new to version 3.0 include support for a number of additional samplers (specifically, the Ensoniq ASR-10, Korg T1/T2/T3, Kurzweil K2000, and Peavey DPM-SP/SX) as well as Digidesign's Pro Tools card. Alchemy 3.0 also works with Apple Sound Manager 3.0 and Opcode's OMS (Open MIDI System), and provides the ability to record audio directly (to RAM, not to hard disk), using the sound input device designated in your Mac's Sound control panel.

In practice, I found Alchemy's sample-rate conversion (a process which is extremely important to multimedia users) to be much more accurate and pleasing to the ear than when performed by Digidesign's Sound Designer (another enormously popu-

lar Mac-based digital audio editor, though one which is sold only with Digidesign hardware). Sound Designer does, however, enable digital audio files larger than the available RAM to be opened and accessed, while Alchemy requires that the entire file be held in RAM and will therefore refuse to open larger files.

The documentation provided with Alchemy is a mixed bag. On the positive side, a good introduction to digital audio theory is included, as well as a number of tutorials. On the negative side, the main manual refers to version 2.0, with an addendum separately describing the features added by version 2.6 and version 3.0. This means that the user often has to refer to two distinct documents, with the addendum itself divided into two discrete sections. For a major update to a program of this importance, it seems to me that Passport really should have updated the manual from scratch.

All in all, Alchemy is an almost indispensable tool for any Mac owner using digital audio. It complements Digidesign's Sound Designer perfectly, so do yourself a favor and get both. As with all its previous incarnations, the latest version of Alchemy is highly recommended—one of those rare products you'll wonder how you ever did without.

—Howard Massey

Howard Massey heads up On The Right Wavelength, a MIDI consulting company. He hasn't yet figured out how to turn lead into gold, but figures this program gives him a running start.

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Roland MS-1 Sampler



MANUFACTURER: Roland Corporation, 7200 Dominion Circle, Los Angeles, CA 90040. Tel: 213-685-5141.

SUMMARY: No-frills "phrase sampler."

APPLICATION: Instant sampled music generator in a box, good for the creation of basic rap and hip-hop music.

STRENGTHS: Inexpensive; portable; battery powered; internal RAM is actually flash ROM; uses standard PCMCIA cards for memory expansion; provides rudimentary onboard sequencer; includes audio CD of sample source material.

WEAKNESSES: Data compression limits sound quality; minimal editing capabilities; no auto-looping; individual samples cannot be pitch shifted; no undo function; maximum four voices of polyphony (but just one when playing back 44.1 kHz samples).

PRICE: \$345

EQ FREE LIT. #: 146

S-S-S-S-SAMPLING has become such a staple of today's music, it's easy to see why manufacturers like Roland keep turning out new products that make the process easier and more affordable. The MS-1 falls firmly into this category — for under \$650, this notebook-sized, battery-powered box enables you to create an entire piece of sampled music in a matter of minutes.

The MS-1 is designed as a "phrase sampler," meaning that it is optimized

for the recording of brief audio phrases (such as drum loops and instrument or vocal stabs). These can be played back manually or with the use of its onboard sequencer, which can store up to four brief songs. It offers four different "grades" of sampling, each of which uses a different sample rate; from CD-standard 44.1 kHz to very low-fidelity 16 kHz. When using the "High" (44.1 kHz) grade, however, only one mono or stereo voice can be played at a time;

when using the other three (lower) sampling rates, up to four voices can be played at a time (stereo samples use two voices). Sample playback is accomplished by pressing any of eight front-panel pads (which are nonvelocity sensitive) or by playing user-defined notes on any MIDI controller. However, unlike virtually every other sampler I've seen, pitch shifting is global, so that you cannot alter the pitch of individual samples.

There are two internal flash ROM memory banks, each of which can contain up to eight mono or stereo samples, totaling from 19.6 seconds (when using the 44.1 kHz sampling rate) to 54 seconds (when using the 16 kHz sampling rate). A standard PCMCIA card (which will run you about \$150 for 1.8 MB to about \$500 for 10 MB) adds another three banks (and additional sampling time). At all but the highest sampling rate, however, the audio fidelity of the MS-1 is pretty mediocre, due largely to the proprietary data-compression algorithm used.

The process of recording a sample into the MS-1 and assigning it to a pad is about as simple as it gets. Once recorded, you can divide the sample up (assigning it to two different pads) if necessary and set loop start and end points, as well as truncating unneeded data at the beginning and end of the sample. This, however, is all the sample editing there is, and, since no auto-looping assistance is provided, looping is pretty much a trial-and-error proposition. Also, you cannot set the loop points of one sample while another sample plays back, so there's no way to match one sample's loop to another except by guesswork. Most distressingly, there's no undo function provided by the MS-1; pressing the (misnamed, in my opinion) "Exit" button enters in the new data before popping you out of edit mode. This means that if you get a pretty good loop point, you'd better write it down (with good old analog pencil and paper) before trying to tweak it further still.



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Same low noise/high headroom gain structure as the CR-1604. Same bottleneck-free mix amp architecture. Same musical-sounding 3-band EQ. And the built-like-a-tank construction quality that's made our mixers legendary on world tours and in 24-hour-a-day production facilities.

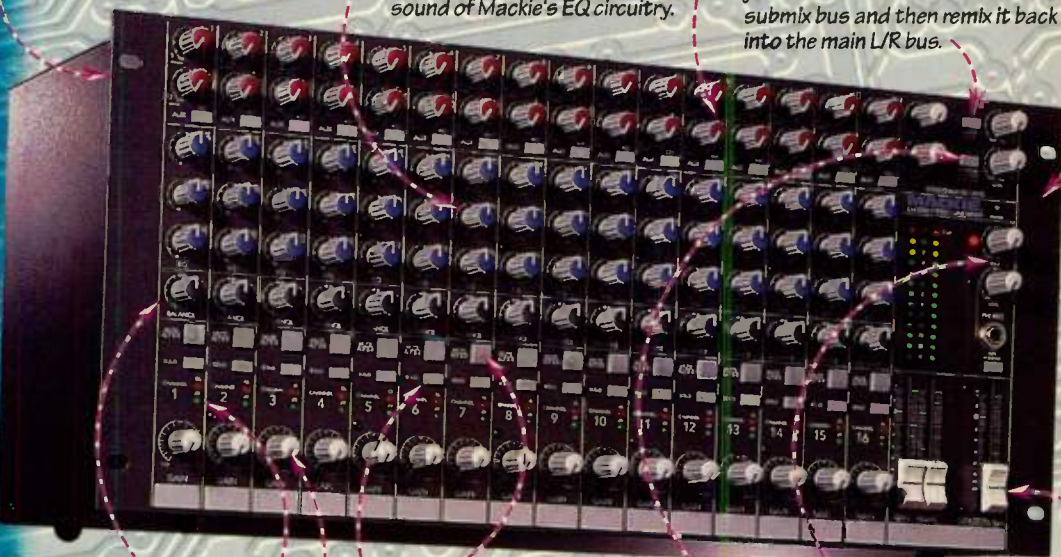
Then we added a Control Room output with its own 45mm fader. Tape Monitor section with both RCA and 1/4" inputs and outputs and even -20dB signal present LEDs on every channel. Then we made the LM-3204 expandable — you can plug in one or more LM-3204Es for 32 or even 40 inputs.

Whether you're looking for a pro-grade instrument or effects submixer, an economical main mixer for a MIDI project studio, or the perfect solution for solo or duo club acts, you've gotta check out the LM-3204. It can make a big impact on your creativity without making a big crater in your equipment budget. Call toll-free today for a free 40-page full line brochure & applications guide.

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CHANNEL GAIN CONTROL with an extra 15dB of gain **PAST** Unity Gain.

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NOTE routes the signal to the **ALT 3-4** stereo bus.

Stereo **IN-PLACE SOLO** maintains stereo perspective including effects; also meters individual channel level on 13-LED ladder.

SOLO & HEADPHONE level controls. **AUX RETURN TO CONTROL ROOM** button sends Aux 4 to headphone & monitor buses so you can "wet monitor" or play along with a cue or click feed.

45mm **MASTER L/R & CONTROL ROOM** faders.

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INPUT for LM-3204E

EXPANDER. Basically an LM-3204 without a master section, the LM-3204E adds sixteen stereo channels and four Aux Returns in five rack spaces for \$899¹.

LM-3204s are currently on tour with Boyz II Men, Chicago, Moody Blues, King Crimson, Little Feat & other notable line-input-deprived touring acts².

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THIS IS EQ ON PAPER

JUST THE SPECS

Sampling Rate: Variable (44.1 kHz, 32 kHz, 22.05 kHz, 16 kHz)

A/D and D/A Conversion: 16-bit

Data Format: Roland R-DAC (proprietary data compression)

Internal Memory: 2 banks (max. 16 samples) plus 4 sequences

External Memory (PCMCIA card): 3 banks (max: 24 samples)

Maximum Sampling Time (unexpanded internal memory): 19.6 sec. @ 44.1 kHz; 27.0 sec. @ 32 kHz; 29.2 sec. @ 22.05 kHz; 54.0 sec. @ 16 kHz

Maximum Polyphony: 4 voices (reduced to one voice when playing back 44.1 kHz samples)

Playback Modes (per sample): "Gate" (sample plays only as long as the pad or note is held down); "Trigger" (sample plays continuously after the pad or note is initially pressed until such time as the pad or note is played again); "Drum" (sample plays once only after the pad or note is initially pressed, even if it is looped)

Display: 1 line (16 characters) LCD

Analog I/O Level: -10 dBm

Output impedance: 1.6 kohms

- Volume/data entry wheel
- Unbalanced analog I/O (RCA jacks)
- Mono (phone jack) and stereo (mini-phone jack) mic inputs
- Headphone output (mini-phone jack)
- Input impedance: 40 kohms (line); 7 kohms (mic)
- Footswitch input
- MIDI in/out
- Optional 9-volt external "wall wart" power supply

The MIDI implementation of the MS-1 is bare-bones; note ons and velocity values (as well as volume and pan data) from an external controller can be recognized for triggering samples, but almost no MIDI data (short of bulk dump data) is transmitted. The bulk dump procedure is quite unusual in that the actual sample data itself is transmitted, as well as all internal settings; this makes the process quite lengthy (it took me some 15 minutes to dump two internal memory banks to an external sequencer). [Roland states dumping five banks of data takes the same length of time as two banks. —HGL] MIDI SDS (Sample Dump Standard) is not utilized, making it impossible to import or export samples to or from other instruments, and even MIDI note-ons are not output when the onboard sequencer is playing back. These two facts alone greatly limit the MS-1 capabilities as a portable "sketch pad" of ideas, since music you create within it cannot be ported over to

higher quality instruments.

The owner's manual is adequate (if not particularly well-organized), and, although a "sampler" audio CD of source material is provided, neither an AC adapter nor a footswitch (which can be used to trigger samples or initiate sample or sequence recording) is included, so you'll have to shell out a little extra for these goodies.

As a traveling companion that can spark creative ideas, or for the production style and sound used in rap or hip-hop, the MS-1 does the job, and at relatively low cost. For more demanding applications, however, you may want to look to more high-end samplers that offer better sound and more in the way of editing and MIDI capabilities.

—Howard Massey

Howard Massey heads up On The Right Wavelength, a MIDI consulting company. He has yet to be auto-looped.



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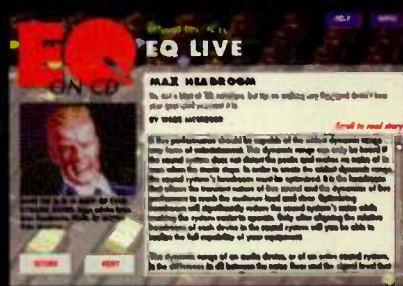
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World Radio History



REVIEW SHORT

Greysounds Sample CDs

"This library represents only a portion of what these keyboards were capable of, but it is a good selection."

Classic Keyboards and Vintage Synthesizers Volume One by Greysounds (Audio-CD \$99.95 retail).

This audio CD is like walking into the past: Hammond B-3, Fender Rhodes, Hohner D6 Clavinet, Mini-Moog, Arp 2600, Prophet 5, Juno 60. To me, the "good old days" mean heavy-weight keyboards with uneven touch, instruments that didn't stay in tune for a single set, two-voice polyphony, and 16-note sequencers. This Greysounds CD represents tens of thousands of dollars of keyboards at their original prices, and today's samplers eliminate the touch, tuning and polyphony problems of the originals.

Included are 37 sets of samples covering 20 keyboards, mostly at three or four semitone intervals. There are also 13 sets of DAT RAM Backups for the Akai S1000/1100. The individual samples are fairly long, most are at least 4 seconds, so you can easily find loops or actually use many of them without looping (if your sampler has enough memory).

This library represents only a portion of what these keyboards were capable of, but it is a good selection. Some of the other keyboards sampled are the Mellotron Choir & Strings, Arp String Ensemble, Roland Vocoder+, the Vox Continental organ, and the Oberheim OB-8.

These samples are all very clean. You get only the instrument — no signal processing, hum, or extraneous noise. If you want authentic sounds, don't forget to buy an old spring reverb or a Roland Space Echo to complete the sound, or maybe even a Fender Rhodes with a MIDI kit to act as your controller!

Philip Wolfe Rock Keyboards Volume 1: Hammond B-3 and Moog Synthesizer (CD-ROM for SampleCell \$299.95 retail).

The title says it all. For those of you who are unfamiliar with Philip Wolfe, he has played keyboards with Wasp, Keel, and Impellitteri. He has also done programming for Oberheim and taught keyboards, programming, and sampling at the Musician's Institute in Hollywood. And here's certainly the most complete B-3 sample library currently available, plus a generous selection of Moog synth samples.

The B-3 section of the disc consists of over 200 MB of direct mono recordings and miked stereo recordings. The sample quality is great, and the looping is even better. Samples contain various levels of distortion, and they are all several seconds long, some as long as nine seconds.

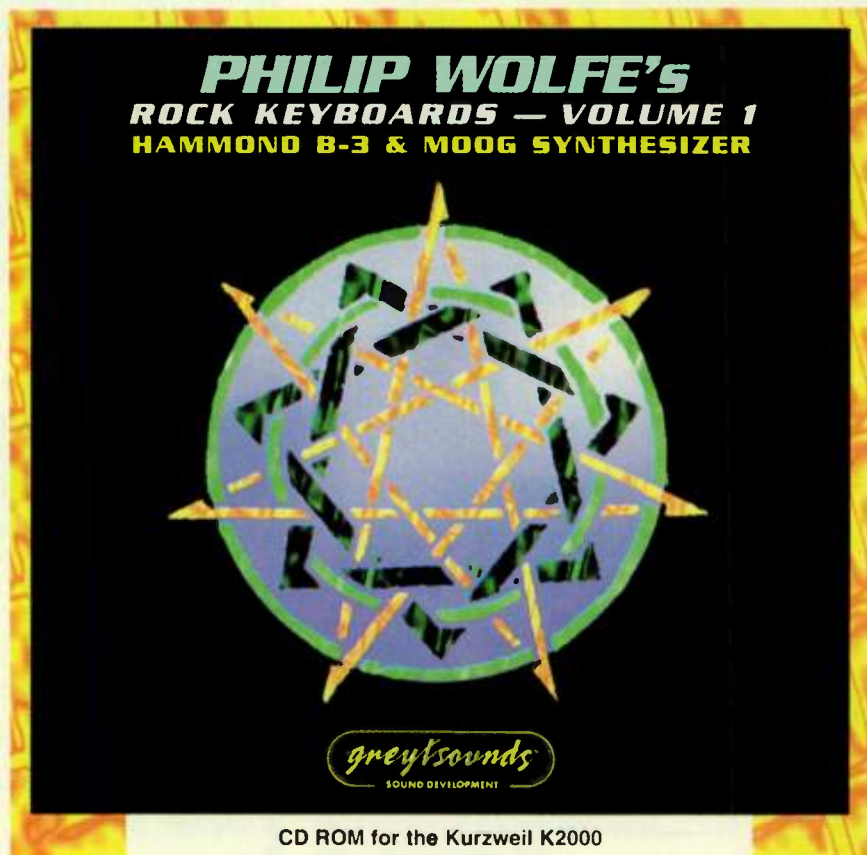
There are 20 sets of Moog synthesizer samples. The sample quality is excellent, with plenty of character, but this library has a few limitations.

