

PC RECORDING *Special Report*

EQ

THE PROJECT
RECORDING &
SOUND
MAGAZINE

FEBRUARY • 1998

Product Reviews:

Symetrix Expander/Gate

Crane Song Digital Converter

Akai MIDI Machine

Great River Mic Pre

FMR Compressor

HHB CD Recorder

Motion Sound
Speaker Simulator

Exclusive First Look:

Audio-Technica 30
Series Microphones

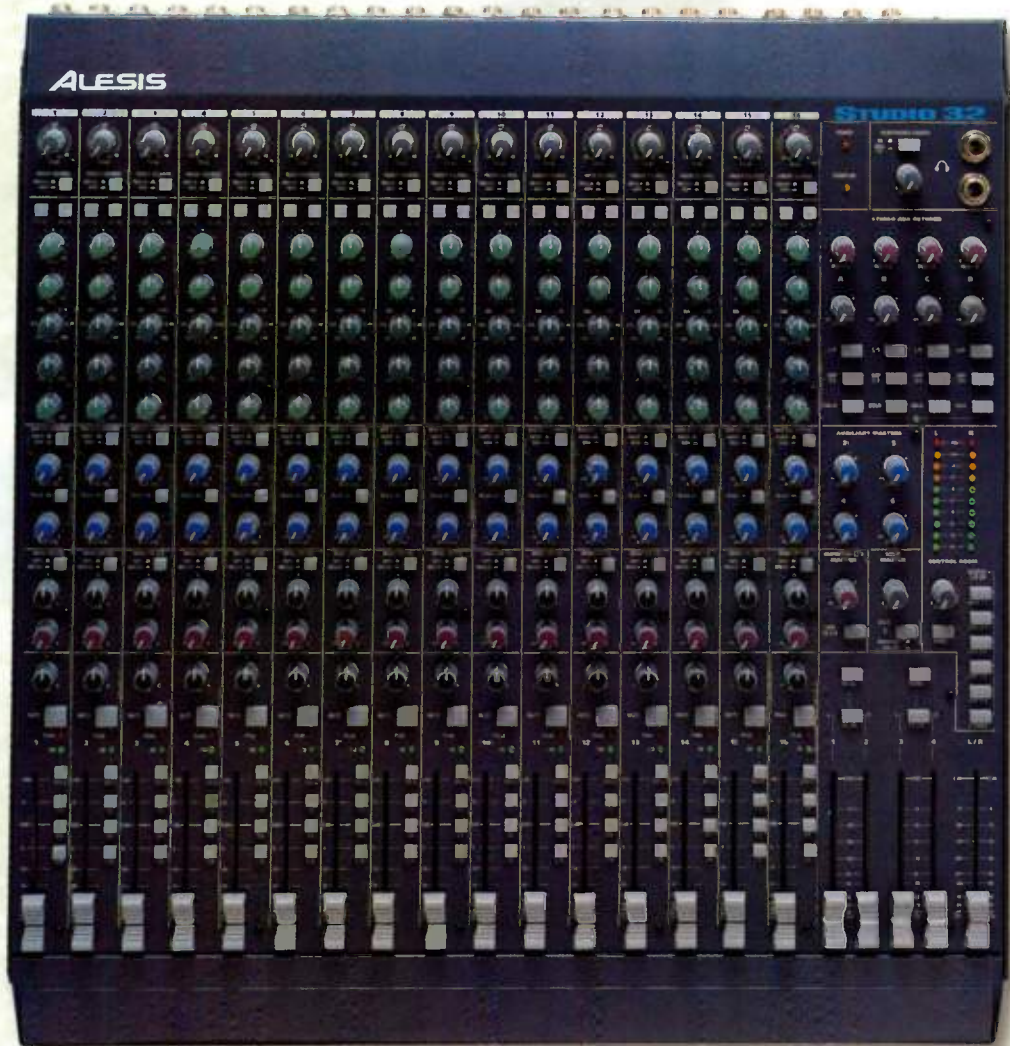
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Project Recording
With...*

Teddy Patterson

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USA

The Recording Console That



The Studio 32's inline design gives you balanced XLR mic inputs and balanced 1/4" TRS line inputs, channel inserts, tape inputs and direct outputs on each channel. Four group outputs, six aux sends (four pre-fader and two post-fader), phantom power for every channel and separate control room outputs are also provided. And since all of these connections are on the rear panel, your studio stays neat and professional-looking.



Looks Sixteen but Acts Thirty-two

The world of small-format consoles seems to be suffering an identity crisis. After all, most of them look alike...and also act alike.

Where can you turn to get the advantages you need?



Introducing the Alesis Studio 32™ Recording Console with Inline Monitoring



The Studio 32 offers 16 hybrid/discrete mic preamps that combine extremely low-noise performance (-129dB E.I.N.) with a wide 60dB range, making them perfect for driving digital recorders. In fact, the Studio 32 offers a wider dynamic range than all of the currently available "affordable" digital consoles (and it's a whole lot less expensive).



Audio sources in your studio multiply quickly. Instruments, miked drums, vocals, and stereo signals from synth modules keep adding up. Fortunately, the Studio 32 has twice as many inputs as an average 16-channel mixer, so simultaneous recording or mixdown of multiple sources—live or in the studio—is no problem.

It's the world's most affordable 16-channel console that offers inline monitoring capability. Inline monitoring means that each channel can send signals to a recorder and receive signals coming back from tape...at the same time.

So, unlike your average mixer, the Studio 32 can hook up with sixteen tracks of ADAT™ (or any other recorder), instead of just eight.

That's *double* the tracks you can access.

Other stuff that makes the Studio 32 stand out from the crowd: fully-parametric midrange EQ and super high-quality mic preamps that are more comparable with the consoles you see on magazine covers than on other compact mixers. 40 inputs available at mixdown...again, twice as many as most other small consoles. All at a price so low that you can afford to get that second ADAT (now that you can use it).

▲
Above: a 16-track digital recording studio that can fit into a corner of your living room. Centered around the Studio 32 and a pair of ADATs, this setup is a professional-quality, low-cost solution for serious recording.



The Studio 32's EQ section provides more than just high- and low-shelving EQ. You'll also find a fully-parametric midrange EQ with individual gain, frequency sweep and bandwidth (Q) controls.

The Alesis Studio 32. The console that acts a lot bigger than it looks. At your Alesis Dealer now.

STUDIO 32™
RECORDING CONSOLE W/INLINE MONITOR

For more information on the Studio 32, see your Authorized Alesis Dealer or call 800-5-ALESIS.

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Alesis Corporation

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World Radio History

ALESIS
CIRCLE 02 ON FREE INFO CARD

HR824 ACTIVE MONITOR

“Overall frequency was almost hard



Logarithmic wave guide helps accurately propagate high frequencies over a wider area. Result: better dispersion, more precise imaging and a far wider sweet spot.

Edge-damped 25mm high-frequency transducer is directly coupled to its own 100-watt FR Series™ Low Negative Feedback internal power amp.

Alloy dome is free from “break-up” that plagues fabric domes, causing high frequency distortion.

Signal present and overload LEDs.

Instead of a noisy port, a passive honeycomb aluminum transducer on the rear of the HR824 almost doubles the low frequency radiating surface.

“This allows the HR824 to move a large volume of air with minimal low frequency distortion & power compression.”
EM Magazine*

Specially-designed 224mm low frequency transducer has a magnet structure so massive that it wouldn't even work properly in a conventional passive loudspeaker. But servo-loop-coupled to a 150-watt FR Series™ amp, it's capable of incredibly fast transient response and extremely low frequency output.

Inside, the HR824 cabinet is 100% filled with adiabatic foam. Result: Unwanted midrange reflections from the low frequency transducer are absorbed instead of being reflected back out through the cone into your listening space.

MACKIE

HR824

Actually this paragraph doesn't have anything to do with the HR824. Mackie is further expanding its R&D/Engineering department and is looking for more analog and digital engineers with experience in pro audio. Log onto our web page for particulars.

“The enclosures — dressed in a conventional yet classy black — are shielded.”
EM Magazine*

Inside. Two separate FR Series™ power amplifiers with a total of 250 watts rated power — the most of any active monitor in the HR824's class.

On the back. HF Boost/Cut, Acoustic Space, Roll-Off and sensitivity controls, balanced 1/4" and XLR inputs. “The Mackie HR824 is the only system (in the comparative review) that doesn't require the user to fumble around with tiny tools in order to make adjustments.”
EM Magazine*

* Electronic Musician, October 1997. All quotes are unedited.

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UREI is a registered trademark of Harman International.

response was so flat that it to believe.” Electronic Musician Magazine*

Ready to confront reality? The HR824 Active Monitor is now in stock at Mackie Dealers.

Owning a set of HR824 near field studio monitors has the potential of seriously altering your perception of sound.

For the first time, you'll be able to hear precisely what's going on all the way through your signal chain — from microphones right through to your mix-down deck. You'll suddenly discern fine nuances of timbre, harmonics, equalization and stereo perspective that were sonically invisible before.

Some tracks you've recorded will amaze you; others may send you back for an immediate remix. But either way, for the first time, you'll be hearing exactly what was recorded — not what a conventional loudspeaker may or may not have been capable of reproducing.

Admittedly, these are pretty brazen claims (which is why we're backing them up with comments from a credible, third-party source).

But all you have to do to become a believer is to visit your nearest Mackie dealer. When you compare HR824s to the competition, you're going to hear some dramatic differences.

First you'll notice far more openness and detail. Critical listeners tell us that it's as if a curtain has been lifted between themselves and the sound source.

Next, you'll notice low frequency output so accurate that you might look around for the hidden subwoofer (some of the world's most experienced recording engineers have



Each HR824 ships with its own signed Certificate of Calibration attesting to its $\pm 1.5\text{dB}$ 39Hz-22kHz frequency response.

done this, so don't be embarrassed). The HR824 really IS capable of flat response to 39Hz. Moreover, it's capable of accurate, articulated response that low. Rather than a loudspeaker's "interpretation" of bass, you can finally hear through to the actual instrument's bass quality, texture and nuances.

Next, if you can "unlock" yourself from

the traditional, narrow "sweet spot" directly between the monitors, you'll discover that the HR824s really DO live up to our claim of wide, dispersion. Their sweet zone is so broad that several people can sit next to each other — or if you work solo, you can move from side to side in front of large consoles — and still hear a coherent, detailed stereo panorama.

Finally, let the salesperson go wait on somebody else and enjoy an extended session with one of your favorite CDs. When you're through, you'll discover that when distortion and peaky frequency response are minimized, so is ear fatigue:

You can listen to HR824s for hours on end.

One final point... your monitors are the only part of all your studio equipment that you actually hear.

Along with good microphones, HR824s are the best investment you can make, no matter what your studio budget. And, like premium mics, HR824 monitors cost more than less accurate transducers.

But if you're committed to hearing exactly how your creative product sounds, we know you'll find owing HR824s well worth it.

But if you're committed to hearing exactly

how your creative product sounds, we know you'll find owing HR824s well worth it.

"In fact, all the sonic details that I can discern on a \$45,000 reference system were very well reproduced, although not identically, on the HR824s. That was very impressive."

"The precise resolution is a major boon for finicky sound sculptors."

"The imaging and high frequency dispersion is brilliant. I was amazed at how far off-axis I could scoot my chair and still clearly hear what was going on in both channels."

"The low end was robust and present; the electric bass and kick drum thump-ed into my chest the way those huge UREI® monitors did back in the old days."

"Overall, the response was so smooth that I wasn't even aware of a crossover point."

"Stereo imaging and depth were fabulous."

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World Radio History



EQ

PROJECT RECORDING
& SOUND TECHNIQUES
VOLUME 9, ISSUE 2
FEBRUARY 1998



ON THE COVER:

Teddy Riley sits in his tour bus/project studio.
Photo by Bob Jones Jr.

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I will play music

Nothing but music

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



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

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CHANGES EVERYTHING

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Reality Headroom

It's good to occasionally go a little beyond your normal capacity. It helps keep you on your toes. Think about it as reality headroom — the ability to go above your nominal peak performance level without clipping or self-destructing. I like to use equipment designed with that kind of reality headroom in mind. It's great when a piece of gear does things it was never designed to do. It shows how solid the design is from the start, and if the designers knew about real-life usage.

Now I'm not talking about abusing a piece of equipment such as using a micrometer as a clamp or a screwdriver as a chisel. It's about using equipment or your talents in unusual ways to meet a particular challenge. The key is to think of circumstances beyond your control as "challenges" and not as "problems."

One of the first bosses I had, from a previous career as a robotics designer, never allowed us to talk about "problems." When we needed to come up with a solution to some situation it was always referred to as a "challenge." We were instructed to rise to this challenge "bait" and come up with an innovative solution. The aerospace industry coined the phrase "pushing the envelope" when you went beyond the expected "norm" and into new unexplored territories. I've never forgotten those lessons. With that in mind, here's a few of the things I've done in the past year that used gear in slightly unorthodox ways. As they say, necessity is the mother of invention.

One neat RF trick involved using a single Lectrosonics UMB200 UHF wireless transmitter to feed ten UMB200 receivers on separate delay stacks for an outside symphonic concert. This provided sound to a crowd of 40,000 listeners that was located as far away as 1/2 mile from the stage. I used a specially wired line-level XLR input cable supplied by Lectrosonics in place of the lavalier microphone. This was fed from a matrix out of a Yamaha PM4000 board. Each receiver went to a digital delay and equalizer used for time alignment and level control, and then to a set of speakers on a Genie lift. Since we didn't have to contend with the hum pickup and high-frequency roll-off you get from thousands of feet of cable run, the sound quality was actually better over RF than via hard wire. The other advantage was that no one could accidentally (?) cut any of the cables feeding the delay stacks.

Another cool gadget that went beyond the call of duty was the Whirlwind Qbox [mic-line tester]. Not only is it great at injecting tone on cables to check connections, it does double duty as a simple monitor speaker. When the Imus in the Morning radio show came to Maryland this past fall, I loaned my Qbox to the MSNBC audio tech. He set it on top of his mixing board and used the built-in amplifier and speaker to monitor the show so he wouldn't have to keep headphones on the whole four hours. I literally had to pry the Qbox from his fingers on the load-out.

On a different note, I used a pair of Craftsman Vice-Grip™ pliers to help get the group Chumbawumba up and running on a rooftop in downtown Washington D.C. The generator required for the 24 kW sound system didn't have a ground rod or clamp, and no extra tools were at hand to fabricate one. When we measured the voltage from the generator neutral to earth, there was about a 90-volt difference. This would be a potential shock hazard to the performers on the roof, who were after publicity, but not the type that results from talent plummeting to their death on the street below. A quick visual inventory showed I had a length of heavy ground wire and a grounded steel-framed building that was located next to the generator. I scraped the paint off a large bolt protruding from an I-beam with my Leatherman tool and clamped the ground wire to the bolt using the vice-grips. A wrap of tape on the handle added insurance that the connection would stay secure. A voltage test revealed a solid ground connection, and the show could go on.

We're already planning some pretty neat shows for the upcoming year, so I'm sure there'll be even more problems...oops...I mean challenges up ahead. If you've had any interesting fixes during shows or sessions that you've done, e-mail me at jmsokol@intrepid.net and I'll include them in a future issue. In the meantime, it's a creative world, so accept the challenge, push the envelope.

—Mike Sokol

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CIRCLE 76 ON FREE INFO CARD
World Radio History

BE CAREFUL WHAT YOU WISH FOR

Having just seen Roger Nichols's wish list (Dec. '97) that includes a 4x CD writer, let me pass on a recent experience. I will try to leave out studio and manufacturer names to protect the innocent.

Having recently mastered an album in L.A. on a Sonic Solutions system and created a PMCD on a CD writer that does not write multisessions, we were trying to create a CD with the audio on the first session and data on the next.

So, we first used Toast 3.5 to read in the audio files and create a new multi-session CD using a 2x CD writer (Pinnacle). However, the resulting audio had noticeable distortion in the high end. We tried different media with the same result.

Then we loaded the PMCD into another Sonic Solutions system (and in the process also boosted some low end) and used your wished-for CD writer to create the audio session. The result had similar high-end distortion and did not have the low-end boost. How could this be? We were very surprised.

As our final test, we used the Sony 900 CD writer (the typical CD writer used in this workstation) and created the audio CD (but not multisession) with perfect results.

In summary, we were not able to use anything but the Sony 900 to create acceptable audio. Yet we cannot create multisession CDs, so we are still searching for a means to add data to our audio Compact Disc.

I will let you know how we proceed...

Gary Levenberg
Interactive Audio
San Francisco, CA
www.interactiveaudio.com

FOUR SCORE

What's all this fuss about 4-track MiniDisc recording? I've been doing it since 1993 in my bedroom recording studio. (With the equipment all lit up at night, my wife says it looks romantic.) I have four Sony MDS 101 MiniDisc recorders with shock-resistant memory, TOC-based erase/divide/combine/move editing, track and disc titling, digital peak level meter display with red Over indicator, RCA analog I/O, and optical dig-

ital I/O. I keep the recorders stacked 2x2 on a shelf in my rack, held securely in place with Velcro™, and labeled MD1, MD2, MD3, and MD4.

When I place all four recorders in Play/Pause mode, and then press Pause on a single remote control, all four recorders start simultaneously and play in perfect sync for at least several minutes. The reason this works is that the "shock-resistant memory" feature provides an internal memory buffer that stores up to 10 seconds of audio data, thus allowing each drive to start instantly and run independently of disc delays.

A typical application would be to add a guitar track and/or vocal track to prerecorded (or virtual) MIDI tracks. I record the MIDI tracks (or SMPTE) on MD1. I use MD2 to record the guitar track and/or MD3 to record the vocal track by placing MD1 in the Play/Pause mode, MD2 and MD3 in the Rec/Pause mode, and then pressing Pause on the remote control to simultaneously start the MD1 Play mode and the MD2 and/or MD3 in Rec mode. I play back the recording by placing MD1, MD2, and MD3 in the Play/Pause mode and then pressing Pause on the remote control.

On each MD, I record the desired track on the Right channel and the resulting mix on the Left channel. That way, if I want to create a composite track from multiple takes on the same disc, I can use the mix channel to precisely align (by ear) the Divide points of each take to the nearest minimum step interval (approximately 0.06 seconds). If the Divide points are properly aligned on each take, when I play back the composite track, the mix channels of the recorded tracks should stay in perfect sync when started and played simultaneously. It sounds difficult, but I've comped tracks like that for years.

Gary Pogoda
Bloomfield, NJ

FOR PEAKE'S SAKE

Please, if you must have someone who makes a living recording keyboards on the cover of an issue dedicated to same, consider tapping the recognized masters such as Larry Fast, Klaus Schulze, etc. I buy *EQ* for its highly useful content whether I recognize the person on the cover or not, and I suspect others do as

well. Would it hurt sales to feature someone skilled but relatively unknown to the pop world? And to quote a letter to *Keyboard* magazine when they put David Bryan on their cover, "Bon Jovi has a keyboard player?"

Thanks for the great magazine.

Mike Peake
via Internet

[Sorry Mike, but we have to disagree. David was not put on the cover for recognizability, but for his ability as a keyboard recordist. Don't sell him short just because he played in a glam band. Check out his solo work before you dismiss this talented musician. Incidentally, Larry Fast and David Bryan have worked together on several projects — an indication of the respect Bryan receives from a "recognized master."—Ed.]

CORRECTING THE CORRECTIONS

In the January letters column, Stephen V. Smith adds some useful information to my review of Steinberg's Wavelab. However, he also took issue with two limitations I pointed out, but he interpreted these in ways other than I intended. Just in case I wasn't clear the first time around...

One weakness I mentioned was the program "can't record changes in effects parameter settings." Stephen mentioned that you can, in fact, save presets, but my comment was in the context of not being able to automate control settings that you make in real time.

The second limitation with which Stephen took issue was where I said the program doesn't "calculate amplitude so that processing doesn't cause clipping." Stephen correctly points out that you can calculate the amplitude for gain-changing operations to avoid clipping by using a peak level find function, but I meant processing to include all DSP functions. In other words, if boosting EQ, I would want the program to scale automatically to avoid clipping. That is not available with Wavelab.

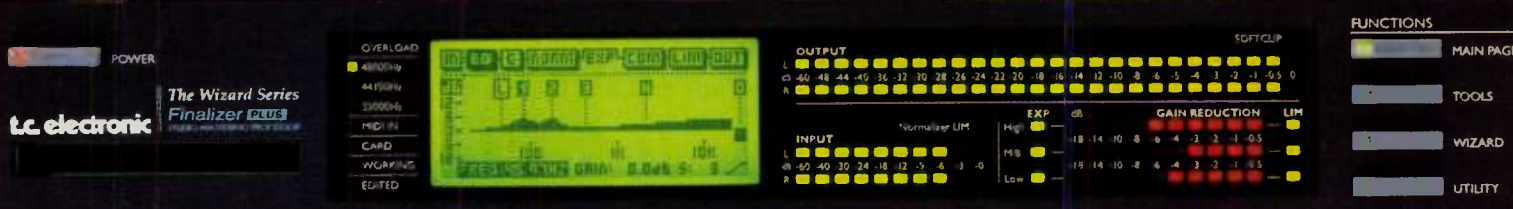
However, we both certainly agree on the bottom line: This is one cool program.

Craig Anderton
Technology Editor

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Finalizer PLUS
STUDIO MASTERING PROCESSOR



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Bernie Grundman
Bernie Grundman Mastering
Six Time TEC Award Winner

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Bob Ludwig
Gateway Mastering Studios
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- MS Encoder/Decoder

NOW SHIPPING!



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- De-Esser, Stereo Adjust & Digital Radiance Generator
- Real Time Gain Maximizer
- Variable Slope Multiband Expander
- Variable Ceiling Limiter

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CIRCLE 75 ON FREE INFO CARD

THIS AND DAT

Q I recently inherited a full case of BASF "Extra" 4D 90-meter 4 mm data cartridges ordinarily used for DAT backup of computer data. How does this tape compare to made-for-audio DATs such as Sony's PDP-124? On the plus side, 90 meters is 3 hours of recording time! Is the tape thinner (as with cassette tape) or are the hubs smaller?

Also, is there more to data DATs than just the certified low error rates? (For instance, is the tape formulation more abrasive than in audio DATs? Can I use 'em and never have to buy a DAT for the rest of my life?)

Steve Moroniak
Reel Productions
via Internet

A A 90-meter data DAT does use thinner tape and so it is slightly more vulnerable than a made-for-audio DAT. I think the application will determine whether these tapes are suitable for your purpose. If, for example, you want to make concert recordings, a data DAT is quite acceptable. If, however, the tapes will get lots of physical abuse, such as heavy shuttling back and forth, I would choose a standard tape.

The tape formulation and the recording format are essentially the same for data and audio. I tested a 3M 90-meter data DAT in a Panasonic SV-3700 and got the same error performance as with a Sony PDP-64 tape.

For the record, here are some facts about DAT:

- The head drum on full-sized decks is 30 mm (1.18 inches) in diameter. Tape is in contact with the drum for 90 degrees of its 360 degrees. The tape speed, 8.15 mm/sec (0.32 in/sec), is only 20 percent that of the standard cassette (1.875 in/sec), but combined with the 2000 rpm head rotation, the effective speed is 3.13 meters per second, or 10.28 feet per second!

- The head drum on some portable decks is 15 mm (.59 inches). The rotational

speed is the same as in standard DAT decks, but the tape is in contact with the drum for 180 degrees and the effective speed is 1.566 meters per second or 5.13 feet per second.