Notes in the B-3 samples are stretched over several semitones, which means the Leslie changes speed on several patches as you play melodies or even within chords. The transposed speed problem isn't as glaring on the Moog samples, probably because the samples don't contain something as recognizable as a rotating Leslie. The "slow-to-fast Leslie" samples do not start slow and speed up and sustain as I expected. The Leslie speeds up and slows down again continuously within the loop. Documentation is very sparse.

CD-ROMs are also available for the Akai S1000/1100, E-mu E-III/E-IIIxp/xs, Ensoniq ASR10/TS10/TS12, Kurzweil K2000, and the Peavey SP samplers.

—Tona Ohama

For more details, contact Greysounds, 501 Fourth St. S.E., Bandon-by-the-Sea, OR 97411. Tel: 800-266-3475. Circle EQ free lit. #147.



REVIEW SHORT

Digital Projects for Musicians

Twenty exciting, useful, and educational projects for studio or stage.
by Craig Anderton, Bob Moses, and Greg Bartlett
Foreword by Herbie Hancock



Digital Projects for Musicians

"If you are into the 'nuts and bolts' of MIDI, it is a must have."

Digital Projects for Musicians, the latest DIY book from Craig Anderton, Bob Moses, and Greg Bartlett, is an excellent reference for technically oriented musicians. The well-written book covers digital theory, microprocessor fundamentals, soldering techniques, and, of course, the "projects." This isn't a book that will show you how to build your own multieffects processor, digital reverb, or even a digital delay, but it will show you how to build the MIDItools computer. This is a general purpose 8-bit microcomputer with a MIDI interface that can run 20 different programs, which make up the different projects discussed in the book.

The MIDItools computer comes in two flavors: a small table-top case

and a single-width rack-mount version. I built the rack-mount version. After opening the shipping box, I was pleasantly surprised to find a solid-steel case and front panel inside. All of the parts were neatly separated in little Ziplock bags. The kit is also broken up into separate functional blocks: the main CPU board; the front-panel LCD display; and the "Human Interface Board." After sorting things out, I fired up my trusty soldering iron and plunged right in.

The CPU board, which has the most parts, went together in less than two hours. The hardest part of

assembly was stripping and soldering a ribbon cable to the front-panel LCD display. This took another half an hour or so. Total assembly time: 5 hours.

I initially had a problem with the Human Interface board — the LEDs weren't lighting and the data-entry potentiometer wasn't working. No problem. Technical help is available via both phone and e-mail. After one round of e-mail and a little detective work, I found a bridge across two circuit traces. After fixing that, I was up and running.

The 20 projects described in the book include a MIDI data filter, a sequencer remote control, a tap tempo transmitter, a MIDI "multieffects" unit, and a channel message transmitter. Each one requires a separate programmed controller chip. A ZIF socket is included to make swapping them out very easy. With a little additional hardware you can build a 4X4 MIDI patchbay, a MIDI-controlled relay driver, or even a custom MIDI instrument. The custom instrument feature can be used to add a MIDI Out to an older keyboard or for creating

something never seen before. I personally checked out four of the projects and really liked the tap tempo transmitter and the channel message transmitter.

The tap tempo transmitter will send out MIDI clock signals as determined by the time sensed while tapping on a switch. Since you are the one building the device, it is extremely easy to wire up any type of switch you want. For fun, I wrapped some aluminum foil around a pair of drum sticks and wired them up to the front-panel switch. By adding a blank measure to the front of a sequence, you can slam the drum sticks together on a four count and have the sequencer kick right in and track you. The tap tempo transmitter also has start, stop, and smoothing functions available.

Another favorite was the message transmitter. It will send volume, pan, pitch bend, breath controller, program change, and seven other messages in real time (only one message type at a time) while merging with a MIDI input. This can be used for all sorts of cool things. Another real time saver is to set the MIDItools computer to send patch change information. Then instead of hitting a little +/- button to change a patch, you can just dial it up, bouncing around until you find just the sound you want. You are instantly adding a data wheel on synthesizer that doesn't have one.

Digital Projects For Musicians is a useful, easy to read book. Even if you don't build the MIDItools computer, it contains a wealth of valuable technical information you need to know. If you are into the "nuts and bolts" of MIDI, it is a must have. I was impressed by the detail spent in explaining how to go beyond the projects in the book. The authors encourage you to venture out and just do it! —Jules Ryckebush

Price: book, \$25; kit in rack-mount version, \$225; PROM, \$45 each (one included with kit). For more information, contact PAVO, 10 South Front Street, Philadelphia PA 19106. Tel: 800-546-5461; e-mail: MIDItools@aol.com. Circle EQ free lit. #149.

Tape Backup Systems

Saving the day
with affordable,
removable memory

BY DAVID MILES HUBER

Insufficient memory to save file" is, without a doubt, one of our least favorite screen messages. It can only be surpassed by the dreaded, "Permanent disk crash due to corrupted data." So what's the alternative?

Most of us create complete backups of our hard drives and save valuable software data and files of manageable size onto separate floppy diskettes. These are wise precautions, but it quickly becomes obvious that these simple tactics are next to useless when dealing with large amounts of soundfile, graphics, and computer-based video data.

There is a simple and cost-effective

(if not downright cheap) answer to this dilemma. I'm talking about the wide range of tape backup systems now on the market for backing up large amounts of data to removable, magnetic tape cartridges. Using these devices (which are also known as "tape streamers"), it becomes a simple matter for data files of almost any size and type to be archived onto a backup tape. Once done, the files can be deleted from your hard drive, leaving room for current project files. When you need to retrieve these files, they can be restored back to your hard disk at any time.

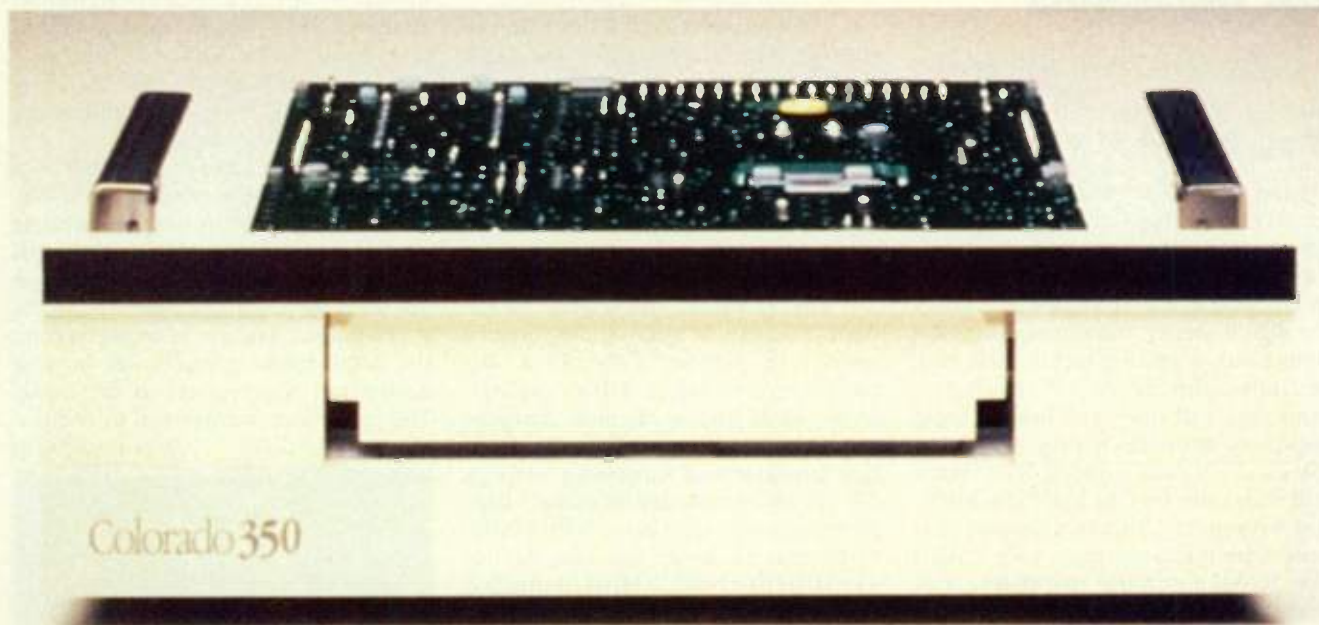
Equally as good is the ability for most backup software to maintain an "offline library" of your files. This feature lets you browse through your entire backup database, without inserting any cartridges. Once the desired files or directories have been found and selected, the system will tell you which tape to put in and will automatically restore them back to your hard disk. For me, this meant that, for the first time, a song's soundfile, MIDI file, and edit list data could be safely backed up within a single directory or folder and retrieved at a later time as

actual data — without having to make audio backups to DAT.

TAPE TYPES

Probably the most popular systems on the market for use with IBM/compatibles use QIC (pronounced "quick") tape cartridges. Internal drives using this format sell on the market for as low as \$130 and can store between 250 MB and 4 GB of compressed data onto a single, affordable tape (multiple tapes can be used to store larger amounts of data). Many of these systems can be plugged directly into your computer's floppy drive's controller port in a piggy-back fashion (without the need for an external hardware controller, and without having to give up a drive on a two-floppy drive system). External QIC backup drives can be added to either an IBM or Mac computer. IBM drives plug directly into the computer's parallel port (allowing them to be used with laptops), while Mac drives are usually connected via SCSI.

DAT backup drives are available in either internal (IBM-only) and external versions and are capable of storing between 2 and 6 GB of compressed data.



STORE MORE: If you're not ready to take the CD storage plunge, check out tape-based systems like the Colorado Memory Jumbo 350.

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133	Eventide	93	201-641-1200	7	Spirit by Soundcraft	54	818-909-4500
89	Fender	29	602-596-9690	73	SPL	67	800-293-4463
8	Focusrite	30	516-249-3662	114	Stedman	81	616-629-5930
119	Furman Sound	82	415-927-1225	103	Stewart Electronics	66	800-316-7626
51	Galaxy	31	316-263-2852	122	Summit Audio	83	408-464-2448
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IBM/WINDOWS SYSTEMS

Colorado Memory Systems

800 S. Taft Avenue
Loveland, CO 80537
Tel: 1-800-845-7905

Internal and external QIC & DAT backup systems (includes software)

Price Range: QIC \$190-\$479 (250 MB-680 MB 2:1 data compressed), DAT \$1213 (4 GB 2:1 data compressed)

Conner Peripherals

3081 Zanker Rd.
San Jose, CA 95134
Tel: 1-800-626-6637

Internal/external QIC & DAT backup systems

Price Range: QIC \$149-\$319 (250 MB-850 MB), DAT \$1200-\$1800 (2 GB-8 GB)

Iomega Corp

1821 West Iomega Way
Roy, Utah 84067
Tel: 1-800-697-8833

Internal/external QIC backup systems (includes software)

Price Range: QIC \$190-\$539.95 (250 MB-700 MB)

MAC SYSTEMS

EXABYTE

11100 West 82nd
Lenexa, KS 66204
Tel: 1-800-825-4727

External mini cartridge, DAT, and 8mm backup systems

Price Range: \$710-\$3275 (2 GB-14 GB)

Hewlett Packard

11311 Chinden Blvd.
Boise, ID 83714
Tel: 1-800-752-0900

External DAT backup systems (includes software)

Price Range: DAT (2 GB) \$1706.00

Magic Line — Mac Products USA

Contact: Bottom Line Distribution
4544 South Lamar, Suite 100
Austin, TX 78745

Tel: 1-800-990-5692

External QIC & DAT backup systems (includes software)

Price Range: QIC \$855 (2 GB), DAT (2 GB-16 GB) \$1000-1600

COMPRESSION

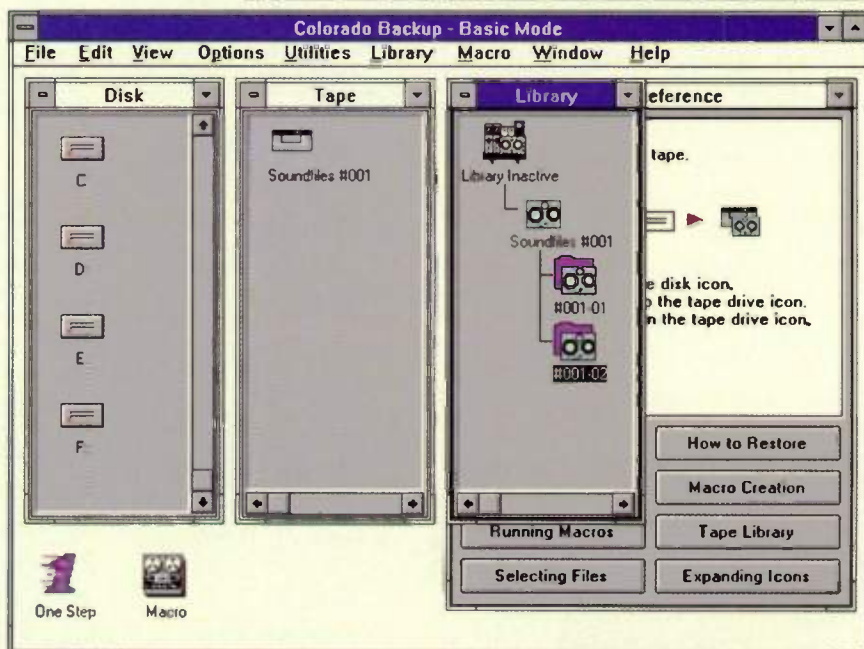
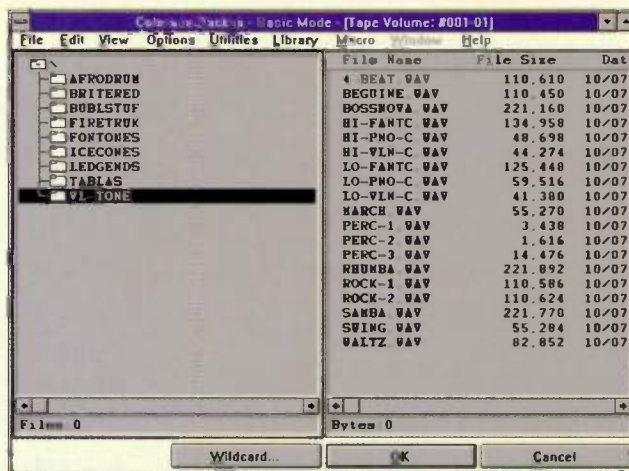
Companies will almost always publish their storage capacity rating using the figures gained once data compression (2:1) has been applied. This figure always looks good on paper since it's twice the size of uncompressed data. However, for those of us who intend to store audio, compression is of no use, since significant data reduction isn't achieved or particularly advisable with soundfile data. Therefore, keep in mind that a 250 MB drive will store 125 MB of audio data, a 2 GB drive will store 1 GB of audio, and so on. For those dealing primarily in graphics and basic program data, this is your lucky day, as compression will yield the promised double-density ratings.

DO'S AND DON'TS

Just a couple of caveats. If you can at all avoid it, *don't* buy unformatted backup tapes. Unlike formatting a hard drive, formatting a backup tape can literally take over two hours! I learned this the hard way. Of course, I didn't read the manual and once you've begun the format process, you're committed to it. If you want to wipe a formatted tape that has data on it, *do* use the "erase" command. Unlike the format process, this should only take minutes, instead of hours.

The following is but a small number of tape backup systems that are available for both the IBM and Mac. Happy file management!

SCREEN MACHINE:
Colorado Memory System's software interfaces help you manage and keep track of the data that you are storing on the tapes. **RIGHT:** The library screen. **BELOW:** The system's basic mode.





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Build a Better Drum Noise Gate

Bang the drum
loudly...or softly —
these do-it-yourself
gates will still
respond accurately

BY STEVE CARR

I have recorded my fair share of live drum kits, and I know the problems surrounding accurate control of the noise gates on the individual drums. One of the problems typically encountered is when a softer hit on the high-pitched tom fails to open its gate, while a strong hit on the snare *does* open the tom's gate. Another problem is the degradation of the drum's leading edge attack because it's below the gate's threshold, which had to be set high enough to keep the other drums from bleeding in.

Years ago I arrived at a solution to the problems of controlling gates on live drums by utilizing the speed of an electrical current in a solid state circuit to control the drum's gate as opposed to controlling it with the comparatively slower and less accurate method that relies on sound waves moving through air. Don't be put off by the seemingly complicated task — writing about this is much more complicated than doing it, and you will really appreciate this method over the conventional ways of dealing with noise gates on live studio drums.

This method of gating will only work if your noise gates have an "external key source input," and you will have to buy as many Piezo electric transducers as needed (Radio Shack cat# 273-064 \$1.79; see fig. 1). You will also need to acquire a few other various common place items.

Attach the two leads from the



IT FIGURES, PART 1: Fig. 1 (inset, right) shows the Piezo package. Fig. 2 (right) illustrates the proper hook-up. Fig. 3 (above) shows how the Piezo should be attached to the drum head.

Piezo transducer to the alligator to 1/4-inch phone adapter plug (fig. 2). This easy-to-make adapter consists of two small alligator clips soldered to a 1/4-inch plug, and allows for quick replacement if the Piezo element gets damaged. The red lead attaches to the tip (+) alligator clip and black lead attaches to the ring (-) alligator clip. The blue wire coming off this particular Piezo is unnecessary and can be clipped off. Attach the adapter plug with duct tape to the drum rim (fig. 3). Make sure the alligator clips don't short out against the drum's rim. Use a small piece of duct tape to hold the Piezo element firmly against the drum head. You can also use a 1" x 1" piece of double-sided masking tape (the kind used for carpet installation) between the back of the Piezo and the drum head for a more secure attachment (fig. 4).

Now you need to find a way to send the current generated when that drum is hit to the external key input on



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the perspective gate for the mic on that drum. In my basement studio, I use a 1/4-inch-to-XLR adapter coming off each Piezo trigger and plug that into old PA snake (non-Mogami wire) that is about 100 feet long. This gets the trigger information from the drum triggers into the control room and subsequent gate input. If you have spare channels on your audio snake to the control room, you could use them

for the trigger's send back into the control room (if that's where your gates are), or you could use a number of guitar cables to connect the Piezos to the key inputs of the gates. The time you put into it will be worth it. Just make sure you get the red (+) output of the Piezo element to the tip (+) of the gate's external key input and the Piezo's black (-) output to the ring (-) of the gate's external key input.

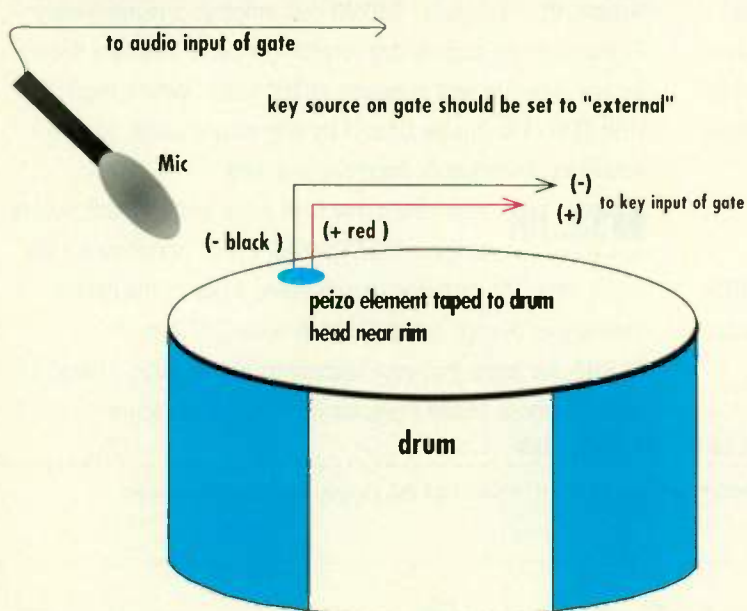
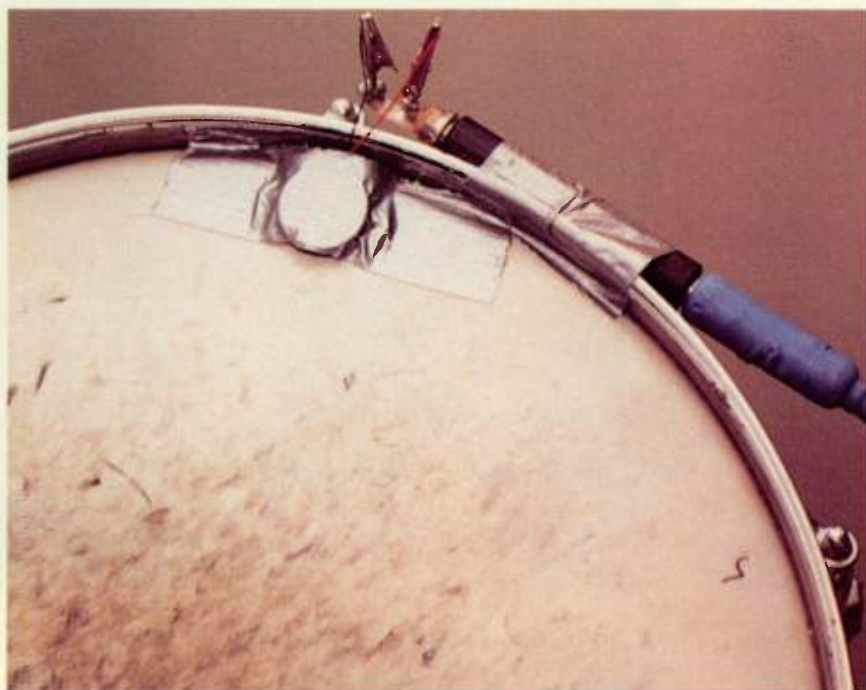
The mic on the drum should be patched into the triggered gate's audio input, and the gate's "key source" switch should be set to external. The instant that drum is touched by the drum stick, a jolt of electricity shoots down that wire and opens the gate before the sound wave gets to the mic. With the Piezo element opening the gate as opposed to the airwaves from the mic, you'll find the gate's tracking of the drums much more accurate and, most importantly, you'll hear the detailed leading edge of the drums attack. You can now keep the gate's attack time as fast as possible because they open before the air wave reaches the mic.

With standard internal keying, popping can occur when a gate opens up too fast. After adjusting the release times on the gates to match the decay of each individual drum, have the drummer play a strong kick-snare-hihat pattern while you adjust the individual thresholds on each of the tom gates so that they don't inadvertently open up when the toms are not being hit. With this method of using Piezo pretriggers to open a drum's noise gate, you'll find that even if the drummer hits the snare very hard, the tom's mic will not be heard because the tom's gate is being controlled by the stick touching the tom's drum head. You'll also notice that the threshold settings can be set relatively low, so that if a drummer does a buildup on the toms, you'll still be able to hear the build up.

Most of the time I don't gate the kick and snare, but this system is so tried and true that it would be unusual for me not to record the toms going to tape with the gates. With the exception of dealing with delays, this is the one opportunity to open the gate before the complete sound arrives at the mic. Just make sure you do accurate level checks when setting up the gates. These Piezo elements last pretty long — even if a drumstick accidentally hits them.

Happy triggers to you! For a system overview see fig. 5

Steve Carr owns Hit and Run Studios in Rockville, MD. His best known work is the digitally remastered Time-Life music compilations (As Seen on TV!).



IT FIGURES, PART 2: Fig. 4 shows the Piezo taped to the drum (top). Fig. 5 shows the an overview of the entire system.

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E-MU DARWIN

continued from page 27

SMPTE, ADAT, DA-88, word clock, or video. The second internal slot is intended for a DSP accelerator card that, when installed, could bring to Darwin DSP functions similar to those found on the Emulator IV. Finally, there is a slot on the front panel that makes Darwin ready for a removable-media drive. A distinct possibility for installation in this space is the Iomega Jaz (1 GB removable) drive. Discs for the Jaz are expected to retail at

around \$100 (no, that's not a misprint). So you could take your Darwin session to an outside studio at a modest cost for, say, tracking live drums.

Darwin supports 44.1 kHz and 48 kHz sample rates, Advanced MIDI Machine Control and MTC, and can backup data to standard SCSI DAT drives. E-mu expects to deliver Darwin during the last quarter of 1995.

For more information, contact E-mu Systems, Inc., 1600 Green Hills Rd., Scotts Valley, CA 95066. Tel: 408-438-1921. Circle EQ free lit. #148.

LETTERS

continued from page 8

zine comes out, it quickly makes the rounds of our studios and classrooms here at the Institute of Audio Research. It is read with great interest and there is usually some fair amount of comment among the students and faculty regarding one article or another. This last issue, however, has sparked instantaneous reaction, confusion, and much head scratching from all who read the Bruce Swedien article on the Neumann M49 microphone.

In the article, in the paragraph on user tips, Mr. Swedien is quoted as saying he uses his "two M49's set to *omnidirectional in an X-Y position*." (italics are mine). He then goes on to describe how this would work on a choir recording and further comments on the good mono compatibility of this arrangement.

IAR's faculty is made up of practicing recording engineers from music, postproduction, and broadcast backgrounds, and has a very extensive technical audio reference library on site for student and faculty use. After conferring with our faculty (and the books), I cannot see how two omnidirectional mics placed in coincident arrangement (X-Y) can result in anything other than a mono signal.

Mr. Swedien's description of his setup does indeed describe an X-Y arrangement. This kind of mic setup generates its localization clues (stereo separation) by virtue of intensity differences at each capsule. This intensity difference is achieved by using microphones with unidirectional pickup patterns (most commonly cardioid). As he stated, "the arrival time is so close, it's almost identical," so there can be no localization due to arrival time (a fact that makes the signal mono compatible).

Mr. Swedien's reputation as one of a handful of premiere engineers in the industry is well deserved, so if the arrangement he describes is not a typographical error, and he does indeed generate a stereo image in the manner described, I for one would like to read more from him about how and why this works.

Noel Smith

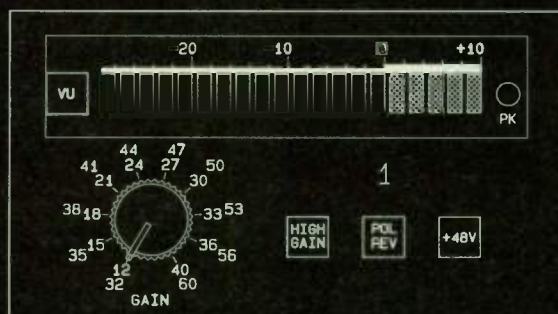
Audio Department Chair

Institute of Audio Research

[Mr. Swedien is currently very busy working on Quincy Jones's new album, and is unavailable for comment. As soon as he has a free moment, we will have him elaborate on his techniques. —Ed.]

EQ

M-1 MICROPHONE PREAMPLIFIER



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Pro Sound News

FOR THOSE AT THE TOP

PRO SOUND NEWS READER PRO-FILE

Name/Company: Tom Jung/DMP Records, Stamford, CT

Business Profile: President/producer/engineer of acclaimed Grammy-nominated, independent jazz label, known for its advancements and leadership in digital recording technology.

Recording Philosophy: "20-bit recording technology is the latest advancement in my quest for reproducing music in its truest form. DMP is the only jazz label to exclusively convert and record the original sessions to 20 bits, while others are just beginning to experiment with 20-bit conversion technology."

DMP Music Profile: "It is the brilliant music and performance of the DMP artist roster that drives me towards a goal of 'lifelike sound.' Music is still the most important part of the equation."

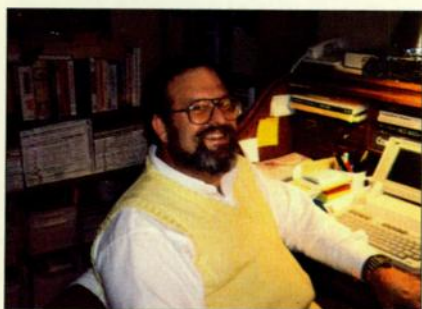
Business Read: "I find things out first in PRO SOUND NEWS. When something is new, when things are happening, I find out about them much quicker by reading PRO SOUND NEWS."

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On the Edge of a Revolution

Move over Windows 95
— check out Apple's new
multimedia lineup
introduced at MacWorld

BY MARTIN POLON



It may well be that September of 1995 will be remembered as the germinal month when computers and virtual audio merged in cyberspace. At first glance, it might seem that the above statement would be pointed at Microsoft's much heralded and awaited release of Windows 95. In fact, although the September 24 release of Windows 95 did have some features of interest to those personal and project studios that use the PC platform, the audio event of the year may well have been MacWorld Boston 95.

That statement might raise some eyebrows among members of the audio community who subjected themselves to the huge crowds that thronged the event in search of audio breakthroughs and found little far and wide in direct improvement of the audio art. Yet the incremental increases in both generic and Macintosh computer and storage technologies — plus certain peripheral areas — promise to improve both the quality and quantity of both audio recorded and edited at the personal and project

studio level, as well as at the commercial level.

It has been one of the givens of the audio universe for the ten-plus years of the Macintosh computer platform that audio and Macs go together. One of the tangential features of the growth of the personal and project studio has been the evolution of the Macintosh computer to first control digital audio devices such as mixers and multieffects black boxes and then to actually record and edit audio in the computer in the digital domain.

The new Macintosh computers unveiled at the MacWorld show promise to be the most potent audiovisual platforms seen either in Macintosh or in PC/Windows. Utilizing 100 MHz PowerPC chips as the CPU speed minimum, the new 7200, 7500, and 8500 machines encompass a family of products with the following enhanced audio and video features:

1. Processor speeds of 75, 90, 100, or 120 MHz on the machines with the ability to plug-and-play new faster PowerPC microprocessor chips as they become available for the two top-end machines. The various chip and machine options operate anywhere from 25 percent to 75 percent faster than comparable Pentium chips operating at the same speeds with the same applications.

2. The use of dedicated RCA phono-type jacks for line-level audio input and output in addition to the Macintosh standard stereo minijacks on the two top-end machines. Similar configurations exist for video usage as well. In fact, with the appropriate software, beta testers of the top-end 8500 have found the unit to be a superb video and audio editing machine.

3. Enhanced hardware architecture to deliver improved 44.1 kHz CD audio quality in recording with internal hardware and software.

4. All of the machines in this Apple family will accommodate up to three of the computer-industry standard Peripheral Component Interconnect (PCI) 2.0 compliant devices in the three slots dedicated for that purpose. From an audio applications point of view, the relative demise of

the old Apple NuBus will hinder in the short term as the availability of PCI audio cards awaits third-party developer transition. But, the presence of a united PC and Macintosh user base for audio plug-in cards almost guarantees a larger number of options as well as lower prices for the new cards.

5. Fast SCSI internal hard disk transfer coupled with either 500 MB or 1 GB (2 GB hard drives in the top end model 8500) fast hard drives means laying down audio tracks will be enhanced by the processor speed, the Fast SCSI transfer speed, and the hard-disk drive speed. With 1 GB of drive space, two tracks of uncompressed 16-bit stereo can be recorded for one hour and then some. The 2 GB disk can handle the same time frame and more with four tracks of stereo.

6. These machines also handle a prodigious amount of RAM, with the top-end 8500 configurable for half of a GB. This is also a plus in recording and manipulating audio.

If the appropriate software is developed by third parties, these may well be the first machines to make the virtual audio studio a right-out-of-the-box experience. Whether the software developers take advantage of this remains to be seen, but since they plan to utilize the top two machines from this release by Apple for video platforms, it does appear to be a safe guess that audio will follow video.