- A 120-minute DAT tape (7200 seconds x .32 inches = 2304 inches) is 192 feet long (58 meters) and about .00075 inches (19 microns) thick. A five-minute piece of tape is 8 feet long. A 90-meter tape is 295 feet long and about .00045 inches (11.43 microns) thick. A standard analog audio tape is actually a bit thicker than the 1.5 mil (.0015 inch) spec, which translates to 38 microns.

Eddie Ciletti
Manhattan Sound Technicians
NYC, NY
www.tangible-technology.com

THE OLD GRAY MARE

Q Can you please help me? I can't get a straight answer on my "antique" recorder — a TEAC 3340s (4-track, large hub, 15 ips). It sounds great. (I have not had the chance to play around with the new cassette 4-track recorders now on the market.) It seems to me

that my reel-to-reel 4-track, even if it is old, would have a far better recording quality than a cassette 4-track. My logic is based on the fact that the reel to reel records at 15 ips vs. 3 3/4 (at best) for the cassette recorders, has large hub reels, and bigger tape size [wider track width] than cassettes (tape doesn't become saturated as quickly), and I can buy an excellent grade tape like Ampex 456. I am told by "people in the know," who, incidentally, are the people that make a commission selling these new cassette 4-track recorders, that the new cassette 4-tracks blow away my old dinosaur, and that high-quality reel-to-reel tape will eventually be hard to find and it is impossible to find parts for this beast.

Can you please answer this question once and for all so that I can get on with my recording life?

I think that Eddie Ciletti is the best EQ writer. I like the way he can make a hopelessly "techy" subject understandable. I am so grateful for a magazine like yours. Keep up the good work.

Jerry Baker (Dinosaur User)
via Internet

A Thanks for the compliments! The answer to your question is pretty straightforward. Your TEAC 3340 "dinosaur" does record better than a 4-track cassette deck precisely because it travels at 15 ips and because the tracks are wider. The open-reel format also has lower wow and flutter than its cassette-based counterpart. Four-track cassette recordings can sound pretty good, but their built-in noise reduction is a necessity.

Beyond this, my choice today — and one you might consider — would be a 4-track Mini-Disc recorder.

For the record, the 3340 is a three-head machine (erase-record-playback), with each head dedicated to the task at hand. The record head is not a very good playback head, but it is used as such when in Sync (overdub) mode. In addition, the 3340 can not be punched in without first manually switching to repro, then pressing

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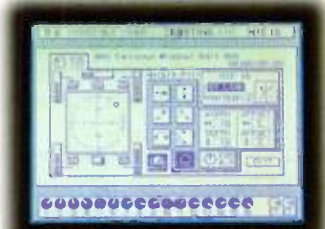
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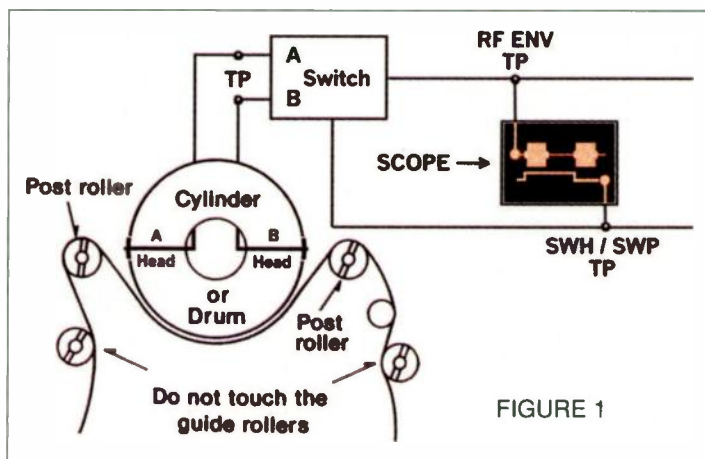


FIGURE 1

Record. Because of these points, almost any 4-track cassette deck is infinitely more user-friendly.

Cassette-based multitracks are even more sensitive to crosstalk between channels when in record. If users are not careful, both formats will be feedback prone when attempting to bounce tracks 1, 2, and 3 to track 4. Watch your record levels and don't add any treble!

You should contact a local tape distributor and a local TEAC/TASCAM service center for information on supplies and parts. Try calling TEAC/TASCAM's technical department at 213-726-0303 if you have no local service center.

By the way, I own a 3340, but long ago converted it into a half-track stereo machine.

Eddie Ciletti
Manhattan Sound Technicians
NYC, NY

ITALIAN BONDING

Q I am writing from Italy and having serious trouble with my Sony TCD-D3 portable DAT. Before taking it in for service I'd like to know more about the possible causes of the malfunction. I have enough basic technical skills to repair my Sony CDP-1 CD player (great vintage device, all metal!), as well as replacing a damaged earphone plug in the TCD-D3.

The problem is digital noise when playing recorded tapes. Tapes made on a Technics deck play poorly in the Sony DAT and vice versa. Do you think it might be failure of the RF module or a mechanical problem? If I could fix it myself it would save considerable time. Perhaps Eddie Ciletti (looks like he might be Italian, too!) has an answer?

Zio Stefano
via Internet

A The Sony portable DATs, like the D3, D7, or D8, are very difficult to service. The units are not easily accessible, even for simple adjustments and, especially if the unit is jammed, not often economically serviced. I normally recommend that you contact Sony, but I do think your problem is mechanical, so here's what to do:

You will find two POST rollers that wrap the tape around the heads. At least one of them is loose. This is very common. The service manual will indicate the location of the RF and SYNC test points, which I believe can be accessed by removing the bottom cover of the unit. A block diagram can be found at <http://www.users.interport.net/~edaudio/helical/path.html>, but I've also included the image here in fig. 1.

Play the known good tape from the Technics deck. Put the unit in Play and observe the envelope. It won't be "square," and it might be necessary to make small adjustments while in Stop mode, then check the results in Play. Adjust for the "squarest" RF envelope, then tighten the set screws at the base of the tape guide.

And yes, my grandparents came from Italy as children almost 100 years ago.

Eddie Ciletti
Contributing Editor
EQ magazine

ASK US

Send your questions to:
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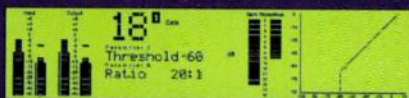
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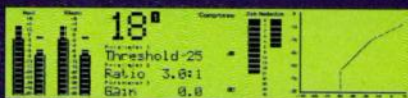


Gate



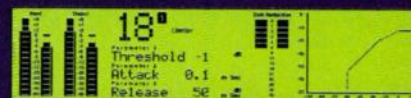
Start with the gate. Set parameters for threshold, ratio, attack, hold, release, and output gain. See the effect of your settings on the graphical display, as well as on the gain reduction and audio level meters, they all interact in real time with your manipulation of the parameters. Start with a threshold setting of about -60dB to clean off the noise in between the vocal takes. You can save your final gate settings as a "gate preset" building block and recall it into any other setup you do.

Compressor



Then move to the compressor. The effects of the gate settings are still visible on the graphic display, so let that help you determine where to set your compressor threshold. The parameters you change here will also effect the curve on the graphical display in real time. Move through all the regular parameters, like threshold, ratio, attack, release, and output gain. For vocals use a threshold of about -25dB, a ratio of about 3:1 or 4:1, and a slow attack and fast release for the most-natural sounding effect. Your compressor settings can also be saved off as a building block to be called up into any other preset.

Limiter



On to the limiter. Changes you make to the limiter settings are also seen on the graphical display. Adjust the level up or down to suit your needs. The flat top line of the display moves up and down as you adjust the level. You can also set the speed at which the limiter lets go of the signal as it goes below the threshold. This is truly smooth limiting, with patented dbx PeakPlus™ algorithms, so rest assured that where ever you set your threshold level, your tape will not distort, and your signal will not get butchered as it goes across the threshold. And like the other parts of the processor, your limiter settings can be named and saved for later recall.



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De-esser

and More



De-essing with the DDP, you see the effects of your settings displayed on the graph. Parameters here are the common ones: threshold in frequency, 800Hz to 8kHz, and amount in percent. Other available processing includes EQ - both in-push and sidechain, for special-effect types of processing. When you're editing any of the building blocks, its icon is visible in the display, and the parameters are shown on the graph, so it's always easy to know where you are. Parameters are easy to see in this page driven operating system. When it's as complex as this, it's nice to know somebody was thinking when it was put together.

You can also work in stereo, or set up a completely different and independent processing chain for the other channel. Also, notice that the audio meters are capable of showing both peak and average levels for input and output. Optional digital output with the TYPE IV™ Conversion System with TSE™ (Tape Saturation Emulation) provides up to 24-bit output in either AES/EBU or S/PDIF formats with the trademark digital processing of TYPE IV™. The DDP also has full MIDI/Automation capability, with separate midi in and thru jacks. Entire processing setups may also be saved into one of 50 user defined presets, or use one of the 50 factory setups.

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• And speaking of stereo, you can work in stereo with dbx's True RMS Power Summing™ for phase-coherent tracking, or in dual mono mode, without the two channels interacting at all, making the DDP a great processing value.

IT NEVER FORGETS

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• When you save a preset, you also save the information that makes it work behind the scenes, too. Digital output (optional), sample rate performance, MIDI setup, as well as any of the other utilities, like sidechain setup and monitor, EQ settings, and SysEx functions.

• When you make changes to any parameter, you can see where your adjustments are affecting the signal, simply by looking at the Hi-Res graphical display, which shows the processing curve in real time as you make your adjustments.

Check out the DDP at your local pro audio outfitter, and experience DIGITAL performance you'll never forget.

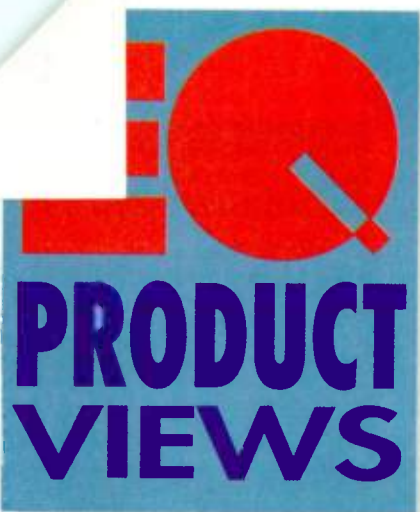
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Shure as model A457, the Z-BAR has been unavailable since its discontinuation in early 1994. Z Right Stuff acquired the rights to the product and now the Z-BAR is available direct for \$17.95 plus shipping (\$3.50) from Z Right Stuff, 762 Inverrary Lane, Deerfield, IL 60015. For additional information or to place an order, call 1-800-520-4380 or fax 847-520-4212. Circle EQ free lit. #101.

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MINI RECORDER

The Otari MR-30 Mini-Disc recorder offers 74 minutes of stereo recording and 148 minutes of mono recording time, along with a full range of on-board editing and programming functions. Features include: automatic recording start

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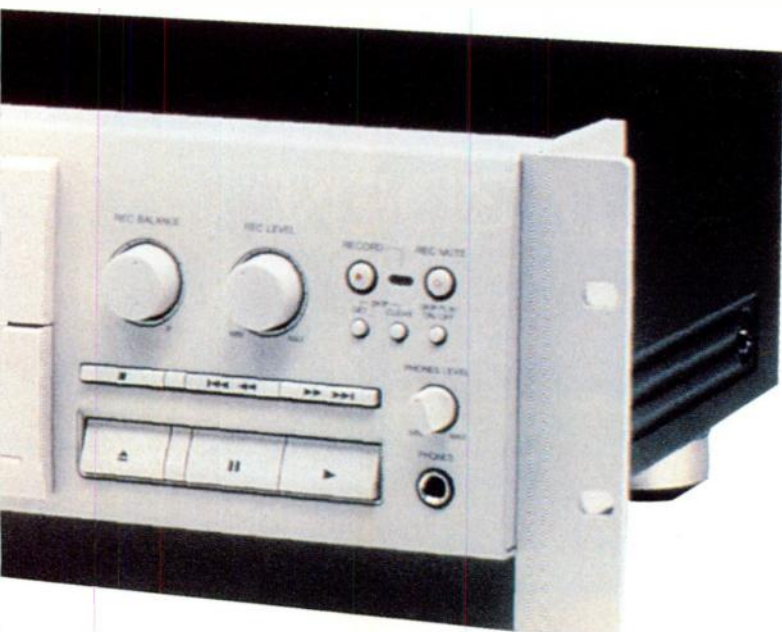
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THE ART OF PROCESSING

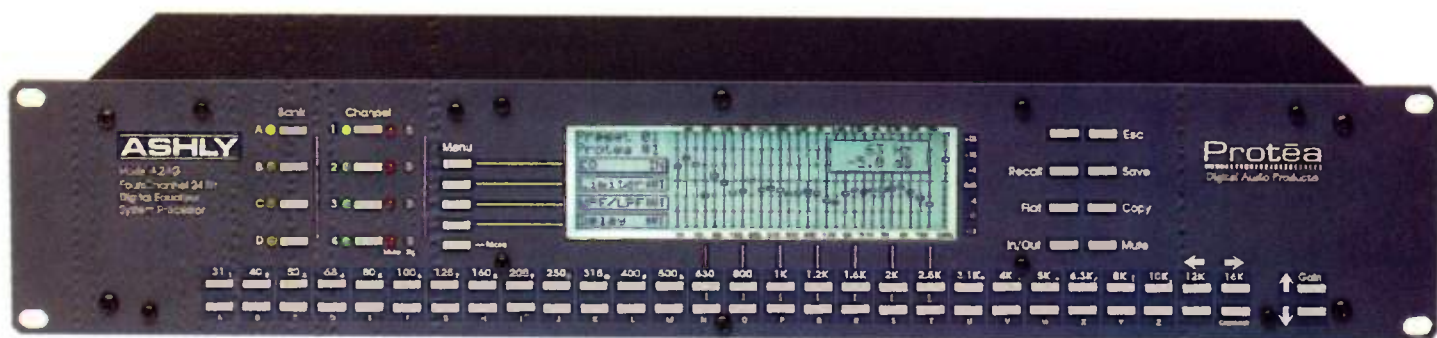
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EQ PRODUCT VIEWS

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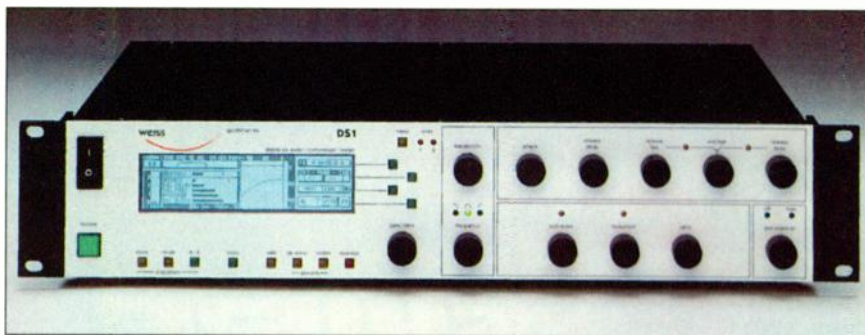


POWER UP

The LSR28P bi-amplified monitor system and the LSR12P powered subwoofer are the first self-powered systems in the expanding JBL LSR product line. Both new systems build on the foundations of JBL's proprietary Linear Spatial Reference (LSR) technology. Both new systems also incorporate other recent JBL transducer technology innovations, including DCD Differential Coil Drive technology and the carbon fiber composite materials. The JBL LSR28P uses of two new LSR speakers, the 218F 8-inch, low-frequency transducer and the 053ti high-frequency transducer. The JBL LSR12P powered subwoofer is made up of the 252F low-frequency transducer and the LSR12P amplifier with 250-watts continuous power. This subwoofer is designed to be compatible for both the LSR28P self-powered speaker system and the LSR 32, as well as offering multiformat compatibility with Dolby AC-3, DTS and other surround audio systems. The LSR28P costs \$995 and the LSR12P costs \$1095. For more details, contact JBL Professional, 8500 Balboa Blvd., Northridge, CA 91329. Tel: 818-894-8850. Circle EQ free lit. #108.

WEISS MEN SAY...

The Weiss DS1 compressor/de-esser can be operated in two basic modes, either as frequency selective compressor (De-Essing, De-Rumbling, De-Brightening) or as a full band compressor. Other features include: switchable linear phase crossover filter with crossover frequencies between 300 Hz and 20 kHz; fully MIDI controllable; 28 snapshots; 40-bit floating point processing; 24-bit AES/EBU Input/Output with switchable dithering; program dependent release; oversampling sidechain and gain multiplier; auto gain makeup feature; and monitor feature for compressed band only listening. For more information, contact Daniel Weiss Engineering Ltd., Florastrasse 10, 8610 Uster, Switzerland. Tel: 41 1 940 20 06. Web: <http://www.weiss.ch>. Circle EQ free lit. #109.



Introducing the Audiowerk8
Home Studio Kit: The
only complete, cross-platform
solution for the computer
based home studio.

Audiowerk8

HOME STUDIO KIT

Here's the deal

Audiowerk8 Home Studio Kit

The complete Plug and Play solution. A PCI Digital Audio Recording card and powerful MIDI/audio sequencer in one package. With this combination even very complex musical projects become a no hassle reality.

The Audiowerk8 Home Studio Kit is a special edition and is only available for a limited time from fine music and computer stores worldwide.

Including:

– Audiowerk8

This powerful 7" PCI recording card optimizes your computer's performance. It provides professional sound quality and extremely accurate synchronization.

- 8 Analog Outputs, 2 Analog Inputs
- Stereo Digital Input and Output (S/PDIF)
- Professional Quality A/D D/A converters
- Sample rate variable up to 50 KHz, Res. 1 Hz
- 8 track playback during 2 track recording

– Logic Audio Discovery

Ideal software for integrated MIDI and audio recording in your home studio. 1,000 MIDI tracks, virtually unlimited audio tracks play back via 16 physical tracks, real-time DSP effects.

– Cool Edit Pro LE

In cooperation with Syntrillium Software Corporation, we have included a new two track version of their sample editor, Cool Edit Pro. This also includes even more DSP effects plus Active Movie Plug-Ins support.

– ZAP® for MacOS

Compress digital audio material up to 60% with our Zero Loss Audio Packer. Unpacked files are restored to the original with 100% bit accuracy. Perfect for archiving or transmitting audio files via the Internet.

Emagic Inc.
Tel. 530-477-1051
Fax 530-477-1052

Emagic Web Site
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Full Cross Platform Compatibility

World Radio History

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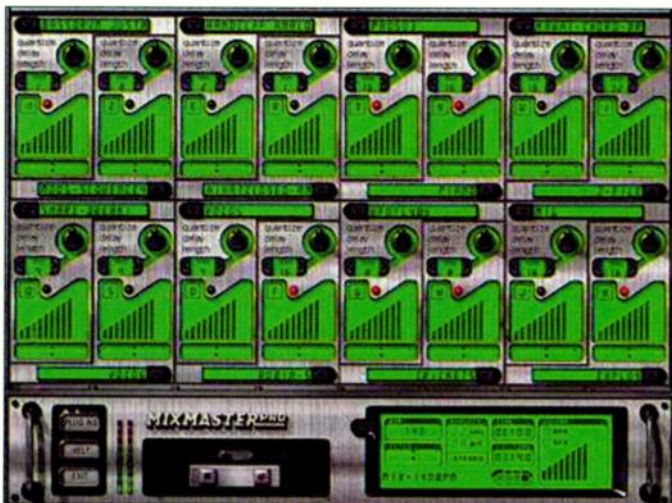
Technology with Soul.

CIRCLE 25 ON FREE INFO CARD

EQ STUDIO WARE

HIGH TECH, OLD SOUND

If you'd like your music to have the sound and vibe of classic old records, then Opcode's unique new cross-platform DSP plug-in fusion:VINYL may be just what you've been looking for. Fusion:VINYL gives the young music producer the ability to sound like vinyl records. VINYL provides controls to change the record surface and condition and adjust the playback parameters. The user can also control just how warped they want the music to sound. Fusion:VINYL includes tools to vary the stereo width of the sound, and controls for amount of compression. Both MAC and PC, fusion:VINYL plug-ins are available for a MSRP of \$99.95. For more details, contact Opcode Systems, Inc., 3950 Fabian Way, Suite 100, Palo Alto, CA 94303. Tel: 650-856-3333. Web: www.opcode.com. Circle EQ free lit. #110.



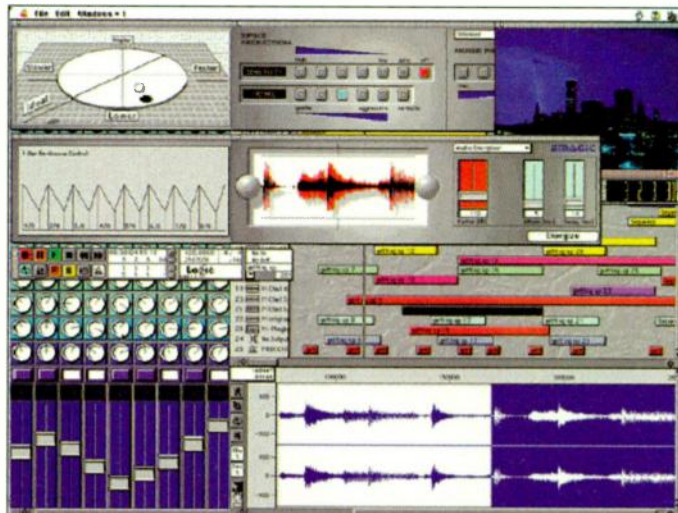
SOME SORT OF MIX UP

HyperDrive.com's Mixmaster Pro provides real-time 16-channel mixing of up to 32 16-bit, stereo samples at 44.1 kHz. The program's features include volume, pitch, balance, and quantizing controls for each individual channel. Mixmaster Pro can be used to mix music of any style, but is especially well-suited to dance, house, techno, trance, hardcore, hip-hop, acid jazz, and rock compositions. Mixmaster Pro also digitally records and saves compositions and mixes for later playback. It converts saved mixes to standard Windows WAV files for sharing or for use in other applications. The Mixmaster Pro CD-ROM contains a library of over 500 professionally recorded, royalty-free, CD-quality samples, including full drumsets, basslines, melody loops, effects, vocals, raps, and more. The samples are standard Windows WAV files for easy use in other applications. In addition, Mixmaster Pro will import a user's samples for use in a mix. Mixmaster Pro requires a Pentium PC, Windows 95,

a CD-ROM drive, and a 16-bit, Sound Blaster-compatible sound card. The retail price is \$29.95. For more information and to order, visit the hyperDrive.com Web site at www.hyperDrive.com/mixmaster, or call 800-901-8622. Circle EQ free lit. #111.

COULD IT BE EMAGIC?

Emagic has completed support of Digidesign's Pro Tools 24 and it is available as a free download for all Logic Audio 3.0 and Emagic TDM Extension owners. Owners of previous versions of the TDM Extension can download the 24-bit Updater from Emagic's Internet site www.emagic.de. Alternatively, the Updater is available on disk for a nominal shipping and handling charge directly from Emagic. All TDM tracks can be switched from 16- to 24-bit word format. When using a 16-bit Audio system, e.g., Audiowerk8 or Macintosh AV, you can use 16-bit and 24-bit audio files simultaneously, freely mixing between them. The Audio Window offers various functions to convert between the two formats. Most functions of Logic Audio (including the Digital Factory) are now working with 24-bit files. Within the built-in Stereo Sample Editor you can even copy and paste between the different audio file formats. MSRP for TDM Extension is \$149. For more information, contact Emagic, 13348 Grass Valley Ave., Grass Valley, CA 95945. Tel: 916-477-1051. Circle EQ free lit. #112.