Where this will take us all is speculative at this point, but it seems clear that computer direct-to-disk advocates could record an entire album — let alone an entire session — on these machines. Certainly, a segment by segment multitrack effort could be undertaken with appropriate software. Coupled with the reliability of RAID (random-rapid arrays of inexpensive drives) drives and appropriate interfaces and multitracking software, these machines should take the virtual studio another step. And as to doing Windows 95 on a Pentium for studio recording and editing, some will indeed flourish in that environment, but like eating Italian food in China, it just isn't playing the odds. **EQ**



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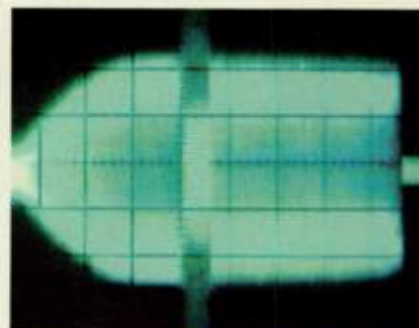
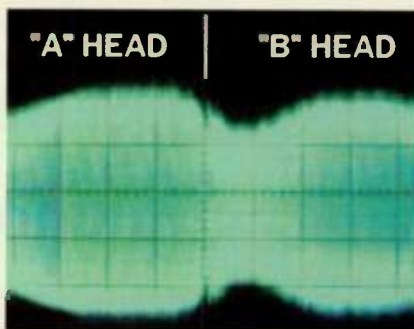
Scaling the Digital Cliff: Part 2

More on staying on the
straight and narrow
(tape) path

BY EDDIE CILETTI



Welcome to part two on the subject of tape path. There are two performance-critical mechanical adjustments for cassette-based digital audio tape recorders: the



FIGURES 3A & 3B: The RF envelope of an S-VHS (3A) and 8 mm transport (3B), indicates bad tape path as a result of a misaligned supply-side guide.

two guides on each side of the rotating head assembly. These are relatively easy tweaks when compared to the task of compiling background information on the subject. In order to help readers circumvent potential obstacles and to conserve real column space, I have created a Virtual OnLine Sidebar (VOLS)TM.

You can access the VOLS via both Craig Anderton's America Online site (keyword SSS > EQ Online > Eddie Ciletti's Virtual Sidebars) and the Micronic BBS (voice: 212-674-0400 or logon @ 212-674-7365). References to the VOLS will be made throughout this article. For the complete list of topics, see the VOL Sidebar.

ELECTRO-MECHANICAL ACCESS

Last month I made a point about

accessibility, specifically that transport tweaks to the TASCAM DA-30 require that only the main cover be removed. Many other transports require that the loading mechanism also be removed. In most cases, oscilloscope access to test points simply requires cover removal. Going only this far will help determine whether the tape or the machine is out-of-spec. Test-point location and disassembly instructions are covered in the particular machine's service manual. (Additional info is provided on the VOLS as well as a section for DAT transports concerning manual placement of the cassette tape.)

GOOD PATH/BAD PATH

In my September column, figs. 2A, 2B, and 2C provided an oscilloscope's

MANUAL LOADING: CASSETTE PREP

With either a Panasonic SV-3700 or an Sony 500/1000/2500 loading-tray mechanism (LTM) removed, here's how to manually place a Digital Audio Tape cassette onto the transport mechanism:

1. Turn the cassette upside down with the protective tape cover away from you.
2. Place thumbnails into the vertical slits and over the "bumps" that latch the bottom cover in place.
3. Slide the cover toward your body until it latches, exposing the reel holes. Latching is key.
4. Flip the cassette right-side up, and, with two index fingers, open the protective cover as you lay the cassette on the exposed transport mechanism. Hold in place.
5. There are two flanges on either side of the SV-3700 transport that formerly supported the Loading Tray Mechanism (LTM). Stretch a rubber band from the left flange, across the tape, and secure under the right flange.
6. On the early Sony decks, replace the two screws that held the front of the LTM in place. Repeat the rubber-band stretch as in step 5.
7. A weight, such as a spool of solder, can be placed on the tape, although this may cause some friction.
8. Once in place, turn the machine on and press the Play button. The drawer should slide in and close, the mechanism should then thread the tape and play. If you hear any buzzing noises or see bizarre tape movement, stop the tape. Press the Drawer Open button, power the machine off, and reseat the tape. Make sure no transport grease gets on the tape.
9. This is a pretty cool sight, right?

Sound Advice

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WORKSHOP MAINTENANCE

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- Disclaimer
- Tried All The Usual Tricks?
- Transport Terminology (Heads)
- How Many Heads?
- Transport Terminology (Guides)
- Anatomy Of A Tape Guide
- Adjustable Guides / The Slant Block Assembly
- Choice Of Guide Materials
- Access to Set Screws and Variations
- About the Guides in Early Sony Machines
- Reel Motion Control And The Tension Arm
- Reverse Tension
- Mechanism Status Report:
 - Optical Sensors
 - Mode Switches
 - Rotary and Linear encoders
- A Note About Tools...

This section concerns specific machines.

- I. About the tape transport used in the following Panasonic models:
SV-3200/SV-DA10
SV-3700
SV-3900
SV-4100
- II. Removing the Panasonic loading mechanism to gain access to transport
- III. Removing the early Sony loading mechanism to gain access to transport
- IV. Preparing the DAT cassette shell for manual load
- V. Unavailable Parts for TASCAM DA30
- VI. What is normal?
- VII. How many Heads?

view of proper tape path via the RF envelope — the signal from tape. These were close-ups of a single "swipe" of a single head's output for an ADAT/RD-8, DA-88/PCM-800, and DAT, respectively. This month's ADAT/RD-8 scope view (fig. 3A) zooms back to show the output from both heads. Adjusting the 'scope's "sweep time" will allow you to zoom in or out.

The RF envelopes in this month's column (figs. 3A and 3B) indicate poor mechanical alignment of the supply-side tape guide. (The take-up guide affects the right side of the envelope in a similar way.) The height of the guides on either side of the rotating head assembly may drift over time because they are responsible not only for the precise mating of the tape to the head drum, but also for pulling/returning the tape from/to the cassette shell. Though only S-VHS and 8 mm envelopes are shown, the same relationship between mechanics and waveform applies to the 4 mm DAT format.

ANATOMY OF A TAPE GUIDE

Fig. 4 shows the anatomy of a tape guide. Also shown is the tip of the special screwdriver required to facilitate adjustment. Before adjusting anything, first verify security by attempting — ever-so-gently — to turn the

guides. A guide that can be easily turned means that either the set screw is loose or that the slant block assembly is damaged. (See the VOLS for a detailed description of a typical guide, plus Sony-specific problems encountered in its earlier machines.)

ALL ACCESS

Access to tape guides and set screws varies from machine to machine. Observe the mechanism while the tape is unloaded, then with the tape loaded, and, finally, with the mechanism in Play mode. Choose the position that provides the best access. In most cases, it will be necessary to loosen the set screw that secures the guide adjustment. (Guides on the Sony 2300 transport, for example, are held in place by spring pressure.) To keep a simple adjustment from becoming difficult, loosen the set screw enough so that the guide will turn, but not so loose as to let the tape turn the guide.

Here are a few tips:

1. Confirm that the rollers are turning. Friction will make alignment impossible.

2. Avoid pressure while adjusting the guides, as this may cause the slant block to shift. If you think the block has shifted, eject the tape, then reinsert and press play.

3. Adjust the guides for the

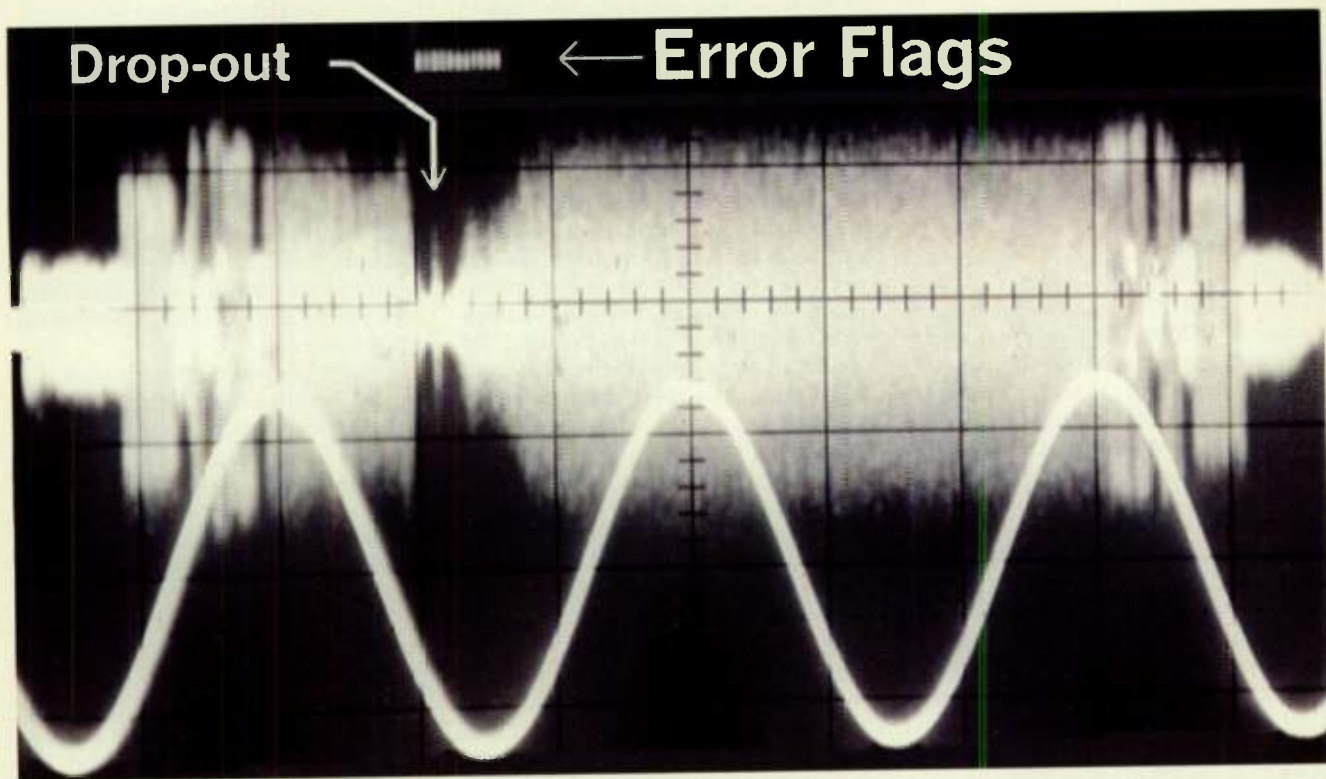


FIGURE 5: The power of error correction on a DAT tape.

"squarest" RF envelope. Then apply the same procedure as in step 2 both after the adjustment seems good and after the set screws have been tightened.

4. Avoid turning the guides more than 180 degrees in either direction. Doing so may make it difficult to return to normal. A quarter turn (90

degrees) in either direction should do the trick. Listen as the tape passes over the heads. You will eventually recognize the "sound" that results when things are right.

5. All transports have an Automatic Tracking Feature (ATF) which, in some cases, can be disabled. Doing so improves the precision of the mechanical alignment.

6. Really bright light can make the optical tape sensors falsely tell system control that either the beginning or the end of tape (BOT/EOT) has been reached. This will cause the mechanism to stop.

7. It is normal for the slant block assemblies to be loose when the mechanism is not in Play mode.

head clog, but may not provide enough advance warning for more serious problems. For example, if the mechanical alignment starts to wander, the machine will make an out-of-spec tape that will not reveal itself until played on an in-spec machine. Don't hesitate to investigate at the first sign of intermittent play.

Fig. 5 shows a "drop-out" on a DAT tape due to a wrinkle. Proof of the power of error correction is the undisturbed sine wave that had been recorded prior to the wrinkle. On top are the corresponding error flags that, on some machines, are counted and indicated via the error-rate display.

SUMMARY

After taking two issues to show how to make these two simple adjustments, you may be surprised to see that the preparation is more than the job itself. From experience, one can never be over-prepared. Congratulations if you overcame the obstacles and made that funky tape play!

FEEL THE POWER

An error-rate display can indicate a

E-mail questions or comments to Eddie Ciletti on the Internet at eddieaudio@aol.com.

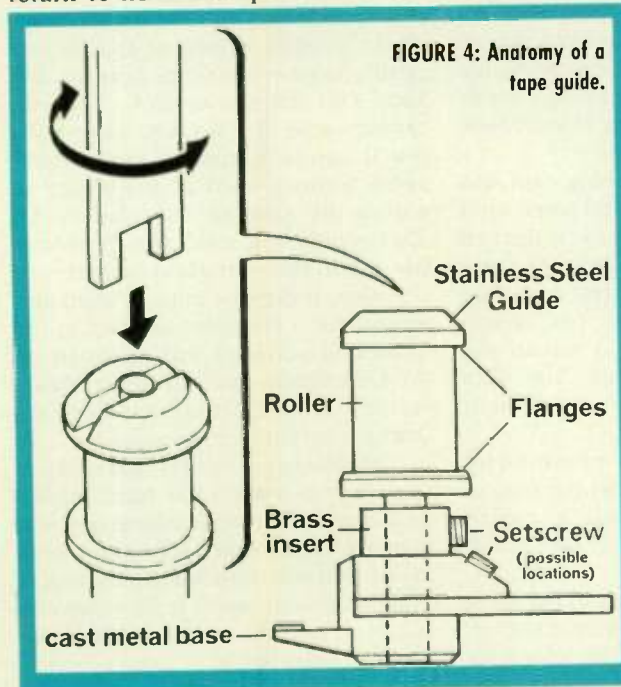


FIGURE 4: Anatomy of a tape guide.

CD FUN

continued from page 66

tains ADPCM audio or video.

If this is a Form 2 FRAC, the Auxiliary Data field contains ADPCM audio or video and Error Detection Code (EDC). If this is a Form 1 FRAC, this field contains EDC and Error Correction Code (ECC).

ORANGE BOOK

The CD you buy in the store is made in large quantities by a rather lengthy process. Wouldn't it be nice if there was a way to write these CDs one or just a few at a time without having to go through a complex process? Well, that's what Sony and Philips thought when they created Orange Book part II, the specification for write-once CD.

A blank writable CD is stamped with a wobbly spiral groove called ATIP (Actual Time In Pregroove). When a disc is first loaded into the writer and a write is initiated, a power calibration is performed to find the optimum power to form the best pit. A recommended starting power for this calibration is encoded in ATIP.

The writer monitors the ATIP and spins the disc fast enough for the wobble to pass under the LASER at 22.05 kHz while it is burning pits into the disc. This is for 1X write and would increase accordingly for 2X, 4X, 6X, etc. Address information is encoded in the ATIP. Free space available on the disc can be calculated by reading the ATIP for the last address written and the last possible start time of Lead Out, and then subtracting the first from the second.

An Orange Book writer is capable of writing all currently accepted formats (CD-DA, CD-ROM, XA etc.) given the proper host software. There are currently two commonly used methods to write information on a writable CD. They are Disc At Once and Track At Once.

TRACK AT ONCE

Fundamentally, Track At Once is just what it says. You turn the laser on, write one track, then turn the laser off. What the writer actually does is finds the first free space in the program area and writes the following track structure there. It can write 1 to 99 of these tracks on the disc. The start and stop time of each track is stored in an area on the disc called the Program Memo-

ry Area or PMA. This allows the writer to know what free space is on the disc when it is reinserted into the writer for more writing. After all of the desired tracks have been written, the Lead In and Lead Out are written. The disc is now usable.

_	LINK	_	RUN	IN	PRE	GAP	_	USER
DATA	_	RUN	OUT	LINK	_			

The Link Block is one FRAC long and provides a place for the laser to turn off from the previous write and turn on for the following write. Orange Book states that the previous write must stop at EFM Frame 26 +4/-0 and the next write must start at EFM Frame 26 +0/-4. This allows for an overwrite, but ensures there is no unwritten gap.

To understand the need for the Run In, think of the CIRC encoders as a pipe that is full of garbage when valid data is presented to it at the start of a write. The data has to travel the length of the pipe before it is encoded and ready to be written to the disc. So while the valid data is being shoved through the pipe, the garbage is coming out the other end onto the disc. The four-FRAC Run In area is set aside as a place to put this garbage. Like the Link Block, you don't want to read this area because it will give you uncorrectable errors.

The pre-gap is always required in Track At Once writing whether or not the track mode has changed. If the track mode is the same as for the previous track, the pre-gap is 145 FRACS long. If the track mode is different, the pre-gap is 220 FRACS long and the rules defined in Yellow Book apply. The user data in a track can be Audio, Mode 1, Mode 2, Mode 2 Form 1, Mode 2 Form 2, or Mixed Form. Mixed Mode is allowed between tracks.

When you stop pushing data into the CIRC pipe, there is still some valid data in there that needs to be flushed through. So 0's are fed into the front of the pipe until all of the user data has come out the other end. When this is done, the data is put in the two-FRAC Run Out area. The data here is valid and can be read without error.

Multisession is an extension of Track At Once writing where one or more tracks are written in a session and several sessions are written at different times.

A session is what we call the thing that is formed by a Lead In, Program Area, and a Lead Out. You can have

several of these on a CD. The only real limiting factor is disc real estate. Each session after the first uses roughly 14 MB of space in overhead to write the Lead In and Lead Out.

_	Lead	In	Program	Area	Lead	Out	
_	Lead	In	Program	Area	Lead	Out	_

_	Session	1	_	Session	2	_
---	---------	---	---	---------	---	---

Each session will have its own TOC. In addition, each session contains file system information for itself as well as all previous sessions so that all sessions can be accessed from the last session.

There are two methods for accessing a multisession disc. In one method, you start at the first Lead In and look for a pointer in the Q channel called the B0 pointer. If a B0 pointer exists, then there is a next session and you go there to see if the next session has a B0 pointer, and so on until you get to the last session. When you reach the last session, you go to the first track in that session and find the file structure information.

The other method is to scan the EFM data at high speed until you see no more EFM. This indicates that you have gone past the last session on the disc. You then back up until you once again see EFM. At this point, you're in the Lead Out of the last session. The Lead Out has pointers to the first track in that session. That's where you'll find the file structure information for the entire disc. With Track At Once, or TAO, writing, you can write a few tracks and then stop. You can't read/play what you've written in standard CD-ROM drives or CD players until you've written the Lead In and Lead Out for the session. You can record audio in a Track At Once fashion if you're willing to live without some features such as the ability to adjust the spacing between tracks. TAO requires a minimum 2 second pre-gap at the start of every track.

Also, if the disc is to be used as a master for a stamping operation, the mastering software will misinterpret the Link Blocks and Run In as uncorrectable errors. Certain packages are learning to ignore these areas.

Multisession is very attractive if you want to write a few hundred MB on a disc, send it to someone or use it yourself, then come back after a week or two and add more information to it. You can record audio in Multisession fashion, but the caveats listed for Track At Once apply.

DISC AT ONCE

Disc At Once is just what it says. You turn on the laser, write the entire disc (Lead In, Program Area, Lead Out), then turn the laser off. The track structure seen in Track At Once writing doesn't exist here. Typically, an image of the disc is created on a hard disk, then this information is streamed to the writer. For audio, this information includes the ordering of the tracks, size of the pause between tracks, the ISRC for each track, and setting the SCMS copyprohibit bit and/or Preemphasis bit if desired. For CD-ROM, XA or CD-I, the file structure needs to be defined ahead of time.

The current method of mass production for audio CD requires a Digital Audio Tape and a list of the tracks, the required pause between the tracks, the track lengths, whether copy protect and/or pre-emphasis should be set for the track, the catalog code for the disc, and the ISRC for each track. An engineer at the mastering plant copies the DAT onto a U-Matic tape and manually puts the information listed above onto the U-Matic tape via a PQ editor. This tape is then used to cut a glass master for CD replication. If there is any problem with the U-Matic tape, the entire process starts over. Writing Disc At Once eliminates most of this process. Since all the PQ information is already on the disc, the main channel and subchannel information can be read from the CD and used directly to make the glass master.

The major disadvantage of Disc At Once is that you must have all of the information prepared ahead of time. Once you write to the disc, you can't add more later.

SUMMATION

This is CD life as we know it today. In the near future we will see improvements that will get us over the hump of only being able to write 99 discreet tracks on a disc. This will truly establish the CD writer as a computer peripheral. We will see higher capacity stamped discs followed by higher capacity writable CD, which will open up the video market as well as improve the audio market. Regardless of the specific changes, the basics presented here should form a good foundation for understanding new developments in the dynamic world of CD.

Bill Mueller is a systems engineer for CD Imaging, Eastman Kodak Company, Rochester, NY.

ADVENTURES IN MODERN RECORDING



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SHURE

SM58 Unidirectional Dynamic Microphone

Consistently the choice of professional performers around the world, the SM58 is a rugged unidirectional dynamic mic with a highly effective built-in wind and pop filter. Its performance characteristics and compact size make it especially well-suited for music and speech applications - anytime the mic must be used outdoors or close to the mouth. A genuine world standard and audio legend, the SM58 makes all out vocalists sound their best.

- Self-contained spherical filter to control explosive breath sounds ("pop") and wind noise in outdoor locations.
- Unusually effective cardioid pickup pattern to minimize background noise and undesirable effects of studio and location acoustics. Rear and side rejection uniform to very low frequencies and completely symmetrical about microphone axis.
- Bright, clean sound. Especially good for vocal music, announcing, narration and dialogue.
- Cartridge shock-mounted for protection and quiet operation.
- Wind and "pop" filter removable for cleaning or replacement.
- Versatility - designed for both field and studio use - hand-held or on a stand (slip-in swivel adapter included).

SM57 Unidirectional Dynamic Microphone

The classic SM57 is the "workhorse" mic of stages and studios worldwide. Its carefully contoured frequency response means clean, warm vocal pick-up on lecterns or stages. The SM57 is the standard for drum, percussion and instrument amplifier miking.

- Unusually effective cardioid pick-up pattern minimizes effects of studio or location acoustics and background noise. Rear and side rejection uniform to very low frequencies and completely symmetrical about microphone axis.
- Bright, clean sound. Especially effective for announcing, narration and dialogue, vocal music, and rhythm packages.
- Cartridge shock mounted for quiet operation.
- Versatility - for use in the hand or on a stand - for use indoors or outdoors.
- Microphone supplied with adjustable swivel adapter - permits tilting through 90° from vertical to horizontal.

SENNHEISER

RF CONDENSER MICROPHONES

Unlike traditional condenser mics, the capacitive transducer in Sennheiser condenser mics is part of a tuned RF-discriminator circuit. Its output is a relatively low impedance audio signal which allows further processing by conventional bi-polar low noise solid state circuits. They achieve a balanced floating output without the need for audio transformers, and ensure a fast, distortion-free response to audio transients over an extended frequency range.

MKH 20 P48U3 Omnidirectional

Low distortion push-pull element, transformerless RF condenser, flat frequency response, off-axis/field response switch (6 dB boost at 10 kHz), switchable 10 dB pad to prevent overmodulation. Handles 142 dB SPL. High output level. Ideal for concert, Mid-Side (M-S), acoustic strings, brass and wind instrument recording.

MKH 40 P48U3 Cardioid

Highly versatile, low distortion push-pull element, transformerless RF condenser, high output level, transparent response, switchable proximity equalization (-4 dB at 50 Hz) and pre-attenuation of 10 dB to prevent overmodulation. In vocal applications excellent results have been achieved with the use of a pop screen. Recommended for most situations, including digital recording, overdubbing vocals, percussive sound, acoustic guitars, piano, brass and string instruments, Mid-Side (M-S) stereo, and conventional X-Y stereo.

MKH 60 P48U3 Short Shotgun

Short interference tube RF condenser, lightweight metal alloy, transformerless, low noise, symmetrical capsule design, smooth off-axis frequency response, switchable low cut filter (-5 dB at 100 Hz), high frequency boost (+5 dB at 10 kHz) and 10 dB attenuation. Handles extremely high SPL (135 dB), ideal for broadcasting, film, video, sports recording, interviewing in crowded or noisy environments. Excellent for studio voiceovers.

MKH 70 P48U3 Shotgun

Extremely lightweight RF condenser, rugged, long shotgun, low distortion push-pull element, transformerless, low noise, switchable presence (+5 dB at 10 kHz), low cut filter (-5 dB at 50 Hz), and 10 dB preattenuation. Handles 133 dB SPL with excellent sensitivity and high output level. Ideal for videofilm studios, theater, sporting events, and nature recordings.

TASCAM

DA-88 Digital Multi-Track Recorder

The first thing you notice about the eight channel DA-88 is the size of the cassette - it's a small Hi-8mm video cassette. You'll also notice the recording time - up to 120 minutes. These are just two of the advantages of the DA-88's innovative use of 8mm technology.

- The ATF system ensures that there will be no tracking errors or loss of synchronization. The DA-88 doesn't even have (or need) a tracking adjustment. All eight tracks of audio are perfectly synchronized. What's more, this system guarantees perfect tracking and synchronization between all audio tracks on all cascaded decks - whether you have one deck or sixteen (up to 128 tracks).
- Incoming audio is digitized by the on-board 16-bit D/A at either 44.1 or 48kHz (user selectable). The frequency response is flat from 20Hz to 20kHz while the dynamic range exceeds 92dB. As you would expect from a CD-quality recorder, the wow and flutter is unmeasurable.



- One of the best features of the DA-88 is the ability to execute seamless Punch-ins and Punch-outs. This feature offers programmable digital crossfades, as well as the ability to insert new material accurately into tight spots. You can even delay individual tracks, whether you want to generate special effects or compensate for poor timing. All of this can be performed easily on a deck that is simple and intuitive to use.

Fostex RD-8 Multi-Track Recorder

Fostex has long been a leader in synchronization, and the RD-8 reaffirms that commitment. With its built-in SMPTE / EBU reader/generator, the RD-8 can stripe, read and jam sync time code - even convert to MIDI time code. In a sync environment the RD-8 can be either Master or Slave. In a MIDI environment it will integrate seamlessly into the most complex project studio, allowing you complete transport control from within your MMC (MIDI Machine Control) compatible sequencer.

- Full transport control is available via the unit's industry-standard RS-422 port, providing full control right from your video bay. The RD-8 records at either 44.1 or 48kHz and will perform Pull-Up and Pull-Down functions for film/video transfers. The Track Slip feature helps maintain perfect sound-to-picture sync and the 8-Channel Optical Digital Interface keeps you in the digital domain.
- All of this contributes to the superb sound quality of the RD-8. The audio itself is processed by 16-bit digital-to-analog (D/A's) converters at either 44.1 or 48kHz (user selectable) sampling rates, with 64X oversampling. Playback is accomplished with 18 bit analog-to-digital (A/D's) and 64X oversampling, thus delivering CD-quality audio.
- The S-VHS transport in the RD-8 was selected because of its proven reliability, rugged construction and superb tape handling capabilities. Eight tracks on S-VHS tape allow much wider track widths than is possible on other digital tape recording formats.
- With its LCD and 10-digit display panel, the RD-8 is remarkably easy to control. You can readily access 100 locate points, and cross-tape time is fully controllable in machine editing. Table of Contents data can be recorded on tape. When the next session begins, whether on your RD-8 or another, you just load the set up information from your tape and begin working. Since the RD-8 is fully ADAT compliant, your machine can play tapes made on other compatible machines, and can be controlled by other manufacturers ADAT controllers. Your tapes will also be playable on any other ADAT deck.

Roland DM-800

Digital Audio Workstation

The DM-800 is a compact, stand-alone multi-track disk recorder that provides an amazing array of features at an unbelievably low price. Whether for music production, post production or broadcast, the DM-800 will make your work simpler, faster, more productive and more profitable. A full function workstation, the DM-800 performs all digital mixing operations from audio recording, to editing, to track-bouncing, to final mixdown. It fully supports SMPTE and MIDI time codes and also features a built-in Sample Rate Resolver to synchronously lock to any time code.



POWERFUL EDITING

- Time Compression, Pitch Compression
- Completely Non-Destructive Cutting, Erasing, Copying
- Very Fast Looping for Music or Ambiance Editing
- Scrub Preview and Preview to, from and thru
- Six Levels of Waveform Zoom for Fast Editing
- Optional RS-422 Interface (D10-8000) for 9-pin Control from Video Editor

FLEXIBLE I/O STRUCTURE

- Full Digital Patch Bay
- Two Stereo Aux Returns
- Digital Stereo Input and Two Digital Stereo Outputs
- Four Balanced Analog Inputs with Gain Controls
- Four Balanced Analog Outputs with Option for 4 More

FULL AUTOMATION

- Dynamic and Snapshot Automation of Level, Pan 2-Band EQ, including Frequency Select, Boost and Cut
- Microscope Editing of Automation Data
- Phase Level Editing of Level, Crossfade and Fade In/Out

TRIGGER FEATURES:

- Trigger Mode to Play any Combination of 8 Tracks for Vocal Fly Ins or Sound Effects Placements
- Advanced Trigger Mode for Live Operation with Preset or Dial up Cue of Phrases to be Played One after Another

MIDI FEATURES:

- MIDI Machine Control
- Internal Tempo Maps
- Accurate Editing by Bars and Beats and Sub-Beats
- MIDI Clock and Song Position Pointer Output
- 8 MIDI Triggers for Instant Phrase Playback
- MIDI Trigger of Record and Punch In/Out
- Tempo Maps from External Sequences, MIDI or Tap Input

ACCURATE SYNCHRONIZATION

- Frame Accurate Sync to any Time Code
- Locks to MTC
- Generates and Reads all Types of SMPTE, including 24.25, 29.97 30 (Dropframe-drop) Frames per Second
- Incoming SMPTE Reshaped to Output Jack

RECORDING OPTIONS

- Records to Standard SCSI Drives
- Up to 24 Hours Recording Time Possible
- Uses Magneto Optical or Syquest Drives for Fast Project Changeovers
- Optional Internal 2.5" Drives for Portable Operation

PROJECT CATALOGING

- Up to 150 Projects on Line at Once
- Easy Cataloging of Sound Effects and Projects
- Easy Transfer of Sounds from One Project to Another
- File Compatible with DM-80

HIGH QUALITY SOUND

- Sampling Rates of 48, 44.1, 32 kHz
- 18 Bit A/D and D/A with 128 and 8 Times Oversampling
- 24 Bit Internal Processing
- Superb Converters

VIDEO OUT

- Composite, S-video, Digital RGB Output
- All Track Overview with Infinite Level of Project Zoom
- Views of Phrases and Waveform Editing
- Very Accurate Level Meters
- Track Status and Time Location

beyerdynamic

TG-X Dynamic Mic Series

The entire TG-X family of microphones is based on neodymium technology coupled with rugged construction and designed for optimum performance in a stage environment

TG-X 5

- Clip-on gooseneck drum mic with high SPL capability
- Acoustically coupled to capture shell sound as well as skin sound
- Internally shock mounted for isolation from mechanical noise
- Rugged construction with convenient clothes peg mounting.



TG-X 30/35

- Ultra-slim flexible gooseneck for easy positioning
- Broadcast performance microphone with rugged construction
- Lightweight, low profile adjustable neckband
- Applications: Hands free vocals (drums/keyboards) and aerobics
- TG-X 30 15 Omni neckwork with pre-amplifier
- TG-X 30 16 Omni neckwork for wireless transmitter
- TG-X 35 15 Cardioid neckwork with pre-amplifier
- TG-X 30 16 Cardioid neckwork for wireless transmitter

TG-X 40

- Hypercardioid polar pattern with excellent isolation from unwanted sound.
- Flat, wide range frequency response for uncolored sound reproduction
- Rugged construction
- Applications: Vocal piano, orchestral/recital recordings, strings and sampling



TG-X 50

- Hypercardioid kick-drum with high SPL capability
- Reduces shell ring in bass drum
- Exceptional gain-before-feedback
- Superb transient response and extended low frequency range
- Applications: Kick drum, floor toms, congas and timpani



TG-X 80

- High quality hypercardioid vocal mic
- Full range frequency response
- Studio quality accuracy
- Excellent off-axis isolation
- Shock absorbing rubber ring
- Applications: Vocals, piano, strings, brass, percussion, woodwind, overheads sampling



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TASCAM

103 Mastering Cassette Deck

Cost effective three head stereo midrange cassette deck, appropriate for audio and video production facilities. With its three head design you can hear what is actually on the tape as it is recorded. Auto Monitor Function switches from playback to input automatically while in record/pause mode, allowing you to set record levels or match tape levels. Dolby HX PRO circuitry provides extended high frequency performance while keeping distortion and noise to a minimum. Tape type is automatically sensed and adjusted for by the Auto Tape Selection feature.

102 Cassette Deck

Designed primarily for midrange, the 102 provides solid performance and sound quality with durability and reliability. Although it is a two head unit, the 102 closely matches the performance and features of Tascam's 103 Mastering Deck.

202MKII

Dual Recording Cassette Deck
Dual record cassette deck offers dubbing and copying capabilities at a reasonable price. The deck is capable of simultaneously making two identical recordings from the same source, or making a single extended recording first on one tape (both sides) then on the other (also both sides). Copying can be easily performed by using one side for playback and the other for record. Can also provide continuous background music, playing first both sides of one tape, then both of the other.