AKG CONDENSER MICROPHONES TAKE YOU FROM THE STUDIO TO THE STAGE

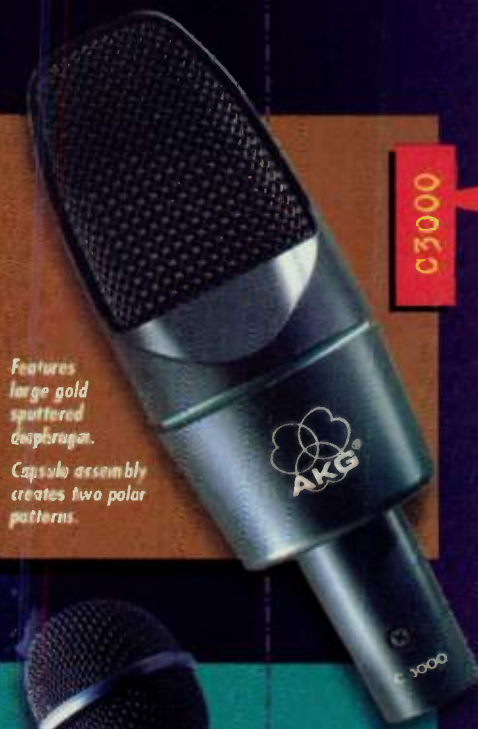
When you think of high quality microphones, your first consideration should be AKG. Since 1947, AKG has been the leader in condenser microphone technology. Our C1000S, C3000 and C535EB are great for professional and home studio engineers, as well as performing musicians.

- **Perfect for both studio and stage performance**
- **Rugged construction for demanding road work**
- **Shock isolation reduces physically transmitted noises**
- **Competitively priced**

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Telephone: (615) 360-0499
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Telephone: (01) 431866540
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CIRCLE 232 ON FREE INFO CARD
World Radio History



C3000

Features large gold sputtered diaphragm. Capsule assembly creates two polar patterns.



C535EB

Characteristic of AKG's best studio condensers at a price you can afford.

Features integral four position output level/bass rolloff switch.



C1000S

Operates on phantom power or 9 volt battery.

Features Dual polar patterns that are ideal for live sound & recording.



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Look for TAYTRIX at the NAMM Show
<http://www.taytrix.com>

EQ STUDIO WARE

VIRTUALLY UNSTOPPABLE

Power Technology's DSP•FX's Virtual Pack packages the 32-bit floating point algorithms and easy-to-use interface found in its hardware-based systems in a pure software form. For use with all PC DAW systems, including Cakewalk Pro Audio, Sound Forge, Cubase VST, and SAW +32, the initial version of DSP•Virtual Pack offers eight effects plug ins, including: reverb, stereo pitch shift, analog tape flanger, multi-element chorus, multi-tap delay, parametric EQ, auto pan, and auto tremolo. The package supports Microsoft's DirectX software interface and also includes support for a direct interface to IQS's SAW+32 package. DSP•FX Virtual Pack-

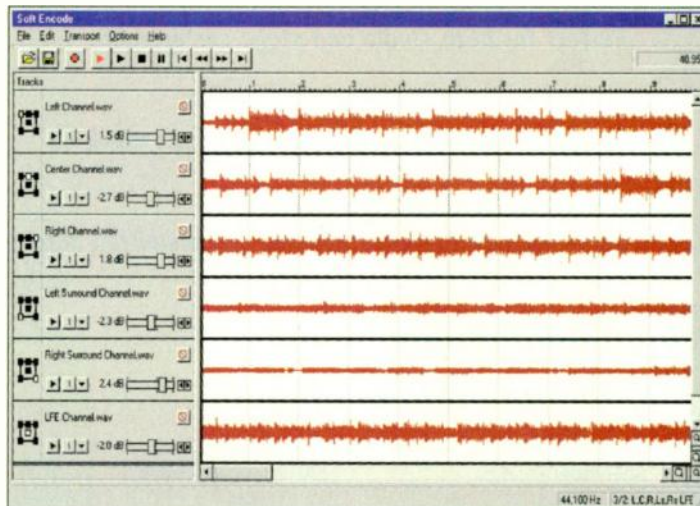


age also offers users the capability to directly process and re-record individual Wave format files. It costs \$599. For more details, contact Power Technology, 100 Northhill Drive, Bldg. #24, Brisbane, CA 94005. Tel: 415-467-7886. Web: www.dspx.com. Circle EQ free lit. #130.

SOFT SELL

Soft Encode is a stand-alone software program that provides cost-effective Dolby Digital (AC-3) encoding for multichannel audio delivery. Because Soft Encode operates in Windows 95 and Windows NT, it purports to be the first truly affordable software-only mastering tool for Dolby Digital. Whether used alone or coupled with an editor like Sound Forge, the entire process of editing, mastering, and encoding files can be handled on a single Windows-based machine. Soft Encode is available in two versions: the

Dolby Digital 5.1-Channel version (MSRP \$1995) and the Dolby Digital 2-Channel version (MSRP \$695). For more information, contact Sonic Foundry, 754 Williamson St., Madison, WI 53703. (608) 256-3133. Web: www.sonic-foundry.com. Circle EQ free lit. #113



CIRCLE 77 ON FREE INFO CARD

Gina™ Digital Multitrack.

Get Music Into Your Computer.
Get Music Out of Your Computer.
Make Records. Have Fun.



You've just written the masterpiece to end all masterpieces. The one that's destined to be the title track of your CD. Do you turn to your trusty four-track recorder? Not a chance. This isn't a demo—this is your life. Okay. So you call up a major studio and book a month or so of premium session time. (Thank goodness you're independently wealthy.) Or you walk up to your PC, plug into Gina, and record, arrange, and master your music with unparalleled fidelity and precision. You make music without watching the clock. Without settling for demo quality. Without being restricted by numbers of tracks, outdated media, or proprietary, closed-ended systems.

Gina Digital Multitrack. Enjoy.

\$499, including multitrack recording/editing software.

Gina is 100% compatible with all of the best Windows 95 multitrack recording and editing software, including programs from Steinberg, Sonic Foundry, Cakewalk Music Software, Innovative Quality Software, SEK'D, and Syntrillium Software.

Is your PC ready for Gina? Download the Echo Reporter™ system analysis software from www.event1.com

Gina is designed and manufactured in the U.S. by Echo Digital Audio, an Event Strategic Partner



CIRCLE 30 ON FREE INFO CARD

	VS-840	Digital Tape	Mini Disk	Analog Tape
Virtual Tracks	Yes	No	No	No
Cut and Paste Song Editing	Yes	No	Limited	No
Digital Mixer	Yes	No	No	No
Digital Effects & EQ	Yes	No	No	No
Waveform Editing	Yes	No	No	No
999 Levels of Undo	Yes	No	No	No

Duh.

The fact that digital recording is the wave of the future is no longer a secret. Unfortunately, which format to go with can be. But not for long. Introducing the affordable VS-840, a complete 64 virtual track digital recording studio and the first to record directly to a built-in Zip drive.

For the producer in you, the VS-840's random access recording system allows you to record a great verse and chorus and then

simply cut and paste tracks to try out endless song structures and arrangements. Throw in a built-in 12-channel mixer with 20-bit A/D converters, a full-blown stereo multi-effects processor, 64 virtual tracks with scrubbing ability, and you've got an unbeatable package at an unbeatable price.

Head on over to your nearest Roland dealer and see where digital recording is headed. It's an absolute no-brainer.



<http://www.rolandus.com> CompuServe®: GO ROLAND Fax-Back Information: (213) 685-5141, ext. 271 (Doc. #10237)

Roland Corporation U.S., 7200 Dominion Circle, Los Angeles, CA 90040, (213) 685-5141 Roland Canada Music Ltd., 5480 Parkwood Way, Richmond, B.C. V6V 2M4, (604) 270-6626
Specifications subject to change without notice. All trademarks are property of their respective manufacturers.

64 Virtual Tracks

You can record up to eight takes on each of the VS-840's eight tracks. Record your solo over and over on the same track, keeping the previous takes. Bounce without fear. Comp the ultimate track. A total of 64 virtual tracks are available.

Built-in Effects

The VS-840 features a world class COSM-based guitar preamp for modeling the greatest vintage tube amps in history. It also comes with digital Reverb, Delay, Chorus, EQs and much more.

999 Levels of Undo

Now you can edit, bounce and record with peace of mind because with the VS-840's 999 levels of undo, operations or mistakes are never permanent.

EZ Routing

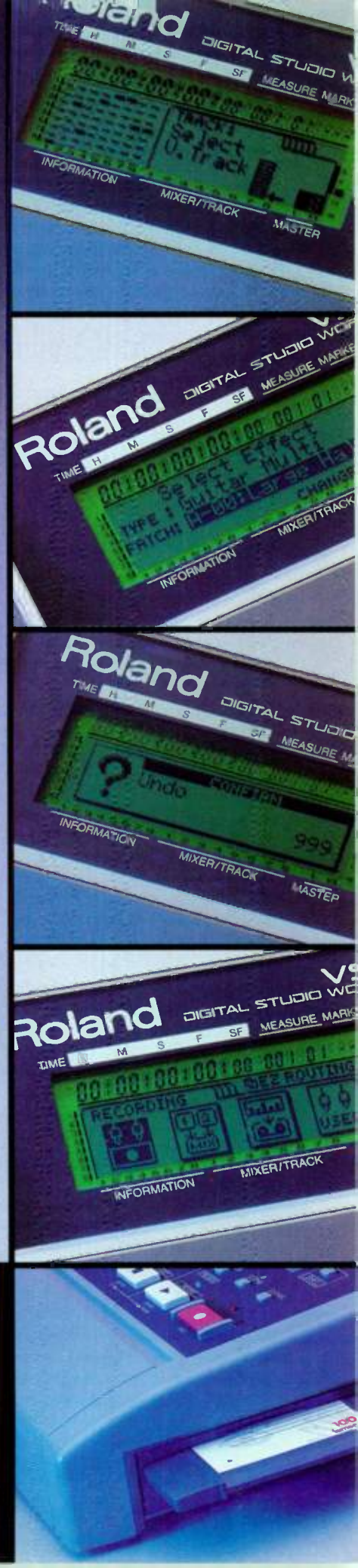
EZ Routing takes the fear out of recording by automatically configuring your VS-840 for greatly simplified recording, bouncing and mixing. Recording has never been this easy.

lomega® Zip™ Drive

The VS-840 uses a convenient built-in lomega Zip drive to digitally record your music, a first for digital multi-tracking. As simple as a cassette tape, Zip media is inexpensive, reliable, portable and available everywhere.

Roland
VS-840 Digital
Studio Workstation

CIRCLE 78 ON FREE INFO CARD
World Radio History



Life in Hale

This studio is a busy spot on L.A.'s commercial and movie scoring scene

STUDIO NAME: What The Hale Music Production, Inc.

LOCATION: Los Angeles, CA

KEY CREW: Ken Hale; Evan Chen; Eric Sproull; David Norland

CLIENTS: Anheuser-Busch; Cap'n Crunch; Kraft; Hallmark; McDonalds; Sears; and Vidal Sassoon.

CREDITS: In addition to their commercial credits, the award-winning crew has done scores for films, including *Henry: Portrait Of A Serial Killer* and *Normal Life*.

CONSOLES: Yamaha 02R [3] and ProMix 01

AMPLIFIERS: Hafler Pro 5000 [2]; Rane HC-6 headphone amp

MICROPHONES: Gefell UMT 70; Neumann U67 Tube; Milab VIP 50 [2]; beyerdynamic MC 740; Shure SM57 [2]; CAD Equitech 300

MIDI: Opcode Studio 5 and 3; Yamaha MJC-8

MIDI MODULES: Alesis DM-5 drum module; Digidesign SampleCell II cards [3]; EMAX II; E-mu Proteus 1, Proteus 2, Proteus 3, and Morpheus; Ensoniq MR-Rack; Korg 01/W Pro, M1-R EX, and Wavestation AD; MiniMoog with MIDI Interface; Rave-olution 309; Roland D-550, JV-1080, and Roland R8-M; Yamaha DX-7, TX-802, and TG-77

MULTIEFFECTS: Alesis Midiverb II, QuadraVerb, and Q2; DigiTech Studio 400; Lexicon PCM-80; TC Electronic M2000; Yamaha SPX-900 [2]

POWER CONDITIONER: Equi=Tech ETSR Balanced Power System

DYNAMIC PROCESSORS: BBE 882 Sonic Maximizer; dbx 163 compressor; Drawmer DF-320 filters [2] and DS-201 dual-gate compressors; Focusrite compressors [2]; John Hardy M-1 mic pres [2]; Massenburg Stereo EQ; Roland SN-550 noise eliminator and Vocoder; TC Electronic Finalizer; Tech 21 SansAmp; TL Audio stereo tube compressor

RECORDERS: Alesis ADAT [3] with BRC; Denon cassette deck; E-mu DARWIN; Digidesign Pro Tools 24 and Pro Tools 442/Sound Designer II; Nakamichi MR-1; Macromedia Deck II; Panasonic SV-3800 DAT; TASCAM DA-60 mkII timecode DAT

VIDEO: Sony BVU-800 3/4-inch VTR [2] and SVO-1520 1/2-inch VTR; Apple Power Macintosh 9500 with Micromotion Video Card; JVC TX-5700 video switcher; Toshiba 35-inch color monitor with line doubling

SPEAKERS: Genelec 1032 and 1030; Yamaha NS-10; Auratones

DIGITAL ACCESSORIES: Z link Plus [2]; Z-system 8.8 switcher; Aardvark AardSync digital sync with blackburst

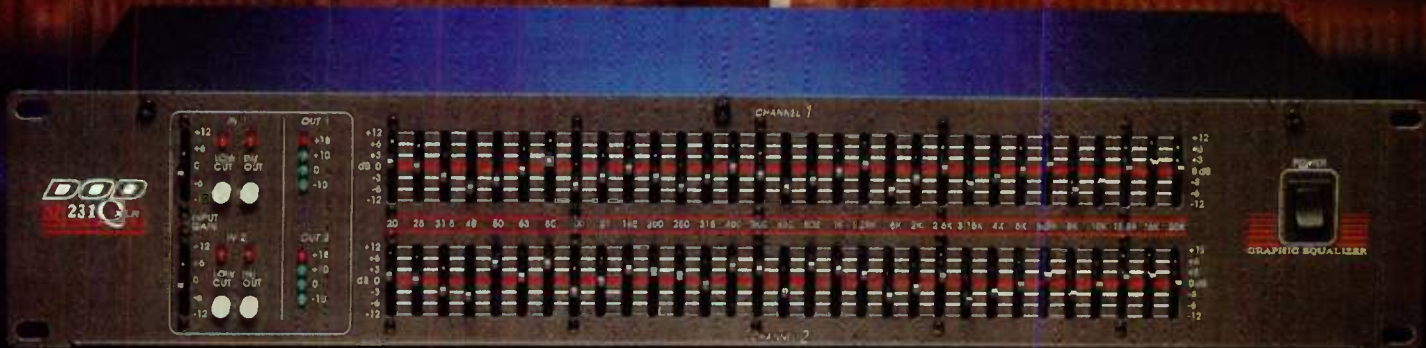
EQUIPMENT NOTES: Ken Hale states: All four producers are huge fans of the TC Electronic Finalizer. Often it's used as the front end of vocals and instrument overdubs — not just as a mastering tool. It has almost everything necessary to sculpt the sound. Occasionally we will insert a tube compressor or tube EQ. On the opposite end of the spectrum, inserting a SansAmp across certain instruments and vocals can add varying degrees of noise and distortion (which isn't always a bad thing).

The three 02R's, each updated with version 2 software, offer 120 inputs of instant recall. All synth, tape, and workstation outputs come up on their own channels, which are mixable in stereo or multiple surround formats, saving hours of patching and documentation. ■



PHOTO BY EDWARD COLVER

SR series equalization



power clarity control

Power to tackle any job that comes your way. Clarity from superior Constant Q technology and low noise design.

Control over the audio spectrum with 1/3 or 2/3 octave models featuring short or long throw sliders.

DOD SR Series EQ's excel in any situation where low noise, high performance and rugged reliability are essential. DOD has the tools you need at prices that make sense.

SR 430Qxr



*Dual 15-Band Constant Q Graphic Equalizer
15 - 2/3 Octave Standard ISO Center Freq. Bands Per Channel*

*Dual 31-Band Constant Q Graphic Equalizer
31 - 1/3 Octave Standard ISO Center Frequency Bands Per Channel*



SR 291Qxr

SR 431Qxr



*Mono 31-Band Constant Q Graphic Equalizer
31 - 1/3 Octave Standard ISO Center Frequency Bands*

*Dual 15-Band Constant Q Graphic Equalizer
15 - 2/3 Octave Standard ISO Center Frequency Bands Per Channel*



SR 230Qxr

SR 410



PA / Monitor processor is ideally suited as the final EQ/Feedback Control System for the monitors. Notch Filters & Dual Limiter

*Mono 31-Band Constant Q Graphic Equalizer
31 - 1/3 Octave Standard ISO Center Frequency Bands*



SR 231Qxr

SR 450D



2 Input, 2 Output, Full Bandwidth, Digital Room Delay with up to 2 seconds of delay for each channel

*31 Band Real Time Analyzer
Built in Pink Noise Generator and Calibrated Microphone (Included)
Five LED's per band*



SR 87A

DOD

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CIRCLE 22 ON FREE INFO CARD
World Radio History

A Harman International Company

Astatic WR-20

Twin crystal
cartridges highlight
this blast from
the past


MICROPHONE NAME: Astatic WR-20
FROM THE COLLECTION OF: Ralph Marsella, End Result Recording, Brooklyn, NY
PRICE WHEN NEW: \$29.50 (1941)
TYPE OF MICROPHONE: Dual-diaphragm crystal
FREQUENCY RESPONSE: 30 Hz to 10,000 Hz
OUTPUT LEVEL: -56 dB below 1 volt/Bar
RECOMMENDED LOAD IMPEDANCE: 5 Megohms
DIMENSIONS: 8 3/4 (height) x 2 5/8 (depth) x 2 11/16 (width) (inches)
MIC NOTES: The Astatic WR-20, designed for use in studio, public address, and recording applications, was one of several models in Astatic's WR-Series. Incorporating two dual-diaphragm, crystal cartridges, the WR-20 employed diaphragms of varying diameter to reduce frequency response nonlinearities. Its sister mic, the WR-40, used four dual-diaphragm cartridges for a total of eight diaphragms inside a single microphone casing (!). Physical appearance of the WR-Series was dictated by the internal cartridge suspension, which was designed to reduce noise transmitted from the microphone housing and mic stand. While the WR-20 was recommended for use with cables of up to 100 feet in length, the WR-40 had a lower internal impedance, allowing it to be used on cables up to approximately 200 feet in length without significant loss of output level. WR-Series models with an "S" suffix indicate that the microphone has a switch built into the connector; a "G" suffix indicates that the mic came with a grip-to-talk desk stand. This particular WR-20 was modified with a standard male XLR connector. 



PHOTO BY EDWARD COLVER

The worlds first compact discs with
high-resolution 5.1 channel surround



“The sound of these DTS CDs is absolutely stunning—probably the best sound we’ve ever heard, period.”

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

A new series of laserdiscs with
original 5.1 channel cinema soundtracks



“I found the DTS laserdiscs to be dramatically better.”

Jeff Cherun - *Home Theater* (August, 1997)

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most incredible surround sound ever offered.

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CIRCLE 99 ON FREE INFO CARD
World Radio History

Audio-Technica 30 Series Microphones

A-T's new mic line offers many 40 Series qualities, but at a lower price

BY STEVE LA CERRA

Audio-Technica's 40 Series (which includes the AT4033, AT4041, AT4050/CM5, AT4051, and others) is a popular and highly acclaimed series of microphones designed for use in pro studio and live sound applications. Using technology developed in the manufacture of the 40 Series, Audio-Technica is now introducing a completely new line of microphones known as the 30 Series. The 30 Series condenser microphones are priced within the reach of most musicians, yet will offer many of the performance advantages of the 40 Series.

Audio-Technica's engineering staff has produced three new condenser mics in the 30 Series: the AT3525, AT3527, and the AT3528. Each of the mics is intended for use in either project studio applications or on stage (though the AT3525 has a look suggesting it'd be more at home in the studio), and each model has a fixed polar pattern: cardioid for the AT3525 and AT3528, and omnidirectional for the AT3527. All of the microphones are designed to be phantom-powered via 48 volts DC.

All 30 Series microphones employ a vapor-deposited, gold diaphragm similar to that used in the 40 Series. One major difference from the 40 Series is that the 30 Series models use transformers in the output stage, making them easily compatible with just about any mixing desk. Some high-end condenser mics have a very hot output that can overload the mic pre input on low- and mid-priced desks. By employing the transformer, 30 Series output levels are slightly lower, avoiding the input overload problem while allowing the mics to handle high SPL — in the 146 to 148 dB SPL range. Although we could not con-

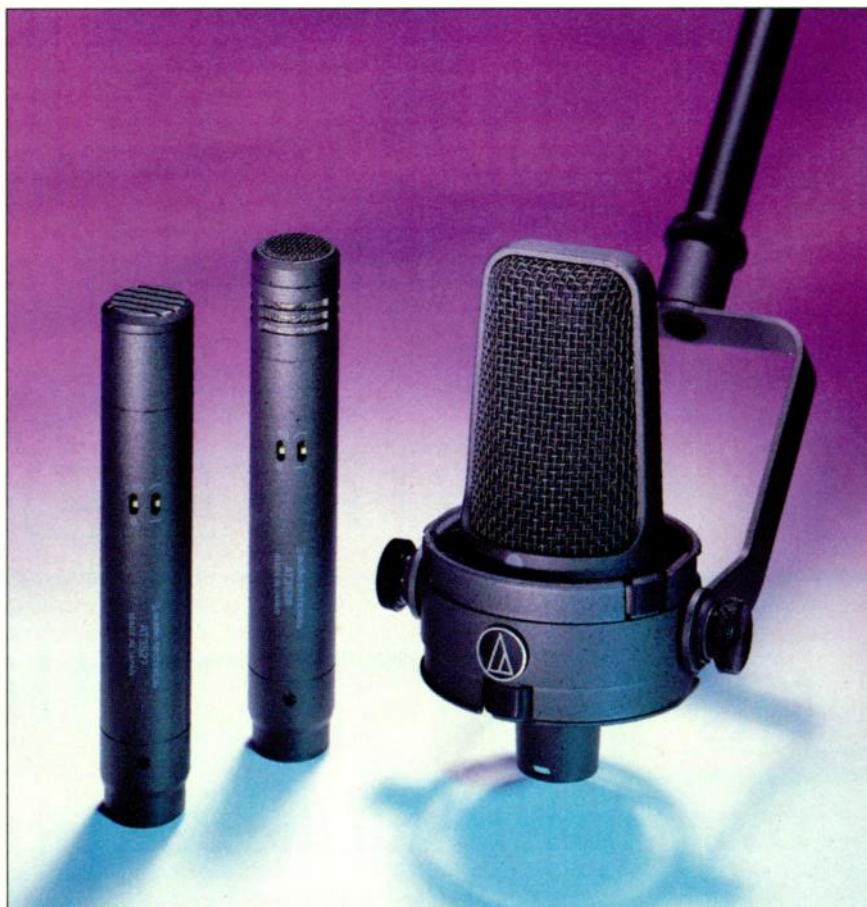
firm tolerance by press time, the frequency response of this trio is said to be from 30 Hz up to 20,000 Hz. Every mic in the 30 Series has two built-in switches: a -10 dB pad and a LF rolloff at 80 Hz, with a 12 dB per octave slope.