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SONY

TCD-D10 PRO II Portable DAT Recorder

Packed with features and functions, the compact TCD-D10 PRO II is everything professionals need in a portable DAT recorder. Measuring only 10" x 4" x 7", it provides high performance, reliability and flexibility. Among its many features are high speed 100x search, LCD multi-function display, 4-motor Direct Drive transport mechanism and absolute time recording capability. With absolute time code, tapes recorded by the TCD-D10 PRO II can be used immediately as source material for the PCM-7000 series DAT editing system. Offering maximum performance and capabilities in a minimum package, the TCD-D10 PRO II is the recorder of choice for any field application.



- Has balanced XLR input, switcheable microphone (-40dB) or line (+4dB) inputs. A 12-pin digital connector provides interfacing with AES/EBU digital signals of 32.0, 44.1, or 48.0 kHz sampling rate. This means that compatibility with other digital systems is assured. It also provides the convenience of digital dubbing and editing without any degradation.
- Equipped with a comprehensive self-diagnostic function that constantly monitors the rotation of the head drum, capstan and reels. The tape transport mode and load/unload time are continuously checked as well. Upon detection of trouble, the tape is brought to a forced stop and unloaded automatically to protect the tape and the recorder.
- Up to 99 start IDs can be re-recorded in the subcode area. When the record button is pressed, the start ID is re-recorded automatically for 9 seconds. During recording, it can also be added manually to any position of the tape. Search for these start IDs is performed in two modes at 100 times normal speed.
- Offers a maximum spooling time of 140 x normal speed. A two hour tape can be re-recorded or fast forwarded in under a minute.
- 20-segment digital peak level meters indicate overload indicators. Closely tracks input signal for accurate level indications.
- During playback, the date and time of recording is displayed.
- Has a 5-segment battery indicator. The last segment blinks on and off, notifying you to change batteries.
- To eliminate distortion caused by unexpected peaks, the TCD-D10 PRO II incorporates a record-level limiter with a fast attack time of 30ms. The microphone attenuator prevents distortion by suppressing the signal level 20 dB.
- Immediate playback is possible through a built-in speaker.
- A wired remote controller is supplied to control the record, play, stop, and pause functions of the recorder. The top end of the controller is designed to accept a microphone holder. Two microphone stand screw adapters are also supplied.
- The supplied NP-22H rechargeable battery pack provides 1.5 hours of continuous operation. The optional NPA-D10 battery adapter enables 1 hour of continuous operation on AA-size batteries. With the use of the supplied AC-38 AC power adapter, it can also be operated on 100-240 VAC, 50-60 Hz.

AMPEX

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467 DAT Tapes

467-R01SP	4.19	467-R03DP	5.09
467-R04SP	5.79	467-R06DP	6.49
467-R09DP	7.79	467-R12DP	9.29

467 Digital Audio Mastering Tape

467-1731U 1/2" x 4600 100" NAB Reel	64.49
467-2721U 1/2" x 4600 100" Heavy Duty Precision Reel	79.95
467-5721U 1/2" x 4600 100" Heavy Duty Precision Reel	149.95

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456-1721U 1/2" x 2500 100" NAB Reel	18.99
456-2721U 1/2" x 2500 100" NAB Reel	26.99
456-2731U 1/2" x 2500 100" NAB Reel	33.99
456-5721U 1/2" x 2500 100" NAB Reel	52.99
456-5731U 1/2" x 2500 100" NAB Reel	58.49
456-9741U 1/2" x 2500 100" PREC	125.99

499 Grand Master Gold Studio Mastering Tape

499-1741U 1/2" x 2500 100" NAB Reel	20.49
499-2741U 1/2" x 2500 100" NAB Reel	37.49
499-9741U 1/2" x 2500 100" PREC	134.99

SONY

PCM-2300/PCM-2700A DAT Recorders

The superb audio quality of digital recording and the convenience of DAT cassettes is not restricted to broadcasting and post-production applications. In fact, it is just as relevant to business and educational applications. To meet the requirements of all these sectors Sony offers the PCM-2300 and PCM-2700A DAT recorders. While both are perfect for serious recording and playback at recording studios, the PCM-2700A is also well suited for simple program transmission at broadcasting stations. Both feature exceptional sound quality, three sampling frequencies, absolute time recording, long record/playback time, alternative subcode recording and digital fader.



THREE SAMPLING FREQUENCIES
At normal tape speeds, either a 44.1 kHz or 48.0 kHz sampling frequency can be selected. When set to long play (LP) mode, they provide 12-bit non-linear digital recording at 32.0 kHz.

PROFESSIONAL PERFORMANCE
The servo system is completely controlled by carefully programmed software. This features sophisticated, smooth transport control, which optimizes tape handling and increases the search speed to approximately 150 times normal.

DIGITAL FADER
A 64-step digital fader is incorporated in both units. Both fade-in and fade-out functions are available on the digital and analog inputs/outputs. The fade duration can be set over from 0.2 - 15 seconds, and can be controlled either locally or by the remote.

PCM-2300 AND PCM-2700A
The PCM-2300 has unbalanced digital input/output, while the PCM-2700A has dual digital inputs/outputs (balanced and unbalanced), allowing most digital audio equipment to be directly connected. Both also have balanced analog line level inputs/outputs which can be adjusted over a range of -12 dBs to +8 dBs, for connection to many other types of audio equipment.

The PCM-2300 has a reliable tape transport system driven by three servo-controlled motors, two direct-drive types for head drum and capstan, and a single DC motor for the reels.

The PCM-2700A employs a four motor direct-drive tape transport with head drum, capstan and reels, all individually driven by servo-controlled motors. The four motor direct-drive mechanism gives even more precise and stable transport.

PCM-2300 front panel display has a 20-segment peak level meter display with 0.5 dB step peak margin. The PCM-2700A has a 29-segment peak level meter with a 0.1dB step peak margin indication.

They record various subcodes separately from the audio data to provide tape search functions. The subcodes include the Start ID, Skip ID, End ID, Program Numbers, Absolute Time, and Data functions. Program numbers can be recorded sequentially as the Start IDs and are written (and can be renumbered) in the correct sequence whenever additional Start IDs are inserted.

OTHER FEATURES
• They operate in the Long Play (LP) mode, yielding twice the normal record/playback time. This also makes them compatible with the LP mode of consumer products. In LP mode, a maximum of four hours of recording and playback is possible.

• Built-in crystal clock generates a date function, which automatically indexes each recording with time and date info (minute/hour/day of the week/month/year). When tapes are replayed it's easily checked for when the recording was made.

• Both units can be installed in a standard 19-inch rack.

• Both included a wireless remote control for remote operation.

PCM-2700A ONLY FEATURES
• Read After Write function allows you to monitor the recorded signal immediately after it has been stored on the tape. This saves you valuable time, as recorded signal can be checked monitored in real time.

• High-speed location, in either direction, to points on the tape with a resolution of 1 second by entering the absolute time address via keys on the front panel.

• Convenient remote operation is performed by the optional RM-DT100 Remote Controller. Connected via the 37-pin parallel remote connector, it allows basic tape transport control.

• Has 8-pin remote interface to give a fader start function, which is particularly useful for On-Air applications.

• When manually writing the Start, Skip, and End IDs, there is an enhanced rehearsal function which is available for accurate ID recording. While monitoring the ID recording, these can be re-located forwards or backwards in 0.3 second steps.

Panasonic

SV-3700/SV-4100 Professional DAT Player/Recorders



Panasonic's SV-3700 and SV-4100 are designed for professional applications. They have highly accurate and reliable transport systems with search speeds up to 400 times normal play speed. They also feature advanced, high-quality analog-to-digital (A-D) and digital-to-analog (D-A) converters and input/output circuitry designed to interface with the widest variety of devices.

SV-3700 Features:

- When recording via the analog inputs, a front panel switch permits selection of the sampling rate (44.1kHz or 48kHz). This provides the need for a conversion of the sampling frequency in CD mastering applications. When recording through the digital inputs, it automatically clocks to incoming frequencies of 32kHz, 44.1kHz or 48kHz.
- Ramped record mute and unmute with three seconds fade-in and five seconds fade-out provides automatic level changes at the start and end of a recording.
- High-speed transport enables searching up to 250x normal speed. High-speed search up to 400x normal speed is possible once the tape has been scanned in Play/Fast Forward or Reverse mode. This ensures access to any point on a two-hour DAT in approximately 27 seconds.

SV-4100 Has All the Features of the SV-3700 PLUS:

Offers enhanced performance required for professional production, broadcast and live-sound systems. Features such as instant start, external sync capability, enhanced system diagnostics, additional digital interfaces and exceptional 20-bit audio make the SV-4100 the DAT quality standard.

QUICK START WITH TRIM AND REHEARSAL

- With 8MB of memory holding five seconds of audio data, the Quick Start function provides sound almost instantly after a play command is executed. Other DAT recorders lag about 7 seconds, making them unsuitable for professional applications.
- Easily adjust the Quick Start position and specify it by A-Time, Start ID or PNO. Recording via Quick Start is also possible, allowing two SV-4100s to be used for frame-accurate punch-in/punch-out and assemble editing.
- You can adjust the Quick Start position with I-frame resolution over a range of ±50 frames. Using the shuttle dial and Skip key for adjustment. Frame number is preceded by + or - sign. A-Time, subcodes and peak level are displayed to provide a general guide to positioning.
- Without playing the tape, you can monitor the level of stored data to check your Quick Start position. This preview capability is handy before actual editing or on-air play. Repeated play is also possible, allowing up to 1.5 seconds of the data to create a kind of sampler effect.

FRAME ACCURATE INDEXING AND EDITING

- Using the trim and rehearsal functions, you can accurately determine points to write, start and skip IDs. These IDs can be written, rewritten or erased at any point in the recording and automatically renumbered.
- With two SV-4100s connected via the 8-pin parallel remote terminal, synchronized frame-accurate editing can be performed. Continuity of edit points can be checked by rehearsal playback. By entering and editing end position in one of the Locate buttons, you can determine a punch-out point as well.

FLEXIBLE SEARCH

- Easily and accurately access your A-Time. You can specify hour, minute, second and frame.
- In most modes, the currently displayed A-Time can be assigned to one of the Locate buttons. Then from Stop, Pause or Play you can rapidly go to any of these four addresses by pressing its Locate key. In addition, Locate Last takes you to the most recent Quick Start A-Time position.
- Search is also possible by Start ID or program number.

5-MODE EXTERNAL SYNC

- Has 5 external sync modes. External sync is essential for applications such as video postproduction and stereo submix recording. It assures uniformity of timing between different equipment so the audio data consistently matches up with the target media.
- Select from 3 video external sync modes (25, 29.97 and 30 frames per second) or use the word sync or Digital Data modes (which lock to the input sampling frequency).

ENHANCED SOUND

The SV-4100 satisfies the highest professional expectations both in terms of sound and functionality. It features new 20-bit (equivalent resolution) digital-to-analog converters.

MULTIPLE DIGITAL INTERFACES

- Has XLR-balanced digital input and output; plus unbalanced digital coaxial and optical inputs and outputs. Analog inputs/outputs are XLR-balanced and output level is switchable between +4dB and -10dB, providing compatibility with other equipment.

3-WAY REMOTE CONTROL

- GPI input allows simple triggering of Quick Start Play. 8-pin parallel remote terminal connects to another DAT deck, computer or wired remote. Includes wireless remote control.

TASCAM

DA-P1

Portable DAT Recorder

- With rotary two head design and two direct drive motors the DA-P1 offers one of the best transport in its class.
- XLR-balanced mic/line inputs (with phantom power) accept a broad range of signal levels from -60dB to +4dB.
- Analog line inputs and outputs (unbalanced) plus S/PDIF (RCA) digital inputs and outputs enables direct digital transfers.
- Uses next generation A/D and D/A converters to deliver amazing sound quality.
- Supports multiple sample rates (48, 44.1 and 32 kHz) and SCMS-free recording.
- Included in its design is a MIC limiter and 20dB pad to achieve the best possible sound without outside disturbances.
- To monitor your sound there is a TRS jack and level control for use with any headphones.
- Built tough, the DA-P1 is housed in a solid, well-constructed hard case. The DA-P1 includes a shoulder belt, AC adapter and one battery.



SONY

TCD-D7

DAT Walkman Player/Recorder

- High-quality Standard Play (SP) mode provides up to two hours recording of 16-bit digital audio on a DT-120 DAT cassette. The SP mode is ideal for recording live music.
- Long Play (LP) mode allows up to 4 hours of recording/playback of 12-bit audio on a single DAT cassette. The LP mode is ideal for meetings, conferences or other voice recordings.
- Equipped with digital coaxial and optical input connector. Maintains highest signal purity for recording and playback of digital sources with all information retained in digital format.
- Also has analog Mic and Line inputs for recording from analog sources without external adapters.
- High-speed Automatic Music Sensor (AMS) search function finds and plays tracks, skips forward or back up to 99 tracks, all at 100x normal speed.
- Has a Digital Volume Limiter System (DVLS) that increases listening comfort and sound quality by automatically adjusting for sudden level changes of the recording. It also helps prevent sound leaks through headphones.
- Two-speed cue-review lets you hear sound while player is in fast-wind modes, up to 3x or 25x normal speed.
- Compact and portable, it has an anti-shock mechanism that permits accurate recording and playback even while in motion.
- LCD display with backlit windows clearly shows recording level, track number, operating status and 4-segment battery indicator, even in low ambient light conditions.
- Optional RM-D3K System Adapter Kit for complete digital interface. The kit is equipped with the input/output connectors for both the optical cable and the coaxial cable. Therefore you can use it as a relay between the TCD-D7 and other digital equipment. Also includes a wireless remote control.



JVC

XD-P1 Pro

Portable DAT Recorder

- An integrated package, the XD-P1 Pro combines a DAT recorder and a microphone with digital output in an uncluttered light package.
- Records and plays at all three standard sampling frequencies. Choose from 32kHz for long recording sessions, 44.1 kHz for mastering if CD production or 48kHz for highest fidelity.
- Operates without restrictions of SCMS (Serial Copy Management System), permitting one generation of digital to digital copy, using 44.1 kHz sampling frequency. You can digitally dub or copy a recording mode on the XD-P1 Pro as many times as necessary.
- The supplied detachable digital output microphone provides two pick-up patterns, "Telephonic" and "Stereo". A collapsible microphone stand is also supplied, allowing you to set the mic on a desktop for the interviews or conferences.
- Extensive use of aluminum and ultra-thin molding techniques make the XD-P1 Pro compact, lightweight and durable. The main module weighs under a pound (12.5 oz). With microphone and battery it weighs only 22 oz.
- All basic controls are on one side of the unit and readily accessible. You can operate the recorder using one hand.
- Advanced power-saving design and low power-consumption circuits give the XD-P1 Pro long recording capability - on a single battery charge. Optional rechargeable batteries further extend recording time.
- Supplied AC adapter/charger works anywhere in the world regardless of voltage or frequency.



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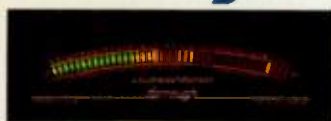
MM Series

MM842/1242/1642/2242
8/12/16/24 Channel Modular Mixers



- Electronically balanced XLR inputs
- Channel gain trim LED headroom indicator
- 3-band active EQ: sweep mid-band
- Individual channel inserts for patching
- Direct outputs on each channel
- Assignable bar graph level indicator for left and right group outputs
- XLR and 1/4" balanced outputs
- +48v phantom power

dorrrough



With today's audio systems stretching the limits of program dynamics it's become critical for engineers to obtain maximum loudness with the minimum of distortion components, to fully utilize the dynamic range available. It is of equal importance that they have a method of monitoring and establishing the maximum safe level at which a system can operate.

That's why every Dorrrough Audio Level Meter simultaneously shows 3 dimensions of program material content: Peak, Average Power and Compression are displayed in a color-coded 40-segment LED scale. Meters are easily viewed while providing precision indications of program energy content.

Loudness Meter Model 40-A

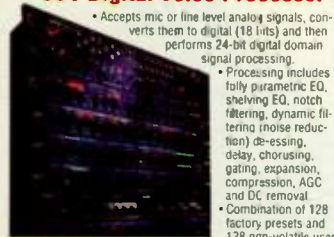
The model 40-A has a scale allowing 14dB of headroom in 1dB steps. A stand-alone unit, it measures 8" x 24" x 6" and has an internal power supply. Model 40-AP has a peak-hold option as well.

Loudness Meter Model 40-B

The Model 40-B provides metering of relative loudness to peak modulation. The 40-B is a scale differentiation of the 40-A and is calibrated in percent (%) modulation, with the over scale in dB from +3 dB to -3 dB. The 40-BP also has a peak-hold option.

Symetrix

Signal Processing Products 601 Digital Voice Processor



- Accepts mic or line level analog signals, converts them to digital (18 bits) and then performs 24-bit digital domain signal processing.
- Processing includes fully parametric EQ, shelving EQ, notch filtering, dynamic filtering (noise reduction), de-essing, delay, chorus, gating, expansion, compression, AGC and DC removal.
- Combination of 128 factory presets and 128 non-volatile user programs guarantee predictable and repeatable effects from session to session, performance to performance.
- Has XLR-balanced (analog) monoaural mic and the inputs and XLR-balanced stereo output, XLR-balanced and S/PDIF (RCA) inputs and outputs. MIDI input/output supports connection to virtually any type of MIDI control device for programming or controlling the 601 in real time.
- Ideal for a variety of recording, broadcast, live sound, and post production applications.

488 Dyna-Squeeze

8-Channel Compressor/Interface

- Can easily increase average recording levels on your digital or analog tape recorder by 10dB with no side effects
- Tracks processed by Dyna-Squeeze have presence and increased articulation. Subtle sounds become more up front.
- Many professional mixing consoles have output levels that are much hotter than digital recorder inputs. The 488 matches any console to most any digital recorder.

**We are a full stocking dealer
for the entire Symetrix line**

TASCAM

M-2600 Series

16/24/32 Channel Eight Channel Mixers

LOW NOISE CIRCUITRY

- Combining completely redesigned, low noise circuitry with Absolute Sound Transparency™ the M-2600 delivers higher-quality extremely clean sound. No matter how many times your signal goes through the M-2600, it won't be colored or altered. The signal remains as close to the original as possible. The only coloring you hear is what you add with creative EQ and your outboard signal processing gear.
- Double reinforced grounding system eliminates any hum. World-class power supply provides higher voltage output for better headroom and higher S/N ratio.

PREMIUM QUALITY MIC PRE-AMPS

- The M-2600's mic pre-amps yield an extremely low noise floor, enormous headroom and an extremely flat frequency response. This lowers distortion and widens dynamic range. It also increases gain control to an amazing 51dB. Plus, you get phantom power on each channel.
- The M-2600 accepts balanced or unbalanced 1/4" inputs, and low-impedance XLR jacks. Better still, the TRIM controls operate over a 51dB input range. For the hottest incoming signals, all it takes is a press of the +20 dB PAD button atop each channel strip to bring any signal down to manageable levels. Plug anything into it — keyboards, guitars, basses, active or passive microphones, samplers and more. No matter what you put into it, you can be confident that signal can be placed at optimum levels without a lot of fuss.

THE BEST AUX SECTION IN THE BUSINESS

The most versatile AUX section in its class, rivaling expensive high-end consoles. 8 sends total, 2 in stereo. Send signal in stereo or mono, pre- or post-fader. Available all at once. Return signal through any of 6 stereo paths.



FLEXIBLE EQ SECTION

You'll find both shelving and split-EQ sections on some mid-level consoles. But that's where the similarities with the M-2600 end. The M-2600's bi-directional split EQ means you can use either or both EQ sections in the Monitor or Channel path... or defeat the effect altogether with one bypass button. Most other comparably-priced mixers will lock the shelving mix into the Monitor path only, limiting your EQ application.

ADVANCED SIGNAL ROUTING OPTIONS

Direct channel input switching. Assign to one of eight busses, or direct to tape or disk, or to the master stereo bus. Because the group and direct-out jacks are one and the same, you can select either without repatching. You won't find this kind of speed or flexibility in a "one-size-fits-all" board.

ERGONOMIC DESIGN

The M-2600 has a big studio feel. All buttons are tightly spring loaded, lock into place with confidence and are large enough to accommodate even the biggest fingers. The faders and knobs have a tight, smooth "expensive" feel and are easy to see, easy to reach and a pleasure to manipulate. Center detents assure zero positions for EQ and PAN knobs. Smooth long throw 100mm faders glide nicely yet still confidently allow you to position them securely without fear of accidentally slipping to another position.

MACKIE

MICRO SERIES 1202

12-Channel Ultra-Compact Mic/Line Mixer

Usually the performance and durability of smaller mixers drops in direct proportion to their price. Fortunately, Mackie's fanatical approach to pro sound engineering has resulted in the Micro Series 1202, an affordable small mixer with studio specifications and rugged construction. The 1202 is a no-compromise, professional quality ultra-compact mixer designed for professional duty in broadcast studios, permanent PA applications and editing suites where nothing must ever go wrong.

BIG CONSOLE FEATURES

- Working S/N ratio of 90dB, distortion below 0.025% across the entire audio spectrum, switchable +48 volt phantom power and +28 dBu balanced line drivers.
- Real switchable phantom-powered mic inputs with discrete, balanced mic preamps as good as those found in big consoles.
- Has 4 mono channels, each with discrete front end mic preamp/line input and four stereo channels, each with separate left and right line inputs.
- Every input channel has a gain control with unity at the center detent for easy setup. Also a pan pot, low frequency EQ at 80Hz, high frequency EQ at 12.5 KHz, and two auto sends with up to 20dB available gain.
- Main outputs operate either balanced/unbalanced, as required.
- Switchable three-way 12-LED peak meter displays.

HEAVY DUTY CONSTRUCTION

- Designed for non-stop, 24-hour-a-day professional duty in permanent PA applications, TV and radio station, etc.
- Sealed rotary controls instead of open frame phenolic potentiometers that suffer from dust and contamination.
- Has steel chassis, rugged fiberglass circuit boards and a built-in power supply. Also has exceptional RF protection.

MULTIPLE APPLICATIONS

- Ideal "entry level" mixer for those just starting a MIDI suite.
- Ideal as headphone or cue mixer, level matching pro audio "tool kit", drum or effects and submixer. 8-track monitor mixer.

CR-1604 16-Channel Mic-Line Mixer

The hands-down choice for major touring groups and studio session players, as well as for broadcast, sound contracting and recording studio users, the Mackie CR-1604 is the industry standard for compact 16-channel mixers. The CR-1604 offers features, specs, and day-in/day-out reliability that rival far larger boards. It features 24 usable line inputs with special headroom/ultra-low noise Unityplus circuitry, seven AUX sends, 3-band equalization, constant power pan controls, 10-segment LED output metering, discrete front end phantom-powered mic inputs and much more.

LOWEST NOISE, HIGHEST HEADROOM

- With the CR-1604, having the lowest noise and highest headroom (90 dB working S/N and 108 dB dynamic range) at the same time are not mutually exclusive. It is free of commonly encountered headroom restrictions, and is able to handle the occasional pegged input with ease. In fact, many drummers consider it the only mixer capable of handling the attack and transients of acoustic and electronic drums.

CONSTANT POWER PAN POTS

- Only with constant power pan pots will a source panned hard left or hard right have the same loudness as when it is sitting dead center. While most small mixers pass simple balance controls for pan pots, the CR-1604's carefully optimized constant power pan circuitry make it a professional tool with the kind of performance necessary for CD mastering, video posting and other critical audio production.

IN-PLACE STEREO SOLO

- Stereo "in place" solo allows not only the monitoring of level and EQ, but also stereo perspective. Usually found in very expensive mixers, stereo solo allows you to critically scrutinize and carefully build a mix using all the channels with their respective sends and AUX returns.

UNITYPLUS GAIN STRUCTURE

- Proper gain settings are facilitated by proper gain labeling, along with center-click detents on the faders, clearly understandable input trim controls and output meters that read channel levels in solo mode. With property set levels you achieve very high headroom and low noise at the same time.

EFFECTS SEND WITH GAIN

- Unusual circuit design that provides two different "zones" that reflect real world use. Send from each channel can vary in level from off to unity gain, which is the normal range of effects sends in other mixers. Since you also get another whole zone from the center detent to +15 dB of gain, the channel fader can be pulled down and the effects send can be boosted above unity when more effect is needed.

INTELLIGENT EQ POINTS

- Low frequency EQ is at 80 Hz where it has more depth and less hollow midbass "bark". Midrange is centered at 2.5 KHz, providing for more control of vocal and instrumental harmonics. A specially-shaped HF curve that shelves at 12 KHz creates more size and less aural fatigue.

REAL MIC PREAMPS

- The CR-1604 has genuine studio-grade phantom powered, balanced input mic preamps on channels 1 through 6. All CR-1604 (and XLR10) discrete input mic preamp stages incorporate four conjugate-pair, large-emitter geometry transistors just like the big mixers use. So, when recording nature sound effects to heavy metal or mixing "futes or kick drums, you get the quietest, cleanest results possible.

BUILT TO LAST

- The CR-1604 is designed for non-stop, 24-hours-a-day professional duty — even for hours that log 100,000 miles in three months. It has sealed rotary potentiometers that are resistant to airborne contamination like dust, smoke, liquids, and even the oxidizing effects of air itself.

Optional Accessories

OTTO-1604

Add sophisticated computer controlled automation to your CR-1604. When connected to the MIDI port of your computer (PC, Mac, Amiga or Atari), each one of the 16 input channels can be programmed to change gain or to mute, just as you would program a sequencer. "Mute" levels can be programmed as well, along with all buss channels.

XLR10

While the standard CR-1604 comes with 6 high performance mic inputs, there are times when you need more. Enter the XLR10. This simple-to-install accessory adds 10 more (for a total of 16) mic inputs, with the same quality, performance and features as those in the CR-1604.

SENNHEISER

Incorporating state-of-the-art technology and decades of experience, Sennheiser headphones offer outstanding design, superb audio quality and luxurious comfort. From the ear padding to the O.F.C. (Oxygen Free Copper) cable, all materials are carefully selected and precision engineered to ensure incomparable quality.

HD414 Classic

- A re-issue of the world's first open-Aire dynamic headphone, the HD414 Classic offers maximum transparency, fidelity and comfort. A limited edition model, the HD414 Classic also features Professor Sennheiser's signature on the headband.
- Radial based diaphragms for more accurate reproduction.
- Field replaceable parts for long-term enjoyment.
- Neodymium-ferrous magnets for broad frequency response (18-21,000Hz).
- 10ft. Kevlar-reinforced oxygen-free copper signal cable with 1/8"-1/4" stereo phone plug.



\$59⁹⁵

HD25 SP Studio Monitor Headphone

Offering dramatic isolation from external sounds, the HD25SP is designed for professionals who rely on studio monitor headphones for work and pleasure.

- High-efficiency drivers for portable and field use.
- Modular parts for long term value and durability.
- Neodymium-ferrous magnets for broad frequency response.
- Frequency Response: 16-22,000Hz
- Sensitivity: 105dB.
- Impedance: 70Ω.



\$119⁹⁵

HD265 Studio Monitor Sealed Headphone

Designed to meet the stringent demands of studio professional and audiophile alike, the HD265 breaks new ground in the sealed-chamber headphone format.

- Sealed-chamber headphone format.
- Triple-wound aluminum voice coils for quick transients.
- Polycarbonate dome-damping minimizes distortion.
- Oxygen-free copper signal cable with 1/8" to 1/4" stereo phone plug.
- Frequency Response: 10-25,000Hz.

\$199⁹⁵

HD535 Dynamic Hi-Fi Stereo Headphone

The HD535's earcups surround your ears rather than resting on them, for a more natural listening experience.

- Open-back construction and classic design.
- Light aluminum coils in the transducer systems offers excellent transient and dynamic response.
- Supported by the open structure, tonal quality develops high dimensional sound qualities.
- Circumaural, oval earpads for good wearing comfort.
- Can be connected to all digital and analogue Hi-Fi components.



\$139⁹⁵

HD545 Digitally Compatible Circumaural Headphone

The HD545 is the headphone to which all in its price category must be compared.

- Polycarbonate dome-damping materials for clearer highs.
- Triple-wound aluminum voice coils mean powerful bass, high output and greater durability.
- Velvety soft, circumaural earpads and adjustable, padded headband for extended comfort and perfect fit.
- Oxygen-free copper signal cable assures optimal signal transfer.
- Includes 1/8" to 1/4" stereo phone plug.

\$169⁹⁵

HD565 Digitally Compatible Circumaural Headphone

Offering natural sound reproduction without tonal distortion — the choice for use with the most sophisticated equipment.

- Silk dome-damping for brilliant highs and ultra-smooth midrange reproduction.
- Copper-coated aluminum voice coils for high linearity.
- Bass-tube tuning for extended, powerful low frequencies.
- Velvet ear cushions provide lavish comfort.
- Oxygen free copper signal cable with 1/8" to 1/4" stereo phone plug.

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**PA1000/1400/1800
Power Amplifiers**



- High frequency switch mode power supply fully charges 120,000 times per second (1000 times faster than conventional power supplies) requiring far less capacitance for filtering and storage.
 - High speed recharging also reduces power supply "sagging" that afflicts other designs.
 - Incredibly efficient, 5 PA-1000 or PA-1400's (4 PA-1800's) can be run on one standard 20 amp circuit. There is no need for staggered turn-on configurations or other preventive measures when using multiple amp set-ups, as current draw during turn-on is only 6 amperes per unit.
 - They produce smooth and uncolored sound, while offering very full detailed low end response and tons of horsepower.
 - They each carry a 5 year warranty on parts and labor.
- PA-1000 weighs 9 lbs., is 15" deep and occupies one standard rack space. Delivers 1000 watts into 4Ω when bridged to mono.
- PA-1400 weighs 16 lbs., is 15" deep and takes 2 standard rack spaces. Delivers 1400 watts into 4Ω when bridged to mono.
- PA-1800 weighs 17 lbs., is 17" deep and takes two rack spaces. Delivers 1800 watts into 4Ω when bridged to mono.



Performance Series Amplifiers



Performance Series 1 300 Watt Power Amplifier

- Measuring only 3.5 inches high and weighing 26 pounds, the Series 1 delivers more than 150 watts per channel.
- Its welded steel chassis is unbelievably strong while a custom heat sink extension provides exceptional thermal capacity.
- An internal fan provides quiet background noise levels for critical monitoring applications and when pushed hard the cooling system insures continuous cool operation even in the most demanding situations.
- Active balanced inputs with both XLR and 1/4" phone jacks.
- Supplied with quality 5-way binding posts for highly reliable speaker connection.
- Front panel handles are reversible for either rack mount installation or easy handling.
- LEDs are provided for signal presence and clip indication; the detented gain controls have large knobs for easy front panel adjustments.

Performance Series 2 600-Watt Power Amplifier

- Same as above except the Series 2 weighs 32 pounds and delivers more than 300 watts per channel.

Performance Series 4 1200-Watt Power Amplifier

- Same as above except the Series 4 weighs 53 pounds and delivers more than 600 watts per channel.
- Has a switch selectable clipping eliminator that prevents damage to the speakers.

TANNOY

System 6 NFM II

A 6.5 inch Dual Concentric with Tulip HF wave guide forms the heart of the System 6 NFM II providing a reference single point source monitor in a more compact enclosure than ever before. Every aspect of design fully complements the drive unit's capability. The rigid cabinet with carefully contoured baffle and trim minimizes diffraction and the high quality minimalist DMT crossover and gold-plated Bi-Wire terminal panel optimize the signal path. Pin-point stereo accuracy with wide frequency response, good power handling and sensitivity make this an ideal nearfield monitor.



PBM Series II Reference Monitors

The PBM II Series is the industry standard for reference monitors. They feature advanced technologies such as variable thickness, injection molded cones with nitrile rubber surrounds and the highest quality components including polypropylene capacitors and carefully selected indicators. With a Tannoy monitor system you are assured of absolute fidelity to the source, true dynamic capability and most important, real world accuracy.

PBM 5 II

- Custom 5" injection-molded bass driver with a nitrile rubber surround for extended linearity and accurate low frequency reproduction. They are better damped for reduced distortion and exhibit more naturally open and detailed midrange.
- Woofer blends seamlessly with the 1/2" polyimide soft dome ferro-fluid cooled tweeter providing extended bandwidth for extremely precise sonically-balanced monitoring.
- Designed for nearfield use, the PBM 5 II cabinets are produced from high density media for minimal resonance and features an anti-diffraction radiused front baffle design.