While not designed to be used on any specific instrument, the 30 Series mics are a natural for studio and on-stage use, due to their high SPL-handling capability and discrete visual profile. The folks at Audio-Technica suggest that, being small-diaphragm condensers, the AT3527 and AT3528 will work well on acoustic guitar, hihat, snare bottom, percussion, and cymbals. Since the AT3525 looks so much like a vocal mic, it will undoubtedly find its way into that application frequently, but certainly it will handle the high SPL from electric guitar amplifiers and drum overheads (it's worth keeping in

mind that the AT4050/CM5 — intended for use as a vocal mic — has found its way into many electric guitar amp miking applications).

Renewed interest in omnidirectional mics prompted A-T to offer the AT3527. Stereo miking aficionados will appreciate the fact that the AT3527 is one of only a few omni condenser mics available in this price range. Audio-Technica is planning additional models for the 30 Series in the future. These first three will be shipping in mid-March.

Suggested retail pricing is as follows: AT3525, \$399 (includes shock mount); AT3527 and AT3528, \$299 each. For more information, contact Audio-Technica U.S., Inc. at tel: 330-686-2600; fax: 330-686-0719; or e-mail: pro@atus.com. Circle EQ free lit. #115.



MOVE OVER 40: A-T's new 30 series offers many features of the company's popular 40 Series, but at a more affordable price.

Panasonic DA7

DIGITAL MIXER

Inspiration can strike you in the strangest places. But, when you've been dreaming of the ideal digital a/v mixer for as long as we have, you jot it down on the nearest piece of paper. Well, the end results of that inspiration have come to pass... Panasonic introduces the RAMSA WR-DA7 digital mixer, and sets an entirely new standard in quality, flexibility, affordability, ease-of-use and value.

TAKE COMMAND... NOW

32 inputs and 6 auxiliary send/returns (for a total of 38 inputs), 8 bus, 24 bit converters, moving faders, instantaneous recall of all settings, surround sound... you'd think nothing this fully featured could be this easy to use or this affordable... but it is!

GREAT SOUND

32-bit internal processing combined with 24 bit A to D and D to A converters, yield an incredible 110 db dynamic range, putting the DA7's sonic quality in a class by itself.

MAXIMUM FLEXIBILITY

Packed into the DA7 are sixteen analog mic/line inputs and individual access to channels 17-32 through channel flip buttons located above each fader. Twenty faders do triple-duty as level controls for channels 1-16, 17-32, or Aux sends 1-6, Aux returns 1-6, and buses 1-8. We've even added an additional fourth layer, which includes MIDI faders.

EASY-TO-USE

The DA7 features automated, logical layout and intelligent design. Access a channel by pushing its select button, and all parameters for the channel: EQ, bus and aux assignments, and dynamic/delay settings come up on the large backlit LCD screen. To access individual parameters, just touch the appropriate knob in the console's master section. This calls up the sub-menu on the LCD screen and zooms in on the appropriate function. No digging through menus or getting lost in functions; just select... and you're there.

THE POWER TO CONTROL

The EQ section offers four true parametric bands active on every channel, with the top and bottom bands selectable from peaking or shelving, or they can be high and low pass filters, respectively. The frequency bands are overlapping, with the top two bands ranging from 50Hz to 20kHz, and the bottom two bands ranging from 20Hz to 20kHz. Boost or cut for these bands are adjustable in 1/2 dB steps to + or - 15 dB. The bandwidth is adjustable from 0.1 octave to 10 octaves. This DA7 is so full featured, even the Aux returns feature a 2 band parametric equalizer. The dynamics section offers you a choice of a Gate/Compressor/Limiter or an Expander on every channel with variable attack and release times and levels for threshold and ratio. A Delay of up to 300ms is available on every channel. In addition, 50 EQ and 50 Dynamics memories can store your favorite settings for instant recall.

SURROUND SOUND AT YOUR FINGERTIPS

The DA7 is equipped to mix 5.1 channel surround through its buses, so you don't have to tie up auxes, controllable by three modes for any channel or combination of channels. All modes provide full dynamic control of panning, and can be copied, stored, and transferred to any other channel. An optional MIDI joystick gives yet a fourth method.

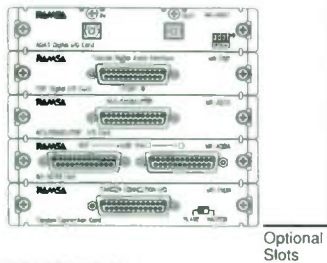
MORE FEATURES THAN WE HAVE ROOM TO TELL YOU ABOUT

The DA7 features four up/down/left/right cursor keys that are switchable to output MIDI Machine Control commands to MDMs, sequencers, or workstations. Data entry is done through the parameter dial or alphanumeric keypad. There's an undo/redo button, solo-mode set, and built-in talkback mic. Honestly, the DA7 is so feature rich, (but still easy to use) that we don't have room to describe it all here. You'll have to test drive it in person!



Panasonic
Broadcast & Digital Systems Company

Panasonic DA7



TAKE ON THE WORLD

The rear panel has 16 analog mic/line inputs (8 XLR with individual software-switched phantom power, and 8 with TRS); 16 channel inserts (preA/D); and 6 auxiliary send/return jacks (1,2 use S/PDIF; the rest, +4dB 1/4inch connectors). Analog outputs include +4dB balanced master outs with XLRs; +4dB balanced record outs on TRS 1/4inch jacks and two +4dB monitor outs on TRS balanced jacks. Digital I/O, via XLR connectors is switchable between AES/EBU and S/PDIF. The rear panel also offers MIDI In and Out, word clock I/Os, plus both a 9-pin RS-422/485 serial port and PC port for Mac/Windows with software support for both, a 1/4 inch footswitch jack for controlling talkback on/off or automatic punch in/out for automation, and a D-15 subconnector for the optional meter bridge.

TAKE IT EVEN FURTHER

3 expansion-card slots allow connection of recorders with ADAT Lightpipe, TASCAM TDIF, and AES/EBU (switchable to S/PDIF) interfaces, with any of the audio cards fitting into any slot. A fourth card provides 8 more analog inputs/outputs via a D-25 subconnector. The third expansion-card slot can be used 3 ways:

- Connect 2 DA7's together with true bi-directionality
- Replace analog inputs 9-16 with digital inputs
- Digital inserts across the 8 buses, six Auxes, and L/R stereo out. An option card provides SMPTE and Video Sync input.

WHEW!

Panasonic worked overtime to provide so much creative power and flexibility in such an affordable package. We can't possibly show all you can do with the DA7 on paper, so experience it yourself at your Panasonic RAMSA dealer.

GENERAL

Frequency response	20Hz~20kHz, +1,-2 dB
T.H.D	Less than 0.1% (1kHz,+10dB input, +4dB output, RL=600 W.20Hz~20kHz)-128DB (RS=150 W INPUT SENSITIVITY -60dB)
E.I.N.	-92dB Typical
Residual noise	84dB BUS OUT
Maximum voltage gain	84dB MASTER OUT 84dB AUX OUT
C.M.R.R.	More than 80dB (1kHz)
Crosstalk	:90dB Typical (1kHz)
Dynamic Range (WCK=48kHz)	113dB AD Converter (analog in through digital output) typical, A-weighted 114dB DA Converter (digital in through analog output) typical, A-weighted 110dB AD+DA (analog in through analog output) typical, A-weighted
AD converter	24 bit* 128times oversampling (INPUT 1 ~ 16) 20 bit* 64times oversampling (AUX RETURN 3~6)
DA converter	24bit* 64times oversampling (MASTER, MONITOR A) 24bit* 128times oversampling (MONITOR B) 20bit* 128times oversampling (AUX SEND 3~6)
Internal signal processing	32 bit(Dynamic range 192dB)
Sampling Frequency	INT:44.1/48 EXT:44.1kHz±3% 48kHz±3%
Signal Delay	Less than 2.5ms (MIC/LINE input to MASTER output)
Compressor + Gate	
Threshold	-40dB~0dB(1dB step)
Ratio	1, 1.1, 1.3, 1.5, 1.7, 2, 2.5, 3, 3.5, 4, 5, 6, 8, 10, 20, ∞ (16points)
Attack Time	0ms ~ 32ms(1 ms step)
Release Time	50ms ~ 2000ms:5ms step
Gain	-0dB ~ +12dB(0.5dB step)
Gate Threshold	-80dB ~ -40dB(1dB step)
Gate Release time	50ms~2000ms:5ms step
Expander/Gate	
Threshold	-80dB~ -40dB(1dB step)
Ratio	1, 2, 3, 4, 5, 6, ∞
Attack time	0ms ~ 32ms(1ms step)
Release time	50ms ~ 2000ms: 5ms step
Range	0dB ~ +40dB(0.5dB step)

Equalizer

LOW PEQ	Q 0.5 ~ 50(41 step) F 20Hz ~ 20kHz(1/12oct step) G ± 15dB(0.5dB step)
LOW SHL	F 20Hz ~ 1.6kHz(1/12oct step) G ± 15dB step) (0.5dB step)
LOW: HPF	F 20Hz ~ 1.6kHz(1/12oct step)
LOW-MID PEQ	Q 0.5 ~ 50(41 step) F 20Hz ~ 20kHz(1/12oct step) G ± 15dB (0.5dB step)
HIGH-MID-PEQ	Q 0.5 ~ 50(41 step) F 50Hz ~ 20kHz(1/12oct step) G ± 15dB(0.5dB step)
HIGH: PEQ	Q 0.5 ~ 50(41 step) F 50Hz ~ 20kHz(1/12oct step) G ± 15dB(0.5dB step)
HIGH: SHL	F 1kHz ~ 20kHz(1/12oct step) G ± 15dB(0.5dB step)
HIGH: LPF	F 1kHz ~ 20kHz(1/12oct step)
Delay	0~14,400sample/0~300ms (fs: 48KHz), 0~326ms(fs:44.1kHz)
Phase	NORMAL / REVERSE
Gain Trim	+ 12dB ~ -24dB (0.5dB step)
Stereo Meter	20point x 2LEDbar graph (VU/PPM selectable, Peakhold on/off)
Fader	100mm motor fader x 21 +10 ~ -90dB, ∞dB (128step / 100mm)
Display	320 x 240dot graphic LCD (with backlight)
Memory	Scene memory(snapshot) 50 Channel library 50 EQ library 50 Dynamics library 50 Automation 4event
Ambient operation temp.	0°C~+40°C
DIMENSIONS	698W X 244H X 549 MM 27.48 X 9.606 X 21.614 INCHES
Weight	Approx 51lbs (23Kg) (include Meter bridge)
Finish	Front panel: ABS, Color: blue/black Rear & Enclosure: Steel, Color black
Power requirement	AC120V,60Hz
Power consumption	105W(with options)
Weight and dimensions shown are approximate. Specifications subject to change without notice.	

FOR MORE INFORMATION CALL: 1-800-777-1146



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Metalithic Systems Digital Wings For **Audio Elite**

The popular program adds more convenience features and makes hard-disk recording easier

BY STEVE LA CERRA

Metalithic Systems, Inc. is a name that will be familiar to many *EQ* readers. Its Digital Wings For Audio — a hardware and software package that allows you to use your PC for digital hard-disk recording, mixing, editing, and processing — won an *EQ* Blue Ribbon award at the 101st AES Convention. By using Metalithic's patented Reconfigurable Computing (a high-speed data processing engine that allows real-time changes in system configuration via software for maximum efficiency), DWA overcomes some of the limitations of traditional hard-disk recording. Metalithic Systems recently introduced a "turbocharged" version of DWA called Digital Wings for Audio Elite, which retains the friendly software interface of DWA while expanding upon the hardware interface.

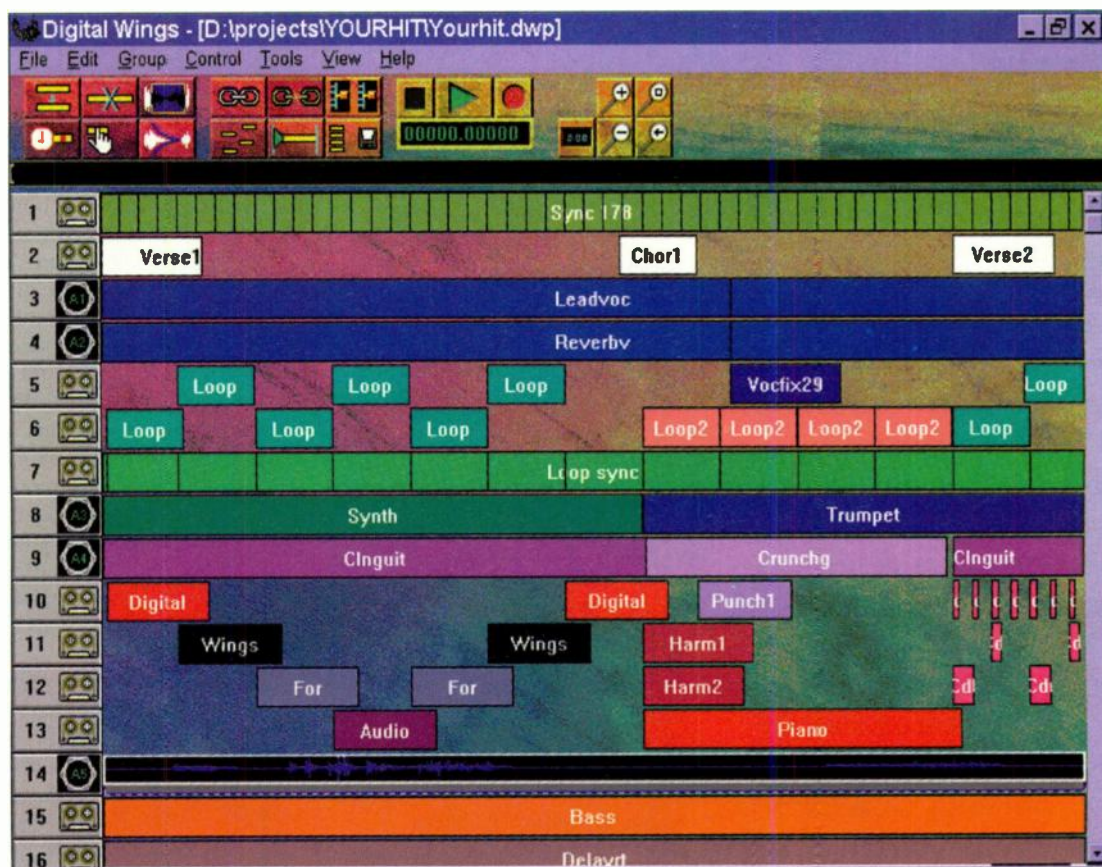
DWA Elite runs on any Windows 95 PC; recommended system requirements are 32 MB of RAM, a Pentium 133 processor, 32-bit PCI slot, and a 1 GB EIDE or SCSI-2 hard drive. A CD-ROM drive is needed to install the software. Up to 128 individually editable and playable tracks (not "virtual tracks") can be recorded. For monitoring purposes, DWA creates a submix, which is the secret to obtaining 128 tracks even on systems with slow hard drives and limited processor speeds.

Audio input to DWA Elite is via the rack-mount 10 x 10 Breakout Box interface that accommodates a total of 10 channels of audio I/O: 8 analog, 1/4-inch TRS balanced or unbalanced (+4 dBu or -10 dBu) and one stereo S/PDIF. Track fanatics will love the fact that up to four of the single-rack-space 10 x 10 Breakout

Boxes may be stacked for a total of 40 I/O channels. Perhaps more importantly, all 10 channels of I/O on a Breakout Box may be simultaneously used for recording or playback.

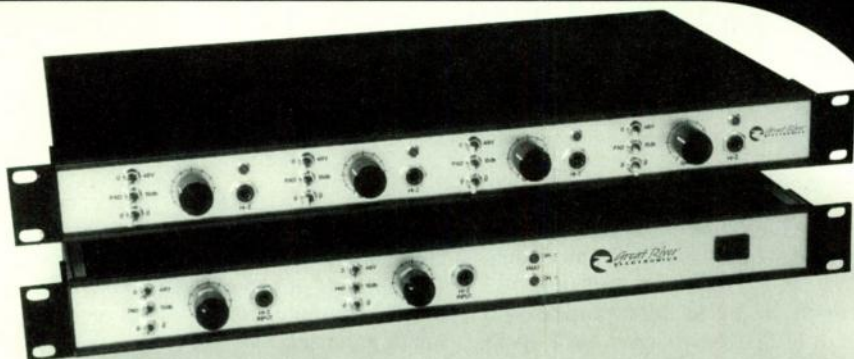
Onboard A-to-D and D-to-A is 20-bit, Delta-Sigma with 64x oversampling; sample rate may be set to 8, 11.025, 22.05, 32, 44.1, or 48 kHz. Metalithic Systems specs the frequency response of the Breakout Box at 20 Hz to 20,000 Hz, with a signal-to-noise ratio at 92 dB (unweighted). An optional ADAT and MIDI interface is available for digital ADAT transfers, as well as for MIDI synchronization purposes.

Each 10 x 10 Breakout Box connects to one of the RJ-45 connectors on the single slot, 32-bit (internal bus) PCI card designed for plug-and-play operation. Onboard processing is accomplished by



WINGING IT: Metalithic's DWA Elite lets you record up to 128 tracks.

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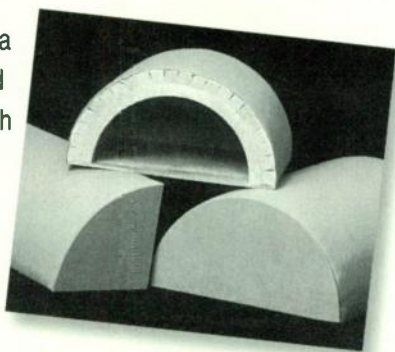
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a Metalithic FPGA-based processor with onboard DSP, and the card may be loaded with up to 128 MB of memory using standard 72-pin SIMMs. A single 15-pin connector interfaces the card with an optional ADAT/MIDI I/O.

Now that you're familiar with DWA Elite's hardware, let's take a look at the software. Recording, playback and editing of up to 128 tracks is supported, including nondestructive waveform editing with unlimited levels of undo. In addition to the more standard cut, paste, copy, and merge features, DWA Elite also has the ability to drop time markers, perform nondestructive fades and sample-accurate snap-to-grid quantization (multiple grids can be generated, making the program well-suited for dance and other loop-based music), and run eight automated channels of real-time pan, level, and fade.

One really cool feature of DWA Elite is Loop Record Mode, whereby a user can play a selected section of a song repeatedly while recording new overdubs. As each new take of the overdub is recorded, it is automatically put on a new track, and the previous takes are muted — enabling a solo operator/musician to concentrate on the performance aspect and not worry about the technical concerns of multitracking. A Prepare Recording option makes the system ready to enter Record mode, eliminating the pause that many hard-disk recording systems experience just before recording.

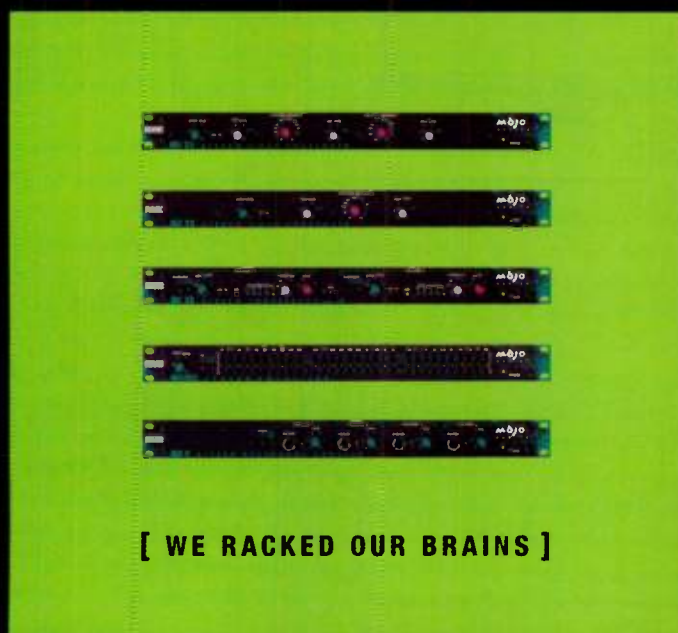
Included with DWA Elite is Way Cool Edit, which features 30 plug-in DSP effects and the ability to process multiple mono or stereo files simultaneously. Effects include filter, compress, ring modulation, noise reduction, reverb, delay, echo, chorus, flange, distortion, pitch shift, time stretch, and others. Way Cool Edit allows user storage of favorite processor settings and can import more than 20 different file formats, including AIFF, MPG, VOX, PCM, WAV, and SND. Additionally, the plug-in can generate silence, white or pink noise and test tones for diagnostic purposes, and perform frequency analysis.

Metalithic Systems' Digital Wings For Audio Elite is now shipping at a suggested retail price of \$1248. For further information, contact Metalithic Systems, Inc. at 800-550-1255. E-mail inquiries may be directed to anthony@metalithic.com; Web site is www.metalithic.com. Circle EQ free lit. #116.

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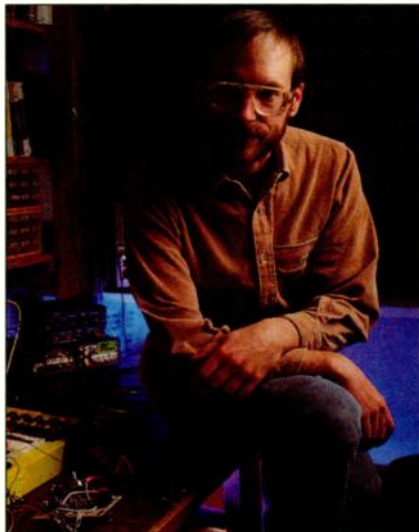
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Searching For Mr. Goodguitar

More tips and ideas on achieving the guitar sound that you are looking for



BY CRAIG ANDERTON

Ever feel your guitar sound isn't quite all it could be, especially if you seek a huge, fat, speaker-dominating wall of sustained sound? Well, you're not alone. Getting a big guitar sound is not as simple as just turning up the volume on a stack o' amps, so let's take a look at ways to make your sound as big as a Sumo wrestler.

CHOOSE YOUR AXE

In this age of tube amps and multieffects, it's easy to forget that the sound starts with the guitar. When going for a big, warm sound, mahogany and basswood are your best choices. Harder woods, like maple, and synthetic materials tend to give a brighter sound with less sustain.

The neck and fingerboard also make a difference. Again, softer woods give a warmer sound (e.g., rosewood and pau ferro for fingerboards), while harder woods contribute more brightness and "snap." A two-piece truss rod promotes sustain — although a single truss rod weighs less and can give a warmer tone. A neck with set-in construction (e.g., Les Paul) tends to transfer string vibrations better to the body for sustain and warmth, whereas bolt-on necks

(e.g., Strat and Tele) and neck-through-body construction generally sound brighter or thinner. Even the headstock counts: the tiltback-type transfers more string vibration into the body, increasing sustain.

Vibrato tailpieces, while lots of fun, generally give less sustain because they contact the body in fewer places than fixed bridges. Increasing pressure on the bridge, for example by using through-body string anchoring, also increases sustain. Anchoring the strings on the bridge or tailpiece itself reduces sustain somewhat.

(Note: If you'd like more information on how guitar construction affects the sound, check out the 2/92 issue of *Guitar Player*, which is devoted to guitar tone.)

STRINGING ALONG

I've always been a fan of thicker gauge strings (top E string = 0.010 inches). This doesn't just stand up better to repeated string bashing, but also generates more output and gives a beefier sound. Nickel-plated steel is a bit brighter than the alternatives, and works well for me.