PBM 8 II

- High tech 1" soft dome tweeter with unmatched pattern control and enormous dynamic capability. 8" driver is capable of powerful bass extension under extreme SPL demands.
- Hard wired crossover features true bi-wire capability and utilizes the finest high power polypropylene capacitors and components available.
- Full cross-braced matrix mediate 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.

PBM 6.5 II

- Transportable and extremely powerful, the PBM 6.5 II is the ideal monitor for almost any project production environment.
- 6.5" lowfrequency driver and 3/4" tweeter are fed by a completely redesigned handwired hand selected crossover providing uncompromised detail, precise spectral resolution and flat response.
- Fully radiused and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass.



TURTLE BEACH SYSTEMS

Turtle Beach audio cards bring true studio performance to the PC platform. Based on the technology used in their professional products, the performance of both their hardware and software has garnered accolades from users and press alike. Unlike other PC-based audio cards, Turtle Beach products are not designed for sound card game compatibility. Instead, the design philosophy is to give the best possible performance and quality, in the Windows operating environment, while bypassing traditional PC limitations.

MULTISOUND MONTEREY Multimedia Sound Card

- The next generation of Turtle Beach's award winning Multisound board, Monterey offers high quality performance and features at a very reasonable price. Multisound's Hurricane technology provides very high speed audio data transfer between the card and the hard drive. This approach allows for data throughput up to eight times faster than the more common HMA designs, while putting minimum burden on the CPU (critical if you're recording audio and video simultaneously).
- The Motorola DSP-56001 Digital Signal Processor operates at 20MIPS and performs all digitization functions with very low system overhead.
- High SN (-89dB, A weighted), low distortion (<0.01% THD, <0.01% IM - both A weighted), flat frequency response (DC-19KHz/5dB).
- On-board real-time effects processor for a variety of effects, including reverb and echo.
- Professional quality MIDI synthesizer with wavetable playback (4MB of real instruments audio). Up to 4MB of standard 512MB-type memory can be added for sampling of new sounds.
- True 16-bit recording, using 64x oversampling and sigma-delta conversion technology.
- True 16-bit playback, with 64x oversampling and sigma-delta conversion utilizing 18-bit DACs, and 48x interpolating filter.

WAVE 2.0

Professional Sound Editing for Windows 3.1 Compatible Sound Card

Wave is simply the best audio recording/editing/effects program available under Windows 3.1. With its logical layout, plethora of functions and wealth of effects, Wave will become an indispensable tool in your studio. Wave has the features (and interface) of a tape recorder. It supports stereo or mono recording/playback at 11,025, 22,050 or 44,1KHz sampling rates. Wave will work with any Windows 3.1 compatible audio board.

- Supports cut & paste editing (just like editing in a word processor) and has a full Undo function to eliminate fatal mistakes.
- Gain adjustment can be made to a whole file, or just the section you highlight.
- Wave can import and export a large variety of file formats, including SMP, SFI, WAV, 16, 8 and VOC. In addition, you can change the sample rate of previously stored files.
- EFX Clips function provides real professional effects like distortion, flange, digital delay, reverb, auto-stutter and others.

- A four band parametric equalizer function (WaveEQ) gives you the ability to touch up sections of your audio as well as the whole file. You can easily correct flaws in the sound or go for the special effects.
- Speed control lets you adjust the playback rate of your recorded audio (up to 200% faster or 50% slower).
- You can mix up to three sound files into a new fourth one, with control of volume and starting time of each file.
- Glitches in the recorded sound can be repaired by simply drawing the correction on the waveform with your mouse.

QUAD STUDIO

Professional 4-Track Recording System

Quad Studio is the first real-time four track recorder for the PC. Now you can record two tracks directly to your hard drive (16ms or faster), then record two more tracks while playing back the first two. With its high performance and ease of use, Quad Studio is the perfect replacement for 4 channel mixer/cassette decks.

- Graphics interface emulates all common mixer/tape deck controls.
- Record, overdub, mix and bounce tracks in real time with no loss of quality.
- Previously recorded audio can be effects processed (using the optional Wave program) and then mixed, in real time, with new audio.
- Includes Turtle Beach's high-performance Tahiti board.
- Software is also separately available for Monterey cards.



BEHRINGER

MDX 1000 Autocom Automatic Compressor/Limiter



- Incorporates an interactive auto processor for intelligent program detection. With the auto processor, the attack and release times are derived automatically from the respective program material - preventing common adjustment errors.
- The auto processor also allows you to compress the signal heavily and "musically" in dynamic range without any audible "pumping" or "breathing" or other side effects.
- Provides both Attack and Release controls allowing for deliberate and variable sound processing.
- Switchable soft knee/hard knee characteristics. Soft knee is the basis of the "inaudible" and "musical" compression of the material. Hard knee is a prerequisite for creative and effective dynamics processing and for limiting signal peaks reliably and precisely.

MDX2000 Composer Interactive Dynamics Processor



- Powerful and versatile signal processing tool provides 4 most commonly dynamic control sections: fully automatic compressor, manually controlled compressor, expander and peak limiter.
- Innovative IKA (Interactive Knee Adaptation) circuit combines the "musicality" of the "soft knee" function with the precision of the "hard knee" characteristics. Provides subtle and "inaudible" compression of the sound allowing creative dynamics processing.
- Auto processor provides fully automatic control of attack and release times. There is also manual control.
- Interactive Ratio Control (IRC) expander eliminates "chatter" on or around the threshold point.
- Interactive Gain Control (IGC) Peak Limiter combines a clipper and program limiter. This allows for "zero" attack, distortion-free limitation of signal peaks.
- IGC is invaluable in live applications. Servobalanced inputs and outputs. Operating level switchable from -10dB to +4dB.

PEQ305

Studio Parametric The Musical Equalizer

- Five independent, switchable bands. The quality of each of the five frequency bands can be modified gradually from notch to broad-band characteristics. This offers more flexibility than any graphic equalizer can provide.
- Bands 1 and 5 are switchable between shelf and peak. This is extremely useful, since acoustic problems usually occur in the upper and lower frequencies.
- Utilizes the "Consistent Q" principle to eliminate interaction of the parametric frequency, bandwidth and amplitude. The same applies to interaction between the individual frequency bands.
- Parallel arrangement of the individual filters reduces phase shifting and associated delays to a minimum.
- Potentiometer response follows human hearing characteristics.
- Relay-controlled hard bypass with auto-bypass function during power failure.

DEQ8000 Ultra-Curve 31-Band Digital Graphics Equalizer/Analyzer

- The DEQ8000 is an innovative programmable graphic equalizer/spectrum analyzer built with digital technology. A two-channel unit, it features Burr-Brown 20-bit A/D and D/A converters for input and output. It achieves the dynamics and audio quality of analog equipment while avoiding the drawbacks of analog filters such as tolerances in components.
- Programmable two-channel equalizer with 31 graphic bands on digital basis.
- Filter settings are displayed either in the form of display slide controls or as a filter curve representing the actual frequency response and taking the influence of several adjacent filters into consideration.
- Shelving function makes the moving of groups of faders possible.
- Up to 3 additional notch filters can be used whose frequency and bandwidth is freely selectable.
- Search and Destroy function automatically detects resonant frequencies, thus acting as an automatic feedback suppressor.
- The integrated Real Time Analyzer features both peak and RMS weighting, a noise generator with a separate output and a broad selection of auxiliary functions such as variable integration time, peak hold, etc.
- In Analyzer mode, a cursor is used to poll the amplitude of the single bands with an accuracy of ±25dB.
- The signal source (measuring microphone or equalizer input) fed into the analyzer input is freely selectable.
- Various analyzer measurements can be saved and recalled for reference purposes.
- Auto EQ mode combines the analyzer with the equalizer section and thus allows for the automatic equalization of acoustic environments. Within 0.5 seconds, the Ultra-Curve provides a linear frequency response based on the actual room acoustics.
- MIDI interface allows for selecting memory locations from an external MIDI controller. Remote control of all Ultra-Curve parameters can be realized via system exclusive information. Also, several units can be linked together via MIDI.

INFORMATION GUIDES

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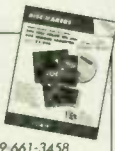
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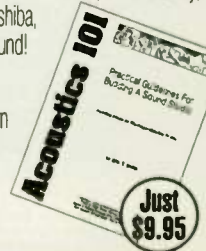
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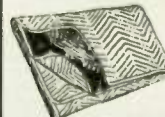
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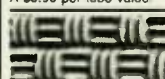
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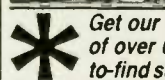
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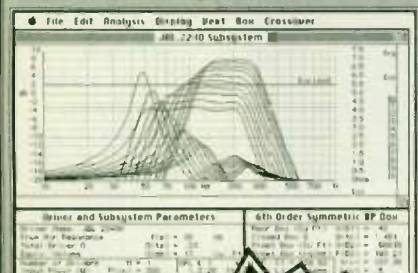
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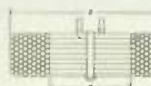
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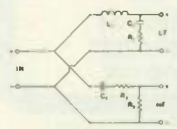
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**Goodbye,
Jerry.
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be missed.**

ACROSS THE BOARD

continued from page 162

Digidesign has changed its method of copy protection. Pro Tools 3.0 ran fine. Pro Tools 3.1 crashes with "Authorization Error," and in the process eats the 3.1 install and your old 3.0 install. Masterlist CD uses the same copy-protection scheme with the same results. When I called Digidesign, they said, "You are the first person who has had this problem, it must be the Turbo 601 board." That is as far as I got. A friend of mine in Miami had the same problem. When he called Digidesign, they told him the same thing, "You are the first person who has had that problem, it must be the Turbo 601 board." I guess they forgot about my calls.

Anyway, it is not the Turbo 601 board. I had a time-bombed review version of Masterlist CD that worked just fine. I liked it so much I bought a copy of Masterlist CD and Mezzo Master for making DDP (EXABYTE digital audio masters) tapes. The copy I bought was copy protected with the new scheme and crashed with the ugly results. I had to buy a copy of Toast CD-DA to get my work done. There has to be a better way.

Right now I have 3476 applications on my hard disk that require "installs" in order to run. Because I always have some new whiz-bang software running that may "eat" my hard disk, I stand the chance of losing all of my installs and having to scramble for the original disks. Oh yes, I almost forgot! I own more than one copy of Sound Designer II. I brought a set of master disks with me to New York in case something happened. I had to replace my hard disk, so I proceeded to uninstall Sound Designer II. The uninstall program complained, "This is not the master disk that installed to this hard disk, so your software cannot be uninstalled." What the hell was that? I was away from home, I had my master disks, I had a legal copy, and Digidesign wouldn't let me uninstall to a different master disk. What difference does it make? I went out and bought Logic Audio to finish the project.

Logic Audio uses a "dongle" for copy protection. A dongle is a device that connects to the keyboard port and incorporates a hardware serial number. Before the software will run, it looks to see if the dongle is plugged in. I think that this is a much better method of copy protection because there are no "installs" that must be placed on the hard disk and risk the

chance of damage. The bad part about dongles is that you could end up with 37 dongles hanging from your keyboard. I have an idea.

After you buy your first dongle-protected software you would know the dongle serial number. When you buy the subsequent pieces of software you would call the vendor and tell them your dongle serial number. You would then enter a code that would let your new software work in the presence of your dongle. You could then have copies of your software at work, at home, and in your car, but the only one that would work would be the one with the dongle plugged in.

WAR BIRDS

I have always wanted to be a private detective. Finding a missing DAT tape just doesn't quite get it. It turns out that Donald Fagen's wife Libby is missing 14 World War II fighter planes and tons of spare parts. Her father, who passed away in 1993, was Ed Jurist, a famous importer of Hawker Sea Furys. Before his death, it seems that many of the planes and parts got scattered around the U.S. and sold without Ed knowing about it. I have found three of them so far. If you see any Sea Furys with N numbers ending in SF, like N35SF or N62SF, send me a note. There is a reward and I will take you for a ride in one.



**COMING UP IN
OCTOBER 1995**

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I Am My Own Big Bang



Dealing with the
complexities of my own
expanding universe

BY ROGER NICHOLS

I was down in my basement a couple of days ago when my wife Connie wandered in to ask me something. As she approached, I was looking for some piece of equipment that I had set down on my workbench just six months ago, and I couldn't seem to find it. She said, "This room looks like an expanding universe." I was stunned for a second, like right after the initial TASER jolt when you approach some woman you thought you knew in a poorly lit parking lot. I replied, "Yeah, I guess I am my own Big Bang." I looked around, and everything I owned seemed to be multiplying and spawning some new piece of gear that it needed to perform better.

A good example would be adding a Yamaha ProMix 01 to your studio. By itself, it is a pretty awesome piece of gear, but the digital output is 48 kHz. I want to mix to 44.1 kHz, so I have to get one of those Z Systems sample-rate converters. Snapshot automation is cool, but I have some guitar solos and vocals that need continuous riding to sound their best, so I have to get some type of MIDI sequencer to record and playback all of the moves. I want the moves to be in time with the audio that I have recorded on my ADAT, so I have to record SMPTE on one channel for synchronization. My sequencer doesn't read SMPTE, so I have to get a SMPTE-to-MTC interface so that the sequence runs in time with the music. I now discover that I really need the eighth track that has been storing the SMPTE, so I have to either purchase the BRC remote that handles timecode without using an audio track, or I could get one of the JLCopier boxes that generates MTC and SMPTE from the ADAT control track. Get the picture? You could start this type of scenario starting with just about any piece of equipment.

The only part of the Big Bang theory that bothers me is that my universe is supposed to be expanding. The equipment is multiplying, all right, but my house is still the same size it was when I moved in. Get Stephen Hawkins on the phone, something is wrong here.

CUBA BOUND

By the time you read this, I will have been to Cuba and back to record the Gloria Estefan concert. Gloria has her own engineer, Eric Schilling, who will fix and mix, but because there was only going to be one show, and I had just finished recording the Steely Dan stuff the same way they wanted to record Gloria, they asked me to come along and help out. Thanks Eric, I have wanted to go to Cuba for a long time, and being a Gloria fan makes it more fun than work.

In case you forgot, or didn't read that issue, the recording setup is pretty simple. The front of house board for the show was a Yamaha PM-4000. I have checked out the mic preamps with my Meyer SIM machine, and they are pretty

flat (I listened to them, too). I connected the inputs of the Sony 48-track digital machine to the direct outs on the PM-4000. Each mic module was switched so that the direct signal came before the main fader. There would be no level changes in the signal recorded on the 48-track. To monitor what was being recorded on the 48-track, I connected the output of the 48-track to three Yamaha ProMix 01's. The output of the three ProMix boards fed a Rane stereo 8-channel mixer and a Rane headphone amp. I used my in-ear monitors to listen to what was being recorded. I hope Eric sends me a copy after he mixes it.

YAMAHA 02R

Yamaha's new addition to the digital console market will make its debut at the AES show in October. I got to see it at the Summer NAMM show in Nashville in July. I am going to be putting together the demo tape for Yamaha to use at the AES. That is the only way I could get them to let me play with the first one in the U.S. Hey, it's a Gear Slut thing.

The 02R has all of the features that everybody wanted added to the ProMix 01: eight busses, digital in, more inputs, more EQ — more of everything. It is also more money, but when you talk bang for the buck (there comes that Big Bang thing again), Yamaha looks like they have another winner.

COPY PROTECTION, AGAIN?

Let's talk about SAFE SECTOR for a second. I would really like to CONDEMn manufacturers who go too far in their copy-protection schemes. The Mac IIci has been the basic workhorse of the MIDI community for quite a number of years. With software applications getting bigger and slower, and with fewer and fewer Macs offering expansion slots, many IIci owners have upgraded their systems by purchasing the Daystar Turbo 601 Power PC accelerator card. This card essentially turns your IIci into a bolt of greased lightning. Everything that runs on the Power PCs runs on the Turbo 601 board — except Digidesign's new software.

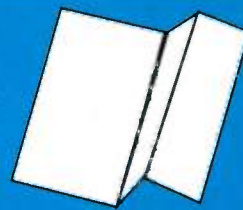
With the shipping of Pro Tools 3.1,

continued on page 160

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