PLAYING TECHNIQUE

Much of getting a big sound depends on playing technique. Chord voicings that use open strings, or chord voicings played low on the neck, have a more ringing sound. You also want to avoid "fretting out," or buzzing, as this cuts sustain and also reduces tonal quality. The simplest solution is to raise the action somewhat; it might be a little tougher to play at first, but strings will bend better, you'll have more sustain, and the sound will be more pure. It's also a good idea to check the neck for any bowing or worn frets. If either problem exists, find a guitar tech who can do a truss rod adjustment and fret job.

SIGNAL PROCESSING

Perhaps the most popular way to fatten up a guitar sound is to throw on some special effects. Special effects can alter four major parameters that contribute to creating a "big sound": tone quality, sustain, ambience (room acoustics), and stereo location. Note, however, that you must choose any effects carefully — the more effects you add, the more your signal is being modified and, in many cases, degraded. Here are some examples of how to most efficiently use various effects to create a bigger guitar sound.

- **Equalization.** Most electric guitars usually generate more low-frequency audio energy than high-frequency audio energy, especially if they're feeding a relatively low impedance input (i.e., 100 kohms or under). Therefore, boosting high or upper midrange frequencies (starting at approximately 3 kHz) can "fill out" an electric's timbre, giving it some extra brightness that increases presence. Also try boosting the very low end around 100–150 Hz for a feeling of "power."

Another option is to cut some of the midrange response and increase the overall volume. This will also accentuate the high and low frequencies, but since you're cutting

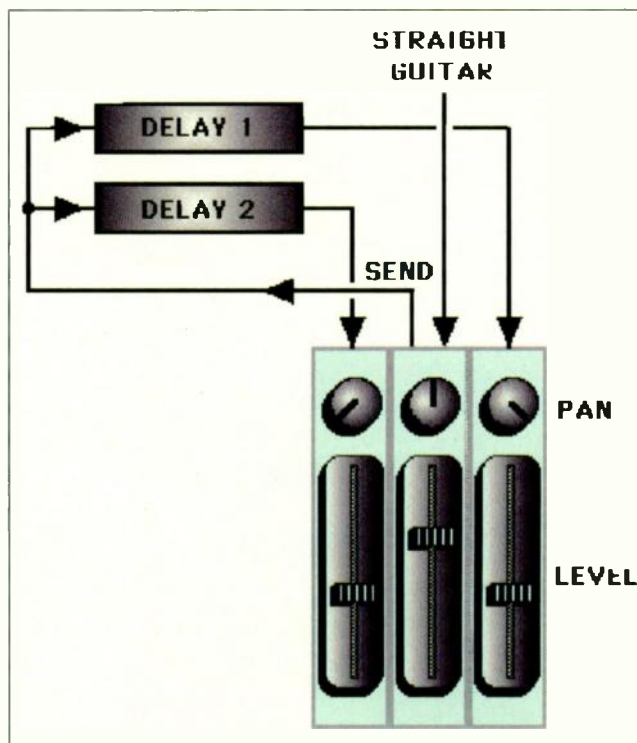
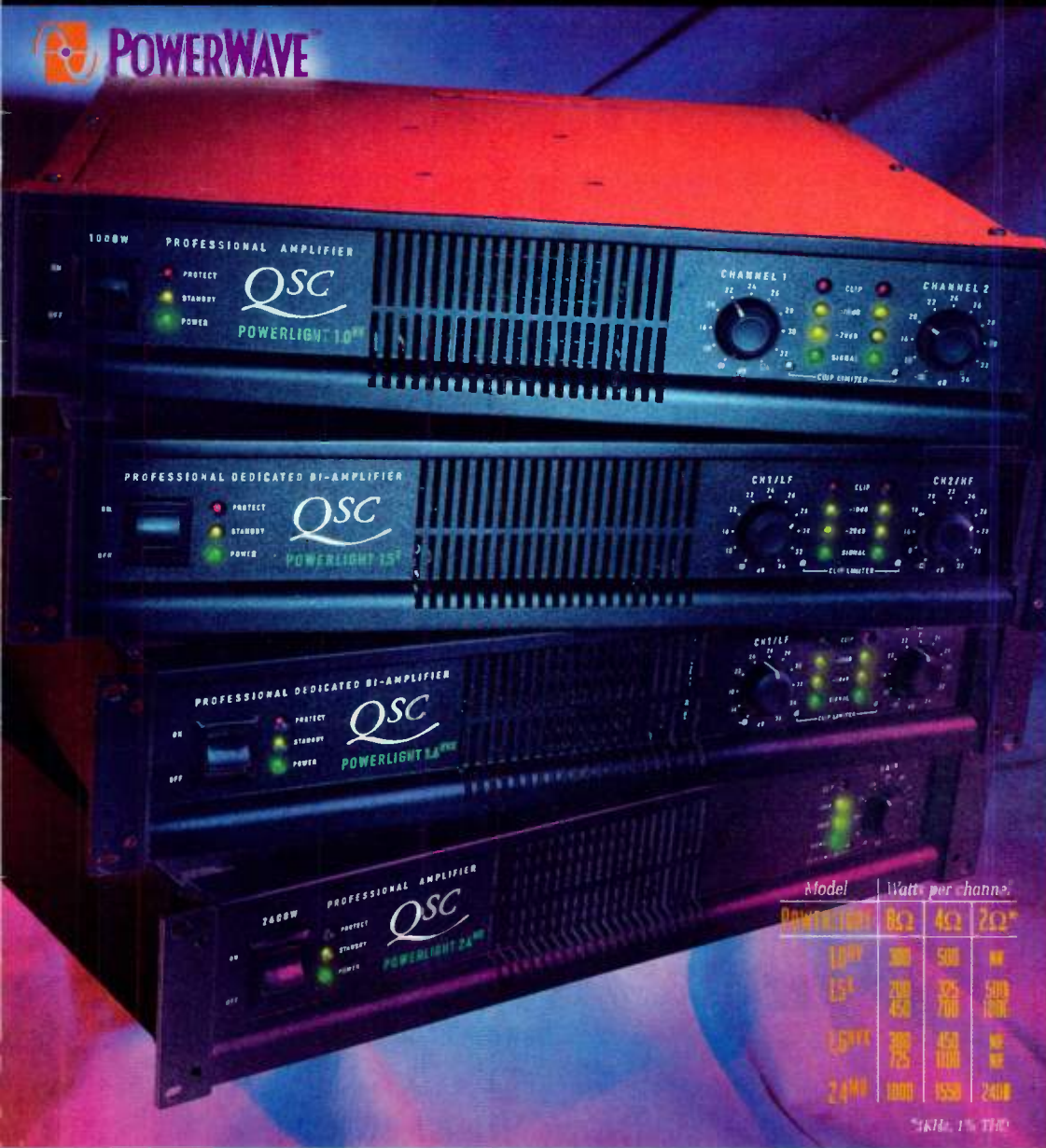


FIGURE 1

PERFECT POWER.



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1.6HVX	300	450	N/A
2.4MB	1000	1500	2400

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rather than boosting audio energy, there's a lower risk of running out of headroom. Incidentally, most acoustic guitars exhibit some kind of resonant peak, so using a parametric equalizer to reduce this peak (while boosting the overall level to compensate for the loss of the peak) leads to a more even sound.

• **Hex distortion.** Although rare, you can find hex distortion as either part of a guitar synthesizer or in a product like Roland's VG-8. This gives a "sweeter" sound than standard fuzz units, which produce a lot of intermodulation distortion (where playing more than one string tends to diffuse and weaken the overall sound). With a hex distortion, each string distorts individually, producing a smoother, more coherent distortion effect.

• **Layering.** Another way to thicken your guitar sound in the studio is by overdubbing multiple guitar parts. However, be careful: the more overdubs, the greater the risk of producing both frequency response cancellations and a "blurring" of the sound. In many cases, you're better off using a delay line on an existing part to "synthesize" the extra part and create a stereo image (more on this later).

• **Compression.** While compressors add sustain, overcompression will actually "thin"

the sound. Use compression or limiting in moderation for the biggest possible sound.

• **Ambience.** No wonder all guitar amps include a reverb—it was one of the first effects universally recognized as giving a "bigger" sound. Other time delay devices (flangers, chorus units, echo units) can also create ambience; however, use these devices with care, as they can just as easily diffuse a sound as augment it. For example, a flanger or chorus puts lots of notches (dips) in a guitar's frequency response, which may dilute the sound. At longer delays, this is generally not a problem.

• **Stereo placement.** It's easy to expand a mono guitar into stereo with delay lines (or pitch-shifting devices), providing you set the delay mix for delay only. Simply feed one mixer channel with your straight guitar signal, grab a send from that, and feed it to another channel through a delay line. By programming a slight delay (experiment in the range of 5 to 20 ms), your guitar will appear spread across the stereo field. Also try equalizing the two channels by boosting the delayed channel's bass a bit and also boosting the direct channel's treble; this will help widen the sound a bit more. For a final touch, add a dash of reverb in the background.

Check the resulting composite sound in mono as well, since shorter delay times may produce response cancellations that weaken the sound. As you listen in mono, fine-tune the amount of delay for the biggest possible sound. Delay time is super-critical when spreading guitar into stereo: too short a delay alters the guitar's tone, but too long a delay produces an audible, distracting "slapback echo" effect.

Placing a straight guitar signal in the center while panning the outputs of two delay lines (set for two different delays) to left and right produces a very big sound (fig. 1). Also, substituting a pitch transposer set for a very slight amount of pitch shift (just a few cents) instead of a delay line can work very well.

I don't always think that bigger is better—thin sounds can be just as emotionally satisfying as big sounds—but for those times when you want a monster guitar sound, try some of these techniques.

Author/musician Craig Anderton wrote Home Recording for Musicians and Multieffects for Musicians. He is a contributing editor to Guitar Player magazine, and lectures around the world on the subject of musical electronics.

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CIRCLE 21 ON FREE INFO CARD
World Radio History

Terry Diane Becker



PHOTO BY ED FREEMAN

The engineer/
producer successfully
applies the human
touch to her work

BY MR. BONZAI

Bonzai: How did you get started as an engineer?

Becker: I came in by the back door after giving up a career as a professional dancer at 23. I had learned how to count music and intricate time signatures, as all good dancers do, and enrolled in The Institute of Audio Research in 1974. Dean Parks, Jim Price, and Daniel Moore were in my class, and I was introduced to working songwriters, producers, and musicians who were interested in engineering.



What was your first pro gig?

Well, I couldn't find a job in L.A. because no one had informed me that women don't do this to make a living.

I had close to 100 interviews and couldn't get hired as an assistant engineer, but I luckily ended up at Dromedary Studios in Colorado. When I came back to L.A., I worked at the Village Recorder for many years. My first real job as chief engineer was for a Wayne Shorter project.

Was their any initial resistance to a woman at the console?

No, because Wayne had called me up and asked me if I was ready. I said, "Yes, I am," and no one questioned me.

Why has this work consumed your life?

I can't think of anything else I'd rather do. I really love it. It's like an itch that you have to keep scratching.

What about your experiences as a producer?

I've mostly been a coproducer, often working directly with the artist. I try to bring out the best performances and enhance the vision of the artist.

How do female artists react to a woman at the console?

I've worked with a lot of women artists, and it's been great. I feel that they have

an innate trust in me. Occasionally, I'll kick everybody out of the studio when doing vocals. Just me and the singer.

How do you deal with the "macho-nerd" element of our industry?

Well, some of my best friends are nerds, and the macho thing—I just ignore it. When I was up-and-coming, it was occasionally a pain in the rear end, but now it doesn't have much to do with my life.

Is it a matter of perseverance?

Yes, and you develop a confidence level that comes with competence.

Is there such a thing as the "feminine touch" in engineering?

I don't know. I'm a pretty gentle person, and I think that puts people at ease and allows the artist to do

the job better. At the same time, I am concerned with getting really beefy, kick-butt tracks.

What did you do for *The Last Waltz*?

I worked on the studio side of the project for the six-sided album, almost exclusively with Robbie Robertson. There were 20 engineers on the project, but I did get a mix of "The Last Waltz Reprise" on the album. I also worked with Richard Manuel on his vocals.

Could you tell me about The Bone-

Suspect: Terry Diane Becker

Occupation: Engineer/Producer

Residence: Los Angeles

Vehicle: 1988 black Chevy Cavalier convertible with rosewood steering wheel

Diet Restrictions: No yams or milk

Birthmarks: Map of Ecuador on backside

Credits: Becker has engineered and/or mixed Bonnie Raitt, Jackson Browne, Wayne Shorter, The Bone-shakers, Manhattan Transfer, Thompson Twins, Paul Kelly, Kansas, Renee Geyer, Strunz and Farah, The Crusaders, The Band's *The Last Waltz*, Pure Prairie League, and Vince Gill, among many others.

Notes: When Becker smiles it lights up the control room.



PHOTOS BY MR. BONZAI

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World Radio History

shakers, with Randy Jacobs and Sweet Pea Atkinson of Was (Not Was)?

I was stunned with Jacobs's guitar work. It's all done with his fingers — the man does not own a pick. He asked me to mix the record, which had been beautifully tracked by Dan Bosworth. Sweet Pea would come into the control room and go, "You're *bad*, girl." Then I knew everything was OK.

How do you like mixing other peoples' work?

I love being the fresh ear, coming into a project at that point.

Did you ever lose anything?

I think every engineer has punched in

early or erased something, and I'm no different. I have to cop to that one.

If you were a recording console, which would you be?

I'd be a Neve 8078 with Flying Faders. I'd like to be the one at Groove Masters, or maybe the Neve at Brooklyn Recording.

What's wrong with the music industry?

As bigger and bigger business takes control, many of the people running record companies, and at A&R departments, are business people — not music people. That hurts, and the bottom line puts a lot of pressure on musicians.

Which came first, the music or the musician?

I think that music has always existed in nature — the percussion of rain, the rustling of branches in the wind, the voices of animals. When people get together, it's their nature to make music. **What is the first music you remember hearing?**

There was a lot of big band music at my house. The first record I conned my mother into buying was "Rock Around The Clock." She thought I'd learn how to tell time.

Who were your mentors?

Three people: Ed Thorne, my first boss at the studio in Aspen. He taught me the basics and a thorough enjoyment of



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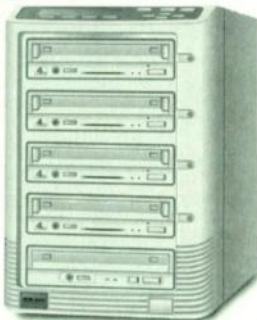
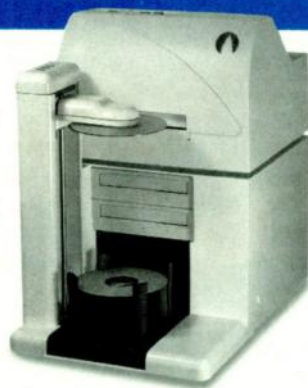


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Geno Porfido, Boulevard Recording Co. New Milford, NJ

"Other consoles I've worked with in the past just couldn't deliver the levels of punch and clarity I felt the music deserved. I never have this problem with my Soundcraft Ghost. The Ghost gives me the flexibility I need over a wide range of frequencies and has the body and warmth to really bring my music to life."

Johnathan Moffett, Drummer with Michael Jackson and Madonna

"After the first mix I did, I realised I was in a whole new league. This thing sounds beautiful. Very silky in the high end and full in the lows. The EQ is totally cool and the board has a quality feel to it. I know of nothing that touches it in its price range and I have been recommending Ghost for months to anybody who's looking for a console."

Garth Webber, Red Rooster Studio, Berkeley CA

"I've worked on many competing 8 bus consoles and none can compare to the Ghost in features, ergonomics and, most importantly, sound. The Ghost, simply put, sounds warm and musical - you don't have to work hard to get great sounding mixes on this board. The EQ is very flexible and we compared the mic preamps (using a Neumann U-47) to the Neve 1066s in our studio. We were very surprised at how favourably they compared to these megabuck classics."

Peter Thorn, What If? Productions.



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CIRCLE 73 ON FREE INFO CARD

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the process. Hank Cicalo, one of the best engineers and teachers and — he was very patient. And saxophonist Tom Scott taught me about music and how a rhythm section works.

Who were your engineering heroes when you were getting started?

Phil Ramone, Al Schmitt, and Hank Cicalo were my favorites.

Who keeps you on your toes today?

Tchad Blake, Ed Cherney, and Elliot Scheiner. Tim Boyle in scoring. Don Was and Paul Kelly as producers.

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

I'd love to work with David Bowie and Robert Palmer. I also wish I could have recorded Count Basie's big band.

What is your strangest characteristic as a human being?

I do a really good impression of an iguana.

How would you like to be remembered in history?

As a spirited little filly.

What was your most hysterical experi-

ence in a recording studio?

I was an assistant for a session with two famous female singers, and it was the first time they had met to do a duet. At the end of the first verse, the first singer held the note for about 20 bars. Not to be outdone, the second singer tried to go further. She was exhausted because she had just come off tour, and reached to the depths of her energy. She held the note, tilted back, and passed out on the floor.

Who do you think you were in past lives?

I think I was a great detective in Europe. **What old saying do you really dislike?** "Just trust me."

What animal do you identify with?

Big cats — a tiger, jaguar, a cougar.

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

Wayne Shorter.

What makes a great producer?

First and foremost is communication. That's the recipe for the whole enchilada.

Have you ever witnessed a miracle?

No, but my brother and I saw a UFO while driving in the Arizona desert. We pulled off the road and shot a whole roll of film. The next day my car was broken into and the only thing they took was the camera.

How do you use computers?

Well, I'd be lost without the computers that are connected to consoles these days. At home, I'm learning the Internet as a research tool.

Any advice for getting a good start as a recording engineer?

There is so much computer recording and project studios, I would suggest learning how to record a lot of people in one room all making music at one time. It's all about great songs and great performances — and that requires humans. **EQ**

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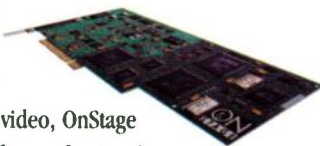
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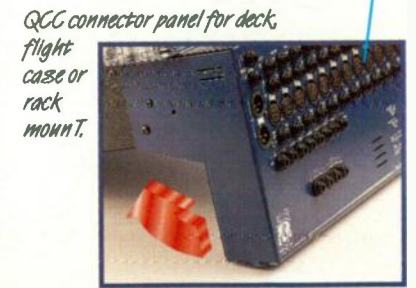
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Feels Like the **First Time**

How to handle
your first time at a
Solid State Logic
console

**BY ROGER
CHARLESWORTH**

[Editor's note: Working on an unfamiliar console for the first time can be an intimidating experience, especially if it's a large-format design such as a Solid State Logic (SSL) or Neve. But it's becoming more and more common for records to be tracked and overdubbed on small desks in project studios and then mixed on consoles with powerful automation systems such as SSL's Ultimotion. Because of this trend, it's important for project studio mavens to be ready for such an experience. While this is not intended as a bible for using SSL automation, it's the nuts

and bolts you need to do a mix on a 4000 or 6000 with a G-computer and not get an ulcer.]

The most important aspect of bringing a project into a "big" studio is to have a plan of exactly what you are going to do. Know what format you are dealing with, what transfers (if any) need to be done, and whether or not the masters need to be striped with timecode — which will be required for locking the automation to tape. If your recording is on DA-88 or ADAT tapes, make sure that the studio



IT'S BOUND TO HAPPEN: Look like a pro when you get to studios like the Mix Room (Burbank, CA), with their Solid State Logic SL 9064J console.

has the appropriate machines or make arrangements to bring them in (you don't want to walk into an unfamiliar studio with a bunch of DA-88 tapes and find out that they don't have compatible machines).

Consider transferring these tapes to the studio's large-format multitrack to simplify synchronization and machine control. Additionally, the project may have virtual tracks that exist in sound modules and sequencers which may need to be put on tape. Once determined, you can discuss these issues with the studio manager and be clear about your requirements. In terms of the mechanical and media aspects, people waste a lot of time and creative energy getting ready for a mix. If you are not clear on how a mix is going to happen,

then there is no way the studio personnel can be clear about how it is going to happen.

This sort of planning should include your objectives about how long you realistically think it will take to accomplish your goals. Budget time for those various phases so you're not going in thinking "we'll work until we're done." Have a map of how many songs are to be done and how long it will take to transfer and mix them. Maybe that's obvious — but maybe not.

ARE YOU EXPERIENCED?

In terms of the automation and your experience (or lack thereof) with the console, being upfront helps a lot. If you tell the studio manager, "Hey, I've never mixed on an SSL before," then — if it's a good studio — they will pair you with an assistant who has more mix chops or might be a little more aggressive about suggesting ways to work (engineers with lots of experience might want an assistant who will basically leave them alone).

Studios are generally interested in getting you hooked on their product, whether they have a regular 4000 or an exotic console like a 9000. They'll be really interested in making sure that everything runs smoothly and you have a good experience. Some studios will allow you to come in before the session for a couple of hours to familiarize yourself with the automation or signal routing, or even throw up a tape. This is commonly done and is something that you shouldn't be afraid to ask. Even successful, big-name engineers may have trepidation about working on a new console. SSL publishes excellent operation and computer manuals — many studios have extra copies, and may make them available to you. If not, they can all be purchased from the manufacturer. If you know that this is something that you'll be doing, it may be worth spending a few dollars to get the book.



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CIRCLE 44 ON FREE INFO CARD

BASICS

For an SSL, the automation computer is physically located in the machine room with the power supplies. In addition to the automation, the computer is going to control the tape machine transport, track arming, and read timecode from the tape machine. It is also going to store cue points and other session data such as track lists. Timecode input to the computer comes up on the patchbay, so it's a straight patch from the tape track out to timecode input. Normally, the assis-

tant engineer has already patched this before you walk in the door. You can also expect that the reels are up and timecode is playing, but the extent to which this actually happens before you arrive depends upon how accurately and meticulously you have prepared the studio for your requirements.

SOCIAL STATUS

If you want to be able to hear what's on the multitrack, the console must be set to the proper status. The Master Status but-

tons (possibly the most important controls) globally set the console's signal routing. In RECORD status, the mic inputs appear at the (large) channel faders and the tape returns come up on the (small) monitor faders. When MIX is selected, the multitrack outs feed the line inputs of the channel faders, which in turn feed the mix bus. Obviously, the master status should be MIX when you want to do a mixdown.

Let's assume that your sounds and timecode are on tape (SSL's computer will deal with any of the standard timecode formats.) It would then be a good idea to title the song and enter some cue points via the automation computer. The part of the console that you interface with most is called the Computer Command Module. It is easily identified as the part of the desk that has a qwerty keyboard and about 30 "computer status" keys. Cue the tape to the start of the song and use NAME, TITLE (type in a song title), and EXECUTE. Now the song has been named and a start time has been established (this data will appear on the monitor screen). Play the tape, and at the end of the song hit TITLE, TO, HERE, and EXECUTE, and the computer will recognize that location as the song's end (the screen will update with this data).

Once a title has been entered, the computer can help you perform locate functions. Entering PLAY, TITLE, and EXECUTE will play the song from the beginning, and you can enter cues on the fly by hitting CUE and then EXECUTE. This command will generate a cue number and its associated TC location. After the song has ended, you can go back and name the cues as verse, chorus, etc. Running down cues also gives you a chance to refamiliarize yourself with the tune.

MASTER-MATION

Having stored cues, next it's generally a good idea to get a static balance, much as if you were doing a rough mix. Unless there are really complicated mutes and moves that need to happen, it's fairly common to mix for a good deal of the day before actually turning on the automation — getting an idea of what the sounds and tracks are, and what outboard gear to use. You'll be using the console computer to locate cues, but you're getting sounds like it's a manual mix. Once you have a balance, you can turn the computer on and record a mix.

On the Command Module there's a MIX button that selects between on and off, and gets the computer ready to

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record your mix (the screen will confirm "mixing" when on). Use any GOTO command to send the computer and tape machine to the start time of the mix. When the GOTO command is entered, the screen will prompt you to press EXECUTE to start the tape and the mix.

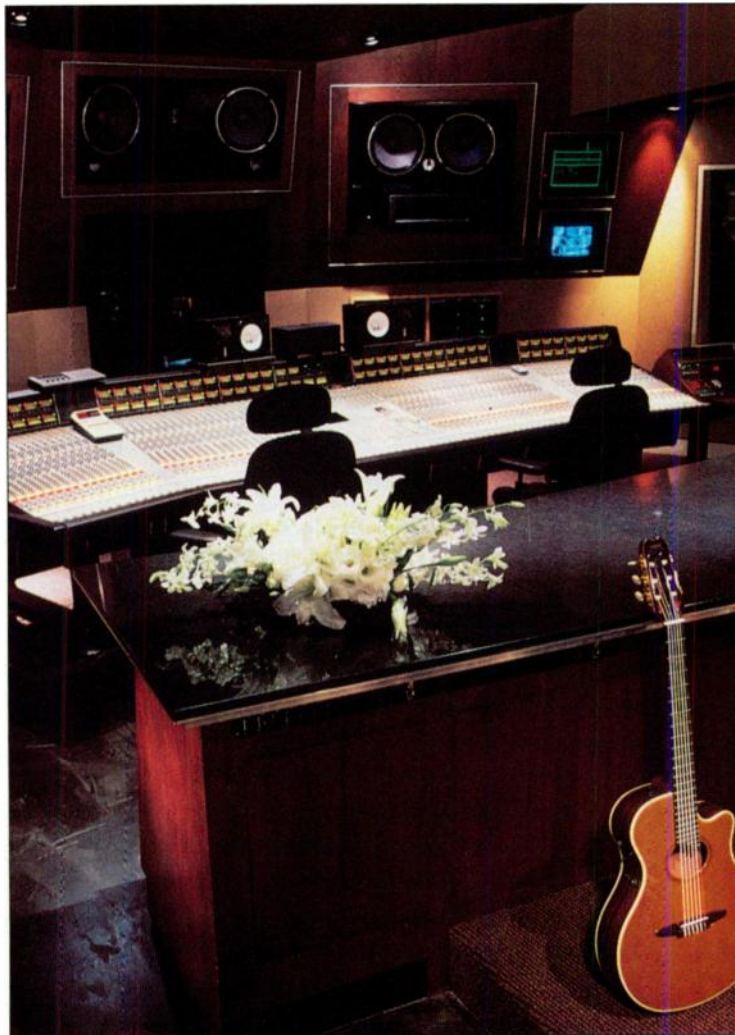
Assuming that this is the first automation pass, the faders automatically switch to what is known as "Absolute" status, indicated by a red LED next to each fader. Absolute mode means that the mix is written exactly as it is happening, with recorded fader level based upon the physical position of the faders. Use the static mix as a foundation for future moves. With a moving fader system, it's important to realize that inadvertently calling up another mix will physically reset the faders and wipe out your balance; if that happens before the absolute pass, your mix is gone. Everyone does this once or maybe twice (some people do this again and again!). A good safety net is leaving the fader motors off (MO, EXECUTE) or storing a "setup" snapshot that captures all I/O module settings, including fader levels.

After making the Absolute pass, you're ready to start fine tuning your mix. Key in PLAY, MIX, and EXECUTE. The tape rolls to the top of the mix and plays back with the fader status automatically defaulting to "Trim" (green LEDs). In addition to trim there is one of five statuses automatically accessed when you put a fader into write. This 'latent' status may be set to UA (Update Absolute — faders in an update mix are switched to Absolute), RC (Revise Cuts — cuts in an update mix may be edited), AT (AutoTakeover — a fader in a new or update mix automatically switches to replay when its level crosses the level of the mix being updated), PV (Preview — fader changes in a new or update mix can be rehearsed), and IP (Immediate Pickup — the automation punches into write when you touch the fader or cut button).

These status options may be combined (for example, Preview Absolute) and can be changed on a fader-by-fader basis during a mix pass. If you are getting ready to rewrite a bunch of faders, you can set the Master Status to Absolute and hit the status buttons on the faders that you want to rewrite — which puts them in Absolute. If you want to just rewrite cuts, then you select that Master Status and select those faders. In Trim mode, all faders are nulled until moved and your moves will be recorded relative to the ab-

Keying in GOTO and MIX, instead of PLAY and MIX, will pause the tape machine at the front of the tune, giving you time to change fader status. When you are done with the update pass, key in END. This will save your work and the computer will prompt you to name this revision. Then it will file the revision on the disk and also file it into the Mix List.

This brings us to an important concern, particularly on the G-Series: saving passes. When you do some big move that you want to keep, by all means save the pass and take advantage of the automation. It's perfectly feasible to do little chunks at a time (for example just the first verse). One of the big advantages of automation is that the mix process becomes nonlinear — you can do a ride on one channel, save it and name it, eg, "Rode the lead guitar." Then you can go back and ride the rhythm guitar or go through the mix in steps, leaving a trail you can trace and edit. It gets tricky if you haven't saved a pass. Going back and forth within the same pass, you might rewrite moves on one channel that the system will play. Then you might punch another channel in and rewrite something on that channel, but it's easy to become confused as to what you have or have not written. You may find yourself unnecessarily deleting work because you flubbed a move or mute on a particular channel. If you forgot that you also wrote four other channels before that and didn't save, then you lose those moves when you go back to the last save.



DREAMS DO COME TRUE...: The SSL SL 4080 G Plus console at Brandon's Way Recording, Hollywood, CA.

solute level, including mutes (more on mutes later). Most updates can be written simply by listening to a playback and making moves on the faders at will.

If, at anytime during the mix process, there are faders that you want to rewrite completely from scratch, you can put those particular faders back to Absolute again by using the status switch.

GROUP THERAPY

VCA subgroups can really help you get around a mix and they should be set up while you're getting sounds. You'll probably use them for overall trim on a bunch of faders such as the drums. The best thing is to *not* start by doing a lot of group rides. Begin by getting the relative fader balances happy with the



INTIMIDATING, ISN'T IT?: The SSL G Plus Console

group fader at unity and do moves on individual channels. Later you can use the group fader to do an overall ride to perfect the mix, rather than committing yourself to a group ride and then trying to make compensating moves on the channel faders. Be conscious of the fact that moves on the group fader will be performed on *top* of channel fader moves, so the data written for the channel fader does not change. If you write a mute on a grouper over a bunch of channels, you won't be able to then subsequently unmute one channel differently.

To assign a channel to a VCA group, simply set the channel's thumbwheel switch at the fader to the desired group number.

MIME IS MONEY

Now we get into the muting or "cut" process, though if you know you'll be muting whole sections of instruments, it probably makes more sense to do the mutes first. Most people do a static pass for the faders and then do mutes to clean things up. To record mutes without affecting the fader moves, you can use the Fader Status Master key to select "Trim

Write Cuts" status for all channels (the green and red LEDs next to the fader will light solid).

To set a single channel to Trim Write Cuts, use the fader's individual status switch. Use PLAY and MIX to run the mix and perform your mutes. When you're finished, hit END and name the update. In cases where you need to rewrite absolute fader level without disturbing the mutes, set fader status to "Abs Read Cuts" (red LED lights solid, green LED flashes). Switching fader status to "Trim Read Cuts" mode (green LED lights, red LED flashes) lets you update the fader moves but leave the cuts unchanged.

TOTAL RECALL

Total Recall saves all channel switch and knob settings. To write a TR setup, enter NAME, SETUP, (type in a name), and EXECUTE (be careful here — if you hit SETUP and EXECUTE, the computer will *play* the last setup). On a 4000, none of the master settings (master fader, main compressor, aux send masters) are saved, so they should be noted manually. It's important to realize that a Total Recall setup is only as useful as how

meticulously mix notes are taken, including patching and settings of the outboard gear. Also, TR is subject to the tolerances of the pots, so a perfectly recalled TR setup on the same console will sound close to the original, but for critical settings, like an echo send on the lead vocal — where the slightest difference on the pot will be noticeable — you'll find that a TR has to be tweaked to sound like the original. TR's are useful but they are the most useful when recalling on the same console and control room with the same gear and good notes have been taken.

Using TR is easy provided you take setups frequently, name them correctly, and document the patching and effects settings so that you can actually re-create them. To load in a TR, you use PLAY, SETUP (type in title), and EXECUTE. The console scans all I/O settings and displays the result on screen. Switches on the console that don't match the TR setup will be displayed doubly-bright; when you switch them to the correct position, they assume background brightness. Pot position is indicated by a white peg; TR value by a colored line. To reset the pot, you rotate it until the white peg and colored line form a cross.

20/20 HINDSIGHT

One of the big things about bringing a project into an SSL studio is that automation frees you from committing to a mix. Also — since you typically have more faders and tracks than in a project studio or have the ability to add a slave machine — you can minimize premature decisions. If you look at records that people start at home, their most common mistake is that they will commit to bounces, premixes, or EQs that will (later) be hard to undo. Through a bit of planning and foresight in the recording process, you can avoid mistakes such as folding the background vocals or the drum mix down to two tracks. This kind of planning and care in recording gives you the ability to make the most of automated mixdown in a commercial studio. Now relax.

Roger Charlesworth is an independent consultant to the music recording and broadcast industries. He is the former vice president of SSL Inc., where he gained considerable experience calming nervous engineers. He can be reached at roger@rogercharlesworth.com.



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World Radio History

Son of Web Site Quick Picks

More sites to keep you happily pointing and clicking

BY CRAIG ANDERTON

Going 'Net surfing? There sure are a lot of waves to catch, but this collection of "greatest hits" will lead you to some of the hottest, most useful sites. Surf's up! **Stomper Drum Synthesizer** (<http://stomper.base.org>). This ultra-cool piece of software (fig. 1) by Håkan "Zap" Andersson is a Windows software synthesis program that models analog drum sounds. It has multiple oscillators (waveforms and noise) that you can program and mix together to obtain sounds very similar to machines like the TR-808, TR-909, Simmons, etc. I've generated a bunch of useful WAV files with this program; if you're at all into analog drum sounds, don't miss this outstanding download.

The Gods of Music (<http://www.marshallphoto.com>). Even if by some chance you don't know who Jim Marshall is, you've seen his photographs of rock icons, many from the '60s. Now there's an online gallery of some of his best work, and it's great. No, there's no software to download or schematics; this is a pure cultural delight. Check it out. **Akai Free Sounds** (<http://www.akai.com/akaipro/SoundDown.html>). The selection of free sound downloads changes periodically; as this was written, you could download the Program Synth sounds from the S-Series sampler library and a set of MPC-compatible hip-hop drum samples (as PC .ZIP files). The site also tells you where to get conversion tools for converting Akai's proprietary sample format to more common formats. Not a lot of selection, but these are pro-quality samples, and the price is certainly right.

Sampler (<http://www.sonosphere.com/sonosphere/sampler/index.html>). This OMS-compatible program transfers sound files between a Mac and MIDI samplers supporting the MIDI Sample Dump standard. With a Roland S-760 sampler, it can also transfer

sound files over SCSI. The program runs on any Macintosh with a 68020 or better processor, System 7, and OMS. \$20 registration fee.

Harmony Central (<http://harmony-central.com>). A comprehensive Internet resource for musicians, with areas for guitar, bass, computers & music, effects, forums, etc. To go directly to a free software section with programs for Atari, Amiga, Mac, Windows, DOS, and UNIX, go to <http://harmony-central.com/Software>.

Windows 95.com (<http://www.windows95.com>). Although this isn't a music site per se, if you use Windows 95, it's invaluable — if for no other reason than it provides links for downloading the latest, greatest drivers for sound cards, monitors, CD-ROM drives,

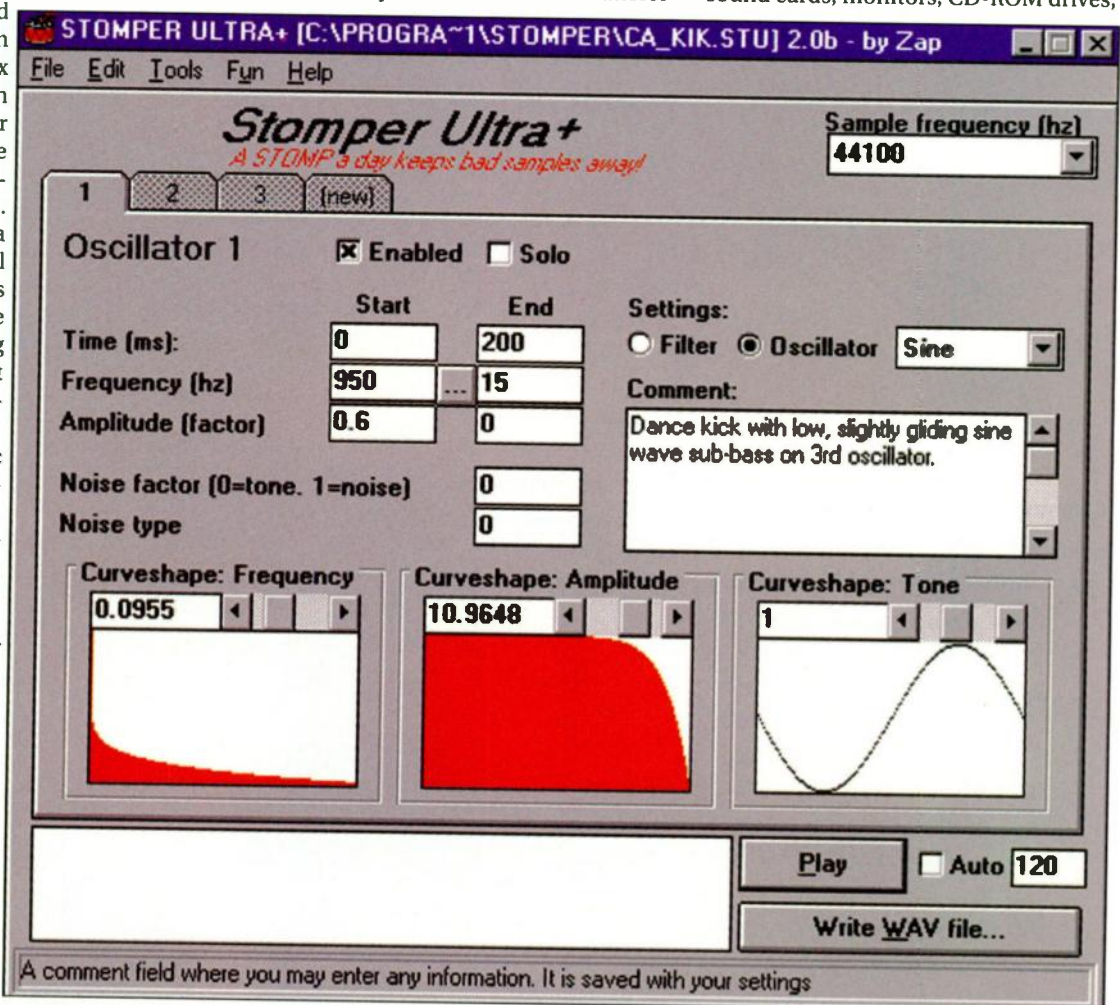


FIGURE 1: Stomper Dream Synthesizer



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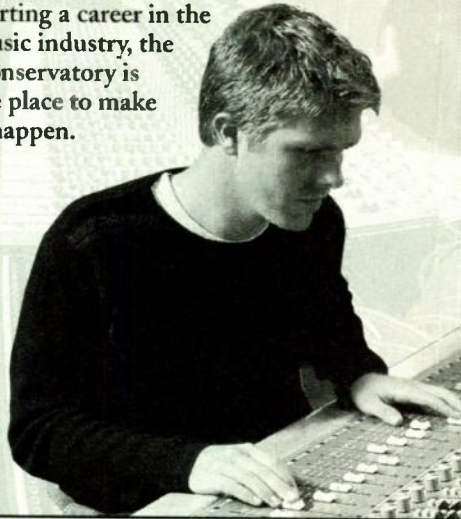
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TECHNIQUES

and so on. But there are also a ton of tips and other goodies, including a solid selection of 32-bit shareware.

FMJ Software (<http://hem.passagen.se/fmj/fmjsoft.html>). This is the home page for downloading *Awave*, a file translator/converter/editor for samplers. It can translate just about any kind of digital audio file format in existence, but is also an audio editor, audio player, and wavetable synthesizer format converter/editor. For samplers, it can send and receive MIDI sample dump standard files, and includes visual editing for parameters such as waveform loop points and layer keymaps.

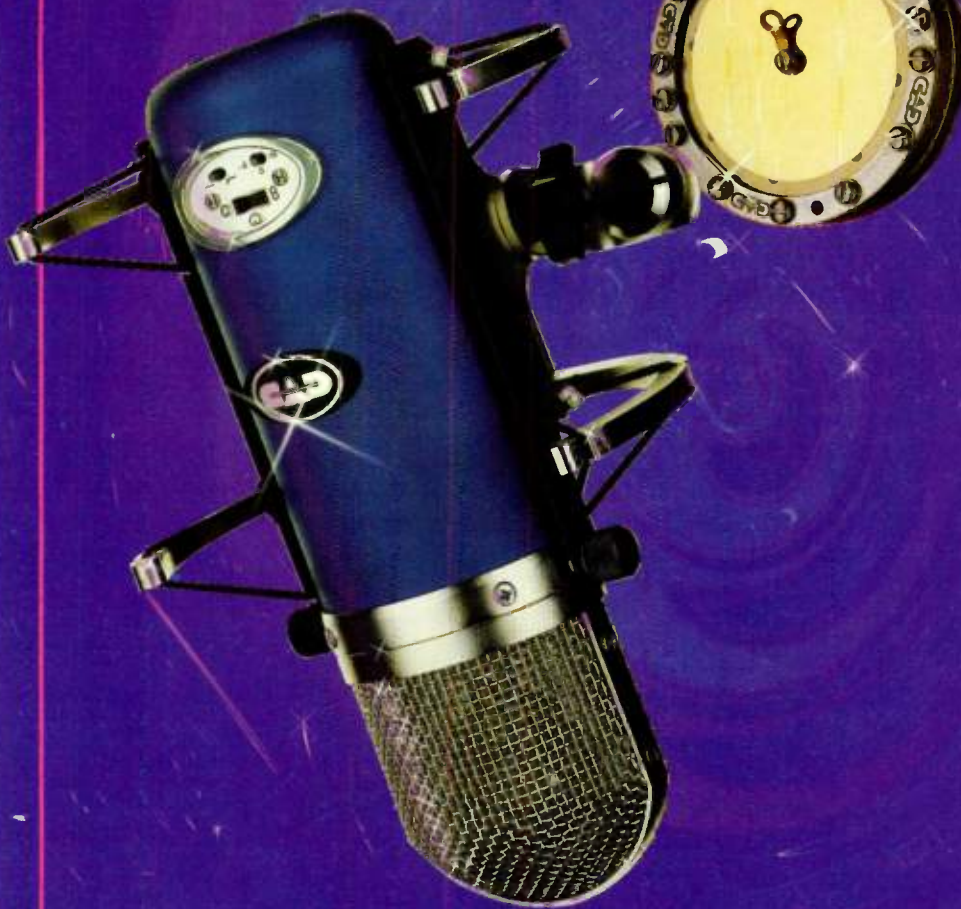
Shareware Music Machine (<http://www.hitsquad.com/smm>). If you're looking for music-related shareware, this should be one of your first stops. There's a ton of programs for Mac, Windows, DOS, OS/2, Linux, and Atari, including drivers, software synthesizers, music training, audio editors, patch librarians, etc. They also have a book page and offer other services.

Peavey Electronics (<ftp://207.120.130.2>). This FTP site leads you to a bunch of free WAV samples, including animals, weather sounds, automobiles, comedy, synths, orchestra FX, sound effects, and more. When these samples were on AOL, some of them had over 10,000 downloads. You can also download backups of DPM factory sounds and PC1600 factory presets. **Digital Music Zone** (<http://users.aol.com/jorman>). A site for hardcore do-it-yourselfers, DMZ offers schematics for both original projects as well as some classic pieces of gear such as the Fuzz Face, Dan Armstrong Green Ringer, E-H Microsynth, and more. There's also some software, although not much of it is music-related.

GEO (<http://www.eden.com/~keen>). Maintained by R.G. Keen, the Guitar Effects Oriented Web page has some excellent FAQs on tube amps and guitar effects, along with schematics and circuit boards for vintage effects. If you're into guitar effects, a visit is mandatory. **Electronicmusic.com** (<http://www.electronicmusic.com>). This e-zine on all aspects of electronic music includes equipment reviews (music and gear — even reviews of games with nifty electronic sounds), interviews with people such as Tom Oberheim, and an extremely useful list of just about all significant newsgroups and mailing lists dealing with musical electronics. 

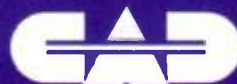
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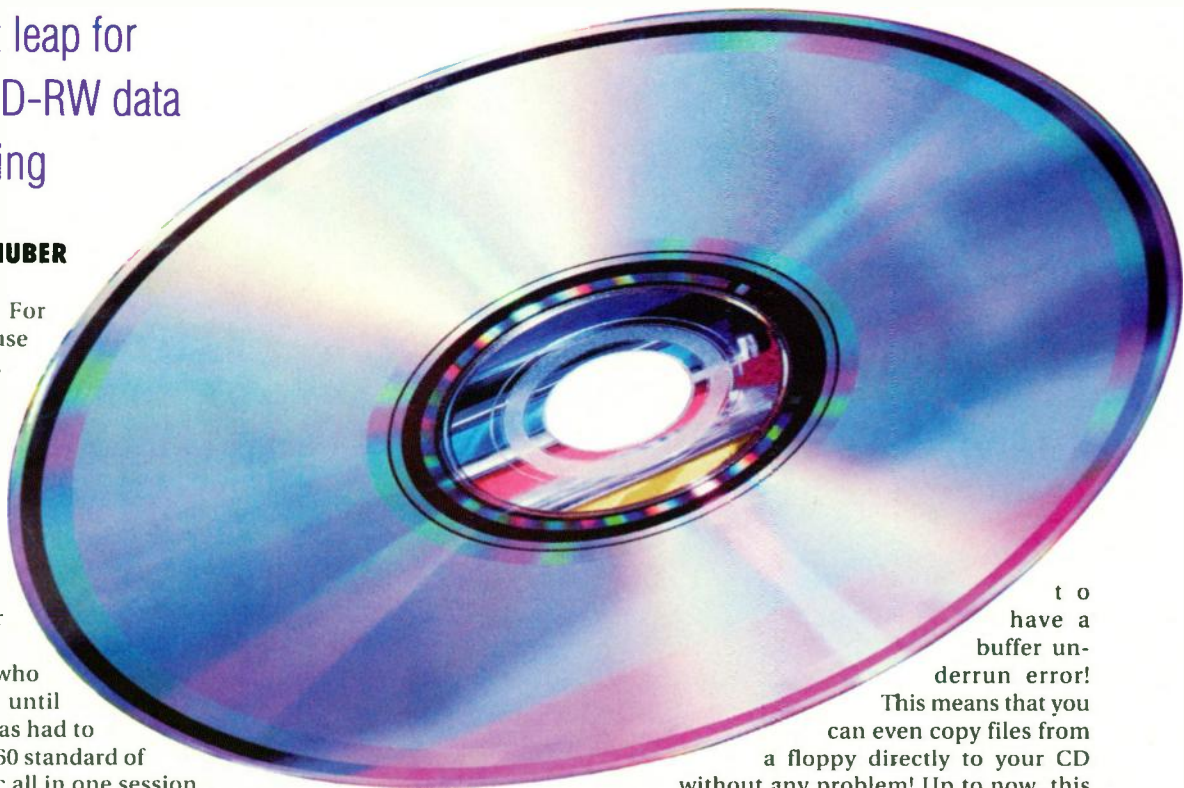
BY DAVID MILES HUBER

Warning! Warning! For those of you who use your CD-Recorders and CD-ReWritable drives for saving program data, doing soundfile backups, and generally saving all your precious little files to CD, this article may change your lives!

As all of you who have CD-Rs know, until recently, everyone has had to deal with the ISO-9660 standard of writing data to a disc all in one session (disc-at-once) or within several sessions (using multisession technology). This generally meant that you'd either have to save up enough data in one giant directory to burn a CD in a single sitting. Or, worse yet, you'd have to deal with the inadequacies of burning multiple sessions (the biggest problems being the inability of standard CD-ROM drives to read the various sessions on a multisession disc and Win 95's total chunkiness when it comes to switching between sessions). Well, buddy, I'm here to tell you that your problems are about to be over.

PACKET WRITING

Recently, all the rules of recording data to CD changed with the adoption of the ISO-13346 Universal Disk Format (UDF), which employs a CD burning technology known as packet writing. Unlike the traditional ISO-9660 standard, whereby files are written to disc in fixed, 2048-byte sectors (a file that only partially fills a sector will still require use of the full sector) and the equivalent of a disc drive's File Allocation Table (FAT) must be entirely rewritten each time a session is



written to disc, packet writing allows small packets of variable or fixed length data to be added to a CD-R disc "one file at a time." In addition, the disc's file table is updated each time data is written to disc, instead of being rewritten in its entirety. Let's take a look at what this techno-talk really means:

1. The most important part of packet writing is that it turns the CD-R into an actual drive in your system. "Drive letter" access means that the CD-R appears to the operating system as another drive letter, and any program that can write files to a drive can transparently write them to CD. Overwriting existing files is also the same as with other drives, with the obvious exception that you can't recover the previously used space when using a CD-R.

Gone is the need to use a special program to write data to disc. Simply drag 'n' drop the file, directory, or selected files to your CD-R (just as you would with any other drive) or save the program file directly to disc. Since the data "packets" are smaller than the CD-R's memory buffers, it's impossible

to
have a
buffer un-
derrun error!

This means that you can even copy files from a floppy directly to your CD without any problem! Up to now, this simply wasn't possible.

2. Another big problem with the traditional ISO-9660 standard is the extreme amount of data overhead that's required to save a session to disc. Using this system, the Lead-In and Lead-Out data that's required to store each session takes up about 13.5 MB of disc space. If you want to store several sessions onto a CD, this lost system space can quickly add up and limit your CDs overall data capacity.

By comparison, the overall system space that's required for packet writing is roughly 3.5 MB. Unlike its predecessor, this data is simply updated during each burn and isn't rewritten every time data is added to a disc.

UDF'S PRESENT DAY AND NEAR FUTURE REALITY

There are currently a number of programs that can turn your CD-R or CD-RW into an UDF-compliant drive. Among these are DirectCD from Adaptec for Win95 (www.adaptec.com), CeQuadrat's PacketCD for Win95 (www.cequadrat.com), Optima's CD-R Access Pro for Mac ([60](http://www.optimate-</p>
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World Radio History

ch.com), and Astarte's Toast Direct for Mac (www.astarte.de). One of the more important things that you should know is that not all drives are capable of writing packets, or may require firmware updates to make them compatible. For example, I have the Philips 2600 CD-R that came with a 1.06 firmware version (essentially the drive's operating software that was burned into a chip). Upon finding out from Adaptec that I needed to have the version 1.07 chip, I contacted Philips and they gladly re-

placed my drive at no charge. Upon getting the new drive and loading DirectCD, I was in business. In order to check out whether your drive or future drives can write packets, check out Adaptec's complete listing at the www.adaptec.com/directcd site.

It almost goes without saying that a disc that's encoded using the UDF standard can't be read by standard CD-ROM drives or even other CD-Rs that aren't loaded with software that makes your drive UDF-compliant. To get around this,

most current UDF programs will let you convert a UDF disc into a standard ISO-9660 disc, allowing it to be read by any drive. Often, you can even change the CD back into the UDF format and continue adding files. Oh, by the way, programs that change your drive into a UDF drive can easily read both UDF and standard ISO-9660 discs with equal ease.

As for the future of UDF, if you're wondering if this is another techno fad that'll soon pass, the answer is no. The Optical Storage Technology Association (OSTA) has wholeheartedly endorsed the UDF packet writing format. Plus, UDF is reported to be included within the upcoming Windows 98 release, and current and future generations of DVD players make use of the format. So, suffice it to say, if you decide to get an UDF-compliant program, future operating systems will support it.

All the rules of recording data to CD changed with the adoption of UDF, which employs a technology known as packet writing.

MY 2 CENTS

Five minutes after installing DirectCD from Adaptec (a \$69, Win95 program) my whole way of looking at CD-R media changed. Before I knew it, I was taking individual files and copying them to disc with astonishing ease. I was copying floppies to disc, doing backups...you name it! Over the course of a few months, it's never failed me yet. My system looks and acts the same, with two simple exceptions: when I put a UDF disc into the drive, a quick splash screen comes up telling me that I've inserted a DirectCD UDF disc; and I have to click on a special icon located at the lower toolbar to eject the disc (this lets the system update the file tables before ejecting the disc). That's it!

In short, I'm a real convert. I only wish that the powers that be would come up with a similar scheme for writing audio to CDs, but that doesn't seem to be high on the computer industry's priority list. **EQ**

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CIRCLE 08 ON FREE INFO CARD

Make Room for Hula

It's a tight squeeze for engineers as Taj Mahal and a nine-piece band play in very close quarters

BY STEVE LA CERRA

Engineers John Gileran, Larry LaSota, and assistant Rich Evans recently recorded Taj Mahal's *Hula Blues* CD at Messenger Studio, situated on an acre of landscaped jungle in Kauai, Hawaii. As is typical for Taj, his band was recorded live — which presented several technical obstacles for John and Larry. Couple that with the fact that this was the first session in Rich Evans's newly-completed Messenger Studio, and the engineers faced a formidable task. Here's how John and Larry worked it out.

John Gileran begins by relating how the project came together: "I've been involved with Taj Mahal as an engineer on several projects over the past six years. *Hula Blues* incorporates his longtime Hawaiian connection into more traditional blues music. As usual, Taj wanted to record everybody live in the studio — just fire it up and go for it. Of course, this presented technical problems (mostly isolation), and the challenge of getting good tracks from all nine players at once. The good news was that we'd get the 'live energy' feel, and

very few overdubs would be necessary."

Larry LaSota concurs regarding the challenge: "I knew I'd have my hands full because this was the first project for this studio, and it was a Taj project. The former meant that there would be a fair amount of debugging to do, while the latter meant 'anything goes.'"

The major problem faced by the two engineers was that the studio had a limited amount of space in which to fit the band — which wouldn't have been a problem if the band was OD'ing their parts. But achieving microphone

isolation in a crowded space is no easy task, and required a bit of head scratching to optimize the available characteristics of the room. The largest room at Messenger is the control room, so it made sense to somehow utilize as much of that area as possible in making the musicians comfortable. Moving things around and creating a few iso areas within the control room — and then bringing most of the band into that room — proved to be the solution.

According to John, "A sound circle in the control room and isolation for the very loud instruments (drums, sax and



BLUE HAWAII: John Gileran (above) and the Mackie/TASCAM/Giltronics setup for *Hula Blues*.

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CIRCLE 59 ON FREE INFO CARD

TECHNIQUES RECORDING

lap steel) was the ticket. The studio diagram (fig. 1) shows our cozy little 'Gobo City' layout. Note that if you want to record in this manner, make sure that the air conditioning is adequate. Most project studios cannot afford a very quiet, low-speed, high-volume system like the big boys. Rich's solution at Messenger is a split system. The compressor is remotely mounted to reduce rumble, and only the cooling coils and fan are in the studio. This saves on transmitted duct noise and is generally satisfactory, except when recording quiet acoustic instruments. Allow cooling-off time for both the room and the musicians in between takes. We'd chill the place down while listening to the playback of the previous take." Audio was recorded through four Giltronics 4-TMP (four-channel) vacuum tube mic preamps, providing 16 channels of balanced +4 signal direct to TASCAM DA-88's. Two 16-channel Mackies were used to monitor the DA-88's and for listening back to takes.

A BAFFLING SITUATION

Because it was a live session, John and Larry recognized the importance of eye contact between the musicians, and set up the control room accordingly. They began by moving some of the control room furniture around and using a few 4 x 4-foot baffles on milk crates to create iso areas for the ukulele players. The

milk crates brought the baffles up just high enough to hide the instruments and the mics, but still allowed the players to see around the room. The intention was not so much to keep the ukes from getting out into the room, but to keep the room sound out of the uke mics. Microphones used on the ukes were a AKG C1000, C451, and C535's. A couch and large stuffed chair remained in the control room, serving both sonic absorption and creature comforts.

ISO MODE

"Then we really got into isolation mode," says Larry. "One of Rich's smallest rooms (a really nice closet with a window) was used as a vocal booth. However, we quickly realized that Taj wouldn't want to hide in the booth — he'd rather be out in the studio with the rest of the guys. So the vocal booth became the guitar booth. As it turned out, Taj only played acoustic guitar in the big (control) room, so the booth remained a very nice, quiet closet. Next came iso for the lap steel. We could have DI'd it, but Fred (Lunt, Hawaiian steel guitar) likes the live sound coming from his Fender Princeton amplifier, so his amp received the premiere spot in the whole place: out on the lanai (i.e., terrace) overlooking Rich's beautiful Hawaiian garden. We miked the amp with a Shure SM57 and Fred played in the control room with the rest of the troops."

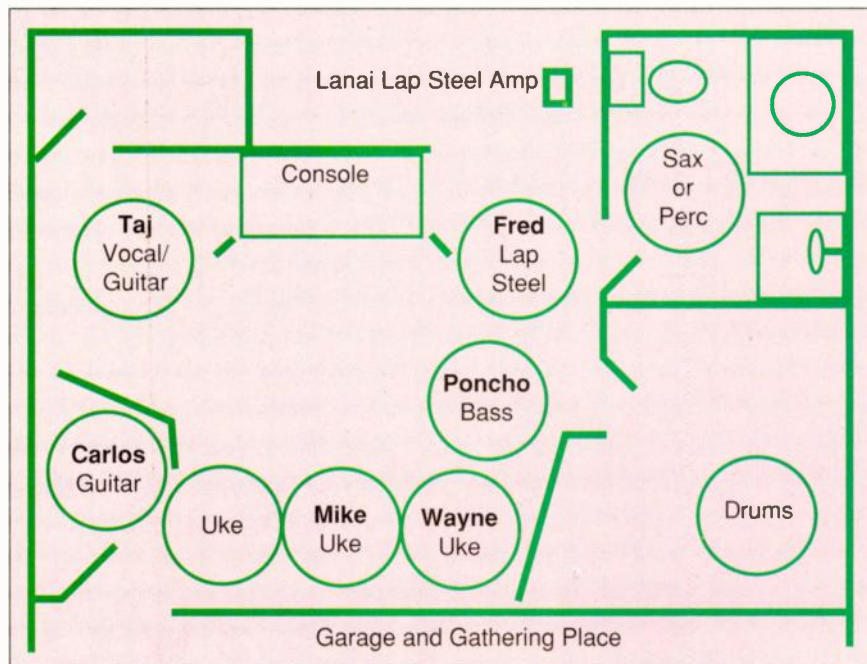


FIGURE 1: The "Gobo City" setup at Messenger Studio.

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Not letting an inch of space go to waste, Rudy (Costa, alto sax, kalimba, pan pipe, three-star clarinet, zither, flute, backing vocals, etc.) and his arsenal of horns and percussion instruments were moved into the bathroom, which had a patchbay and enough isolation to be used as a booth. Rich placed acoustic foam on the wall right behind the mic (a CAD E-200), and another baffle on the bathroom counter directly behind Rudy. In conjunction with the shower curtain, this cut down most of the bounce in the room — leaving it just lively enough for either the horns or the various percussion toys that Rudy had up his sleeve. Acoustic guitar was (for the most part) left out in the open in one corner of the control room, and Carlos Andrade did his vocals live from there as well.

Obviously it made sense to isolate the drums most completely by placing drummer Kester "Smitty" Smith in a booth. Larry and John miked the kit with CAD E-100's on kick and overhead, a Shure SM57 on the snare, Peavey M-520 NT's on toms, and an AKG D226 (dynamic) on the hat. John employed a clever-yet-simple acoustic treatment to tighten up the bass response of the drum room: he carefully placed several whole rolls of fiberglass insulation around the room, which effectively damped the low frequencies enough for a full, but controlled, low end (the rolls of insulation were covered with material to make them look more attractive). Poncho Graham's acoustic stand-up bass was recorded using an Underwood pickup into a custom Giltronics passive DI (which uses a Reichenbach transformer), and then from the DI into a Giltronics mic pre. "Selecting the mics took a little mixing, matching, and trial and error to find the winning combination," advises Larry, "but in the end it sounded really good!"

LISTEN UP!

Four headphone mixes were used to cue the musicians: one for Taj, another for Rudy in the drum booth, a third for the band members in the control room. John also ran a headphone mix for himself, through which he monitored the takes in the control room. During the actual recording, the control room monitors were turned off. They were turned back on for playback purposes in between takes. The primary nearfield

continued on page 146

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World Radio History

Room To



Teddy Riley and crew create a rolling project studio to keep recording even when out on tour



PHOTO BY BOB JONES JR.

DOMove

What would you do if your band were heading out on a tour, but you were working on a bunch of studio projects that were still in the production process? Not being one to punt his responsibilities, producer Teddy Riley faced exactly that situation when his band Blackstreet was due to hit the road with New Edition. Rather than turn his back on the studio projects, Riley decided it might be a good idea to have some kind of recording rig with him out on the road, and thus begins the story of Teddy's mobile project studio

Ordinarily, an artist who needs to do studio work out on the road might have a small recording system built into a few road cases, which could be unpacked and assembled backstage at a gig or in a hotel room. But that involves a lot of pack-

ing, unpacking, and moving of gear. Since Blackstreet was already using a bus to tour in, it made sense for Riley's gear to be on the bus — set up, connected, and ready to go at any time. With a studio on the bus, Teddy could work while they were traveling, and there'd be no set up or tear down. The studio could be put in a lounge on the bus, and there would still be bunks for sleeping.

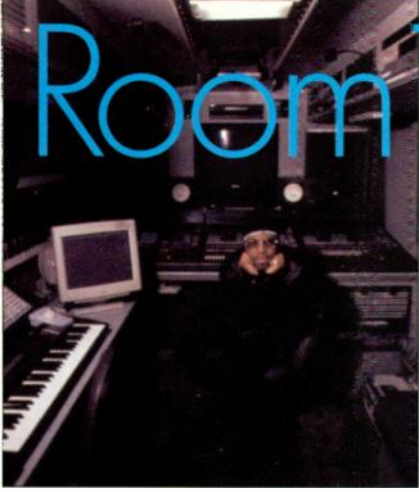
According to Serban Ghenea, Riley's studio engineer and technical advisor, it was all supposed to have been a lot more simple than it ultimately turned out. "Our initial idea was to get a few keyboards, a couple of TASCAM DA-88's, and a Mackie console, and put the gear in the lounge of a Prevost." (For the uninitiated, a Prevost is a tour bus used by many acts. In

the rear of the bus, there's a lounge with a space of about 8 x 8 feet.) "Since I work with Teddy every day in the studio, I was asked to help put this idea together. We had this huge pile of gear, and I was wondering how to fit it into such a small area. After studying the situation, it came down to the fact that we'd have to rip out the back row of bunks from the bus to make the area bigger — the whole thing became a lot more involved and expensive." Of course, no studio install would

MAKING CHANGE FOR THE BUS:
(From left to right.) The initial prepping of the bus' interior; with cutouts and some wiring in place; and the finished product.



Room To Move



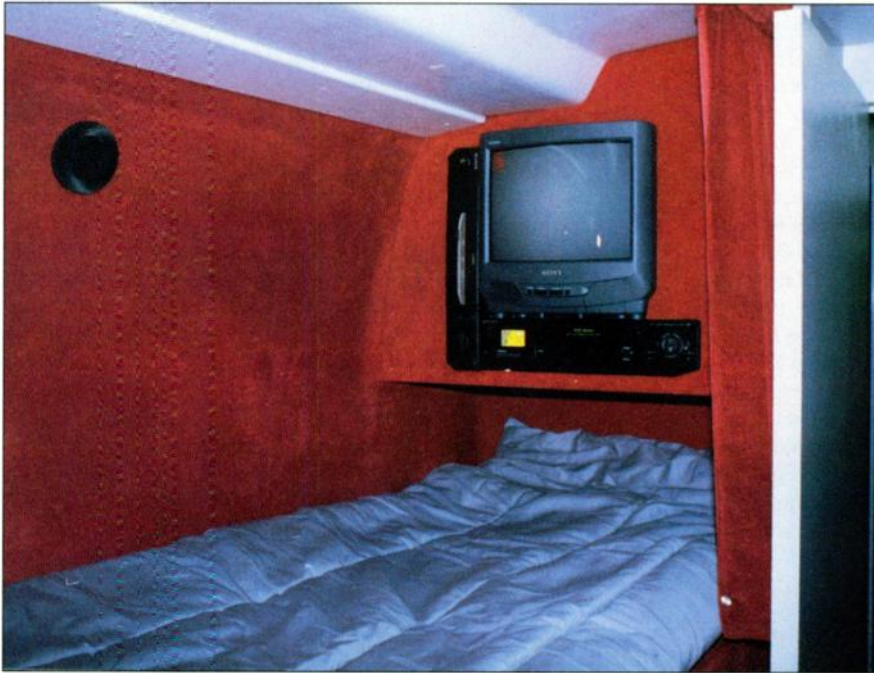
be complete without a killer deadline, and this would need to be completed within about a week!

At this point, Riley was leasing the tour bus and modifications to the bus were being made by Vulcan Coach (Hueytown, AL). After removing the bunks, the area was now about 8 x 14 feet and included a small vocal booth, intended for use when the vehicle is stationary.

With the physical modifications underway, Dennis DeCamillo of Q Cables, Inc. (Ashtabula, OH) was called in to handle the wiring scheme and patchbay layout/design. Installed in the bus are three Yamaha 02R's, four TASCAM DA-88's, an extensive MIDI rig including a controller, several keyboards, and a rack of MIDI sound modules, several stereo tape machines, and a smattering of out-board processing. Mogami cable was used exclusively (Q Cables is a Mogami distributor), terminated with Neutrik, Switchcraft, and DL connectors.

Dennis explains that, since construction was under way, there wasn't a lot of time to dote over cable measurements. "Serban sent me some drawings of the room that he made on his computer, and there was enough detail in the dimensions to help me determine the cable lengths. Since there's not a lot of room to hide the harnesses, I had to make sure that there wouldn't be a lot of excess cabling.

"We had to take into consideration," Dennis continues, "the fact that all of the harnesses and connectors would be subject to vibration and a different type of handling than what you'd expect in a normal studio. The whole room had to be wired more durably than normal. I brought in a lot of extra screws and clamps to tie the cabling off to walls or support points so as to take as much weight as possible off of the connectors. There couldn't be excessive weight pulling on any of the connectors because, through road vibration, they might pull loose." While it might have been possible for Dennis to modify some of the gear to use more secure connectors (e.g., XLRs in place of TRS), they wanted the ability to remove any piece of gear and put it into another room or get a replacement installed quickly if repairs had to be made.



CREATURE COMFORTS: Each bunk has its own entertainment center that can work on its own or view whatever is on the main television.

After approximately five months with version one in this bus, Teddy decided to purchase a tour bus, but was unable to obtain the leased bus — which meant that the studio would have to be removed and re-installed into the new bus (some of the cabinetry was reused in the new bus). The new studio is approximately one foot longer, so almost all of the cabling was retained from version one, the exception being the TDIF cables linking the TASCAM DA-88's to the Yamaha 02R's. Their length was a hair

short and had to be replaced (as an interesting side note, new Prevost busses are delivered with a completely empty shell, plywood on the floor, and a temporary driver's seat).

Wall surfaces in the studio were covered with 1/2-inch plywood secured at the outer edges only, allowing the panels to vibrate freely and absorb excess low-frequency energy. For additional isolation, a layer of 1/4-inch lead was used to line the studio and vocal booth floors, as well as the back wall of the bus where the engine resides. Additionally, the vocal booth walls are treated with a combination of plywood, 1/4-inch lead, and a high-density, rubber-backed foam to further improve isolation.

Although the speakers are audible from outside the bus, leakage from the outside in was minimized by the wall treatment.

A bay in the belly of the bus was used for a power generator and a set of UPS's that power the studio gear. In addition to providing uninterrupted electrical service in case of a generator failure, the UPS's also filter the AC line supply. When the bus is parked at a location with suitable accommodations, it hooks into shore power, temporarily avoiding need for the generator.

GROUND CONTROL

Quite interestingly, Dennis was able to run the studio wiring without any kind of complicated

grounding schemes. "We start with the concept that the more things are connected to ground, the better. Typically we'll use all shields on both ends. If necessary, we'll tie equipment down to ground with bus wires, chassis to chassis. But in this case we were able to get away with *not* having to do any tying. All of the interfacing worked very well right off the bat. Audio grounds were connected at both ends of the gear and through the patchbay. Any applicable AC ground pins on the gear remained con-

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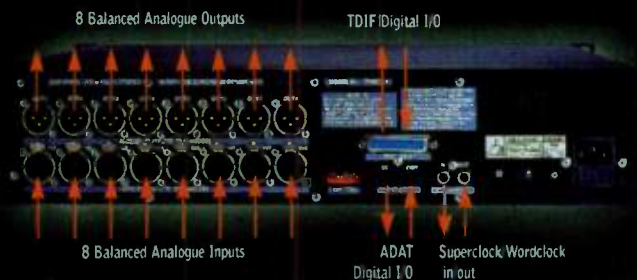
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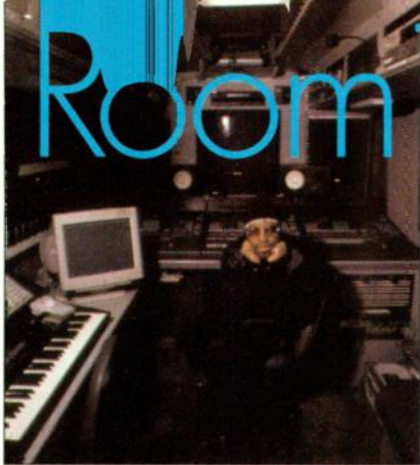
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Room To Move



patchbays down to ground as well, but we were very fortunate that we didn't need to do any of that."

In all cases possible, equipment is digitally interconnected. Interfacing between the 02R's and the DAT deck and the 02R's and the DA-88's employs AES, S/PDIF, or TDIF digital connections, routed through the same ADC patchbays as the analog audio signals. Some of the digital connections — such as the AES/EBU mix out from the main 02R to the DAT deck — were normalled via the

nected and effective (we normally don't like to remove ground pins to begin with). We were also prepared to tie all the

bays, though Serban and Dennis were sure to keep the analog cabling and the digital cabling physically separated to avoid interference.

CONDITIONING THE AIR CONDITIONING

While most of the studio design in the new bus was retained from the leased bus, there was a need for another air conditioning unit to cool the room and the gear. Due to space restrictions, the air exchange unit had to be placed underneath the console and contained within one piece of cabinetry along with the subwoofer and patchbay. But positioning the exchange unit in that location left Dennis and Serban a tough hand to deal with, because the location of the unit presented several distinct problems: mechanical noise from the unit, vent noise from the intake, and EMI (electro-magnetic interference).

Initially, this exchange unit was positioned so that the intake would face the studio interior and the motor would face the rear of the bus. But then the motor was sitting directly on top of a wiring

The air exchange unit had to be placed underneath the console within one piece of cabinetry along with the subwoofer and patchbay.

trough that created all sorts of EMI noise and hum. Serban also comments that "the noise from the intake was pretty silly." They then realized that by turning the unit sideways, they could seal the entire area underneath the desk (and around the subwoofer cabinet) airtight. This would move the motor away from the wiring trough and get rid of the EMI noise. However, then the question became, "How do you get air in there?" because you can't have the exchange from an air conditioning unit located in a vacuum. The studios engineers then realized that they had a patchbay right there with-

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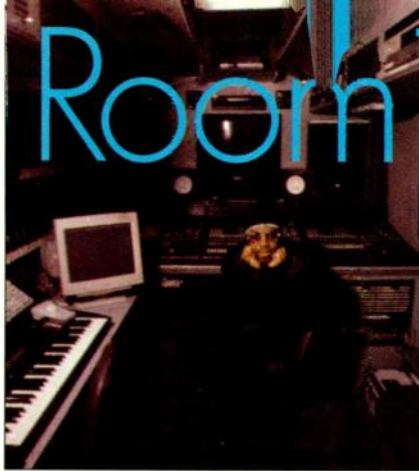
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Room To Move



in the cabinetry — which is nothing much more than a bunch of holes. The power amps were located directly underneath

the patchbays. With the exchange unit sucking air in — and the area sealed except for the patchbay — air would be sucked through the holes in the bay. Heat from the amps would rise up towards the patchbay and get sucked away, thus cooling off the amps, quieting the system vent noise, and cooling the studio as well. Very clever. Mechanical noise from the exchange unit was damped by packing insulation into the cabinetry.

Ghenea and DeCamillo both agree the air conditioning situation was one

of the biggest challenges, though they did have a bit of a tough time dealing with working in tight corners and fitting in all that gear. Located along the rear wall of the bus is the mixing desk with the aforementioned patchbay, subwoofer, and air exchange unit. A pair of Tannoy DMT 12 monitors is placed in the traditional position with a large Sony video monitor centered in between.

In particular, layout of the MIDI rig was handled with quite a bit of finesse. Since Riley uses the MIDI rig extensively and needs it close by, it had to fit into one area. If you're standing in the middle of the room facing the desk, the MIDI workstation is to the left. There's a desk with an Apple Power Macintosh 8600 (fully loaded with Pro Tools, Logic Audio, Sample Cell, and Glyph hard drives) and a Roland XP-50, which serves as the master controller. Directly facing the operator and mounted on the wall are four full-size keyboards that can be seen and adjusted without the need to stand up (these units are used for sounds and not actually played).

Ease of use was a major concern in the studio design, so all of the gear is basically within arms' reach. Additionally, the patchbay normals were configured so that scenes on the 02R's may be instantly recalled for tracking, overdubbing, or mixing without the need to make any patch changes in the bay. [Editor's note: Serban recently used the bus studio to mix the *Blackstreet* Unplugged special for MTV; Riley is currently using the bus studio to work on remixes for Janet Jackson.]

Looking slightly to the left, along the same wall as the workstation, is the floor-to-ceiling MIDI rack, which is angled slightly inwards to make viewing of the units easy.

Access to the rear panels of the units in the MIDI rack is provided by a closet-type door on the side of the rack that allows a person to walk in behind the rack to change routings or adjust cables. Opposite the MIDI rack is another rack with the four DA-88's, forming a sort of cockpit around the center of the room. Access to the rear panels of the DA-88's is through a small removable door positioned on the side of the rack. Directly overhead to the right and left of the desk are two sets of racks containing the DAT and cassette decks, CD player, and outboard processing gear. Basically, they filled every possible inch of space with gear. An addition to the studio that may

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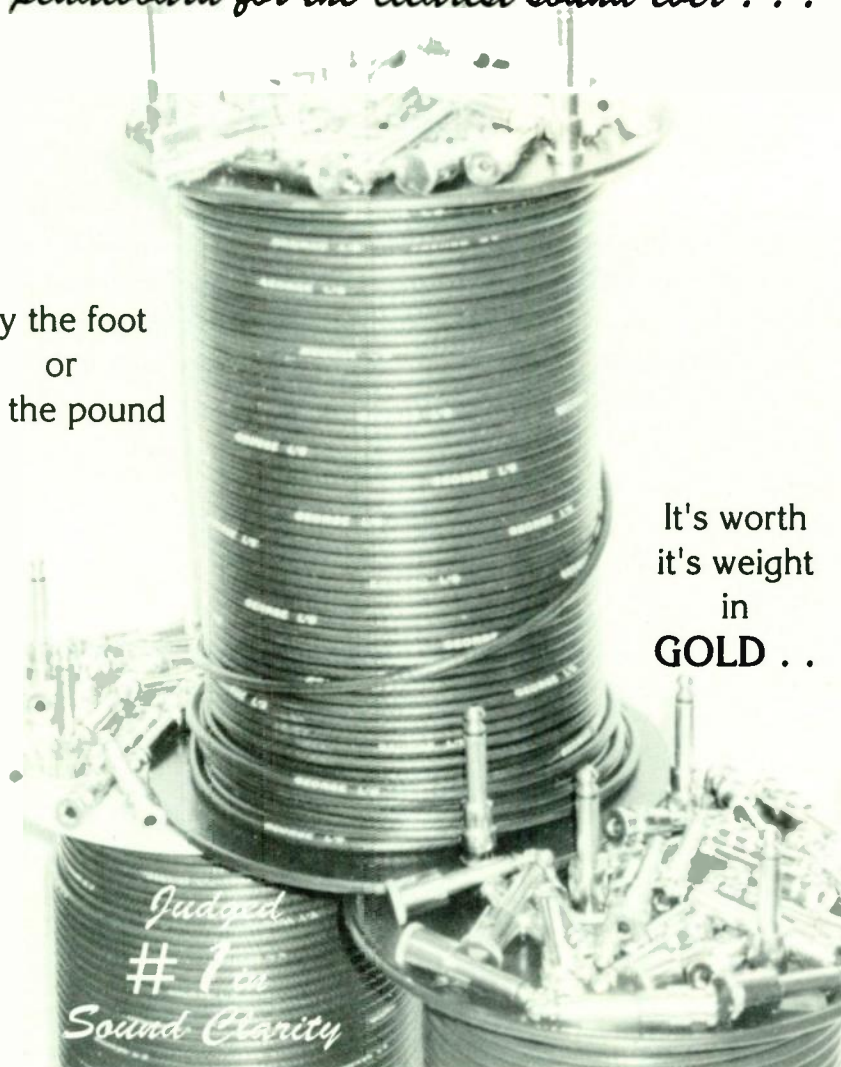
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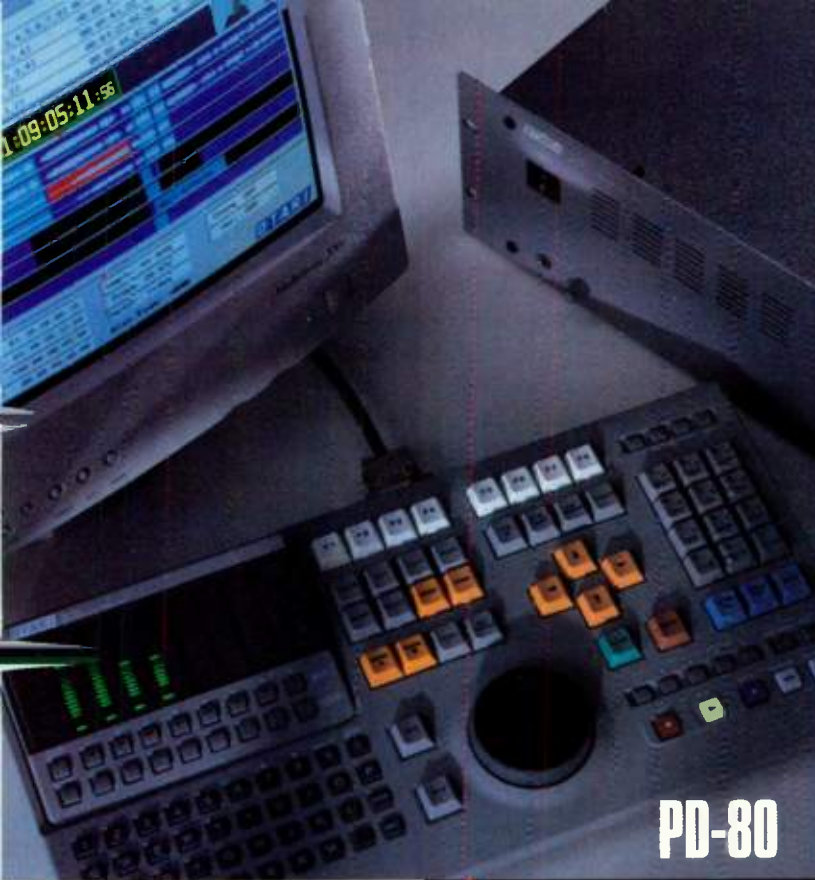
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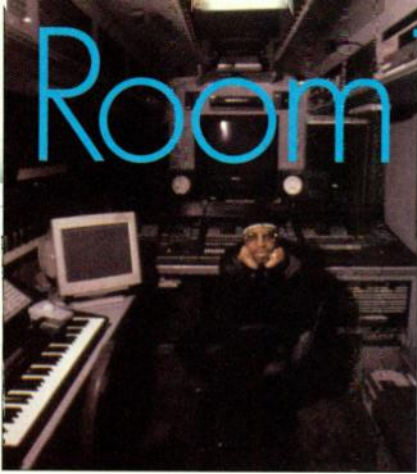
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Room To Move



be made within the next month or two is a balanced power system that Dennis is interested in trying "to see if we get the same results on the bus as we have in other installations."

USING THE STUDIO LOGICALLY

Serban reveals that the operational focal point of the studio is Emagic's Logic Audio. "We use Logic Audio with Digidesign 24-bit, 888 interfaces. The program handles both MIDI sequencing and digital audio recording — which is a key to remixing. We can do remixes by getting the tracks we want such as the vocals and maybe a key instrument or two, dump them into Logic Audio, and write the remix arrangement around

that. In the old days we'd have it on tape and would need to wait for rewind and locate time. Now we can rearrange the song by cutting and pasting. Since sometimes a song might be too fast or slow, we can put a vocal into Logic and time-compress or -expand it to any tempo, changing the remix into more of a remake."

AN OUTSTANDING COACH

Both Serban and Dennis acknowledge the fact that the folks at Vulcan Coach were instrumental in helping them realize their design. "They would accommodate any ideas we could come up with," says Ghenea. "We'd ask if they could do something and (owner) Bruce Basden's answer would be, 'The question is not can we do it, but would you like us to do it for you?' Whatever we thought of, they'd do for us — no matter how off-the-wall. We even have an in-motion satellite for DSS with video distribution throughout the bus. Each bunk has a TV, so if you're watching a movie in the lounge and want to go lay down to watch the rest of it in bed, you can tune

into whatever was on in the lounge." It's also interesting to note that the bus' stock suspension isolates the studio sufficiently from mechanical vibration without any special modifications.

ROLLING DOWN THE ROAD

Although the duo faced their share of peaks to overcome, Riley's studio is happily up and running (as is his new SSI 9000J Series recently installed into his "normal" project studio). DeCamillo's advice to anyone venturing into this kind of project is: "Take your time and make sure that you try your ideas before it comes time to actually to do them. Once you are in the middle of doing something and find that there are difficulties (like with the air conditioning unit), a lot of unnecessary time and worry are added to the project. Be prepared to realize how the gear will be installed."

Dennis DeCamillo may be reached at Q Cables at 440-992-8113. Serban Ghenea may be reached at sghenea@sprynet.com.



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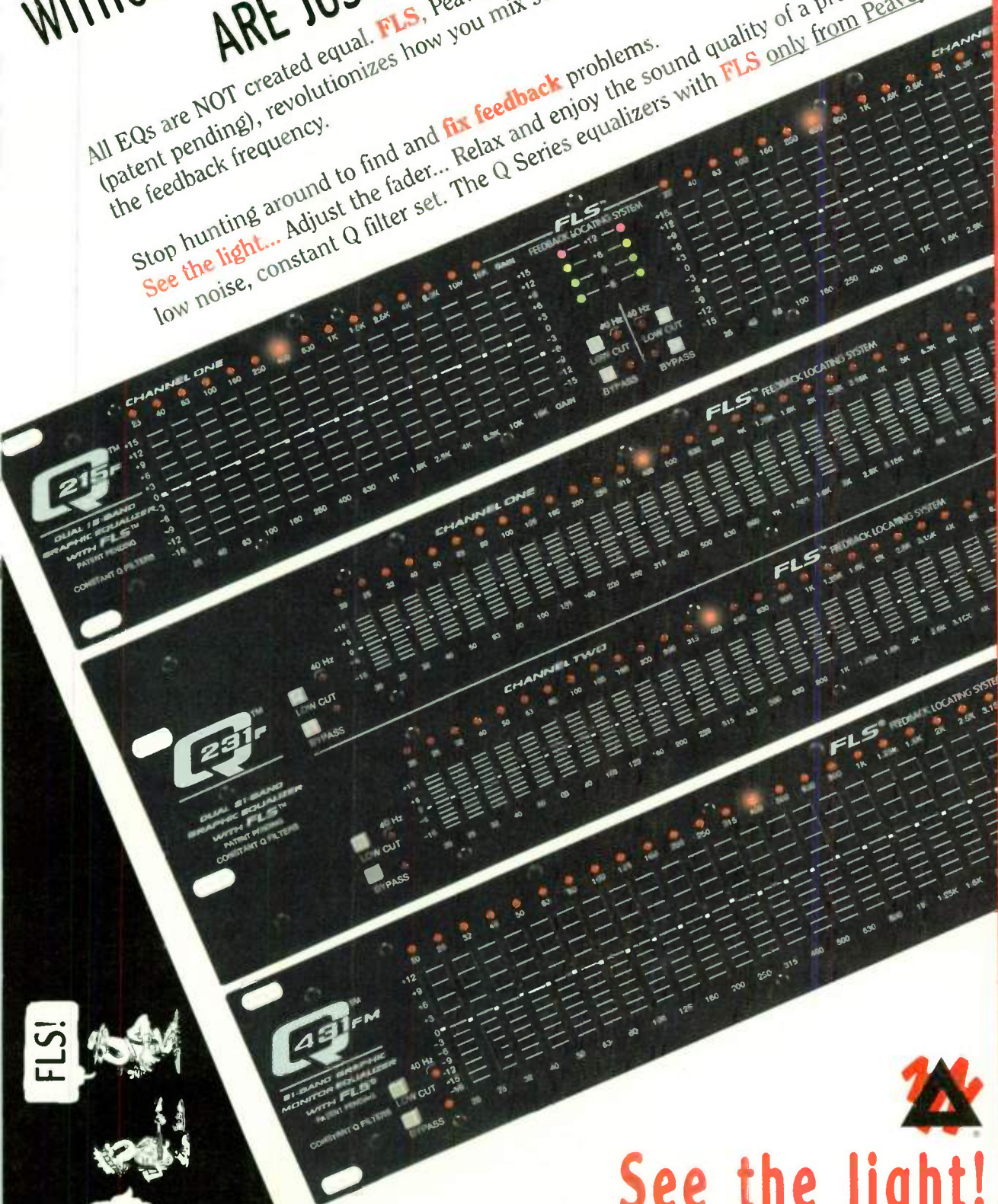
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Sample CDs offer some great loops, but the possibilities are endless when you do it yourself



Creating Your Own Drum Loops

BY CRAIG ANDERTON

Sure, there are some great sample CDs available with fabulous drum loops. But it always seems that I want to customize them, or do something like add effects to everything *but* the kick drum. Fortunately, many CDs also include samples of the individual drums used to create the loops, so you can always stick 'em in your sampler and overdub some variations. But frankly, I find that process a little tedious, and decided that it would be easier (and more fun) in the long run just to make my own customizable drum loops. However, there's more than one way to accomplish that task; I tried several approaches, and here are some that worked for me.

REBIRTH: LOOPING WITH TRAINING WHEELS

The simplest method I know to create your own drum loops involves Stein-

ASSEMBLING FROM SAMPLES

For more easily edited loops, you can import samples into a multi-track hard-disk recording program, arrange them as desired, bounce them together to create loops, then save the bounced tracks as WAV or AIFF file types for use in tunes. Let's go through the process, step-by-step.

1. Collect the drum samples for your loop. In addition to my own samples and sample CDs, there's a Windows program called Stomper (available from the

gram Digital Wings for Audio for drum loop creation because it lets you set up multiple "sync tracks" to which you can snap samples, much like the snap-to-grid feature in sequencers (fig. 1). With programs that have limited snap options (e.g., quarter notes only), I record a metronome track from a drum machine as the first track. Each click gives an obvious visual reference to which you can align samples (fig. 2).

3. Import and place samples. Each sound goes on its own track, although sometimes it's helpful to spread the same sound on different tracks if specific sounds need to be processed together. For example, fig. 1 shows a techno-type loop with a 16th note hihat part (hihats are in orange). Since I wanted to accent the hats that fall on each quarter note, these go on their own track, while the other hats go on a separate track. Calling up a fader can lower the level of the non-accented hats without affecting the ones on the quarter notes.

4. Bounce and save. This is the final part of the process. One option is to

FIGURE 2: Version 1.0 of PARIS allows snapping to beats, but not finer divisions. Track 1 shows an eighth-note metronome track. Track 5 (kick), track 6 (snare), and track 2 (hihat on beat) all snap to 1/16th notes. Track 3, with hihats on the offbeat, has the hats lined up visually with the metronome track.

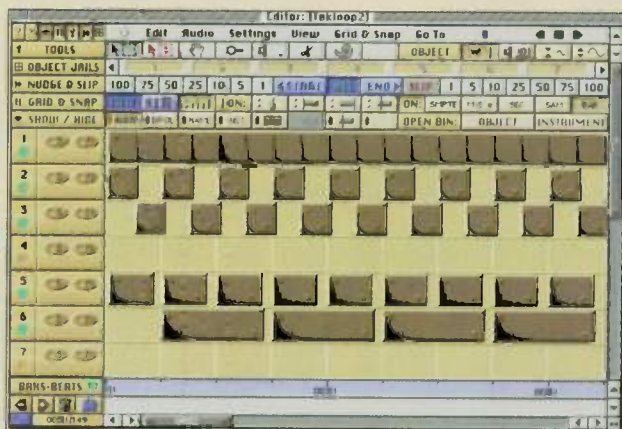


FIGURE 1: The top three tracks consist solely of "time marks" to which samples can snap. Note that hihats not on quarter notes have been grouped, with a fader applied to lower their level and create some dynamics.

berg's ReBirth (reviewed here 10/97), a software emulation of a TR-808 drum machine and two TB-303 bass lines. If you're into electronica, just boot ReBirth, set the tempo, plug the output into a DAT, and twiddle the knobs. Transfer the best sections of the DAT into a hard-disk editor, set loop points, and there you go — instant loops.

'Net; see the Web picks story in the Techniques section of this issue for more information) that can generate some very cool analog drum sounds.

2. Set up a rhythmic reference in your hard-disk program. You'll need a "click track" to line up samples rhythmically. I generally use the [Metalithics] pro-



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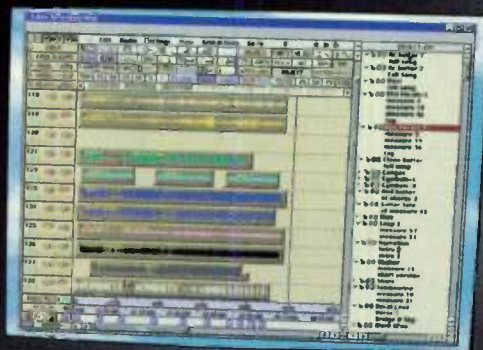
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simply bounce all parts together into a mono or stereo track that you can save as a WAV or AIFF file. But I also make a mono or stereo mix of each drum sound, as well as a stereo mix of all sounds except kick for use with reverb. The end result looks something like fig.



FIGURE 3: Each drum sound has been mixed down (bounced) into its own 4-beat track, suitable for saving as a WAV or AIFF file for loading into other tunes. The green tracks are a stereo mix of all parts, less the kick.

3. The final step is to save each mix as its own file in a folder for that particular loop.

The advantage of giving each sound its own file is that it allows lots of flexibility when creating variation loops. Here are a few examples:

- Slide a track back and forth a bit in time for "feel factor" applications. For example, move the snare ahead in time for a more "nervous" feel, or behind the beat for a more "laid back" effect.

- Change pitch in a digital audio editor (this assumes you can maintain the original duration) to create timbral variations.

- Copy and paste to create new parts. For example, a common electronica fill is to have a snare drum on every 16th note that increases linearly in level over one or two measures. If a snare is on 2 and 4, you can copy and offset the track until you have a snare on every 16th note (fig. 4). Premix the tracks together, fade in the level over the required number of measures, and you have a quick fill.

- Drop out individual tracks to create remix variations. Having each sound on its own track makes it easy to drop out and add in parts during the remix process.

- Create "virtual aux busses" by bouncing together only the sounds you want to process. Suppose you want to add ring modulation to the toms and snare, but nothing else. Mute all tracks except toms and snare, premix them together, import the file into a digital audio editing program capable of doing ring modulation, save the processed file, then import it in place of the existing tom and snare tracks.

TRICKS WITH COMPLETE LOOPS

After you have a collection of loops, it's time to string them together and create the rhythm track. Here are some suggested variations.

- Copy a loop, then transpose it down an octave. This really fattens up the

sound if you mix the transposed loop behind the main loop. If your pitch shift option has a "preserve duration" option, do not select it; the stretching out in time is what makes for the fat timbres.

- When trying to match loops that aren't at exactly the same tempo, I generally prefer to shift pitch to change the overall length rather than use time compression/expansion, which usually messes with the sound more (especially with program material). This only works if the tempo variation isn't too huge.

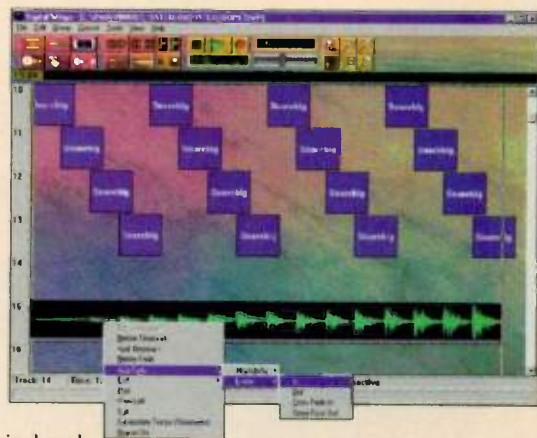


FIGURE 4: The original snare part has been copied several times and offset, so that there's a snare drum on each 16th note. These were then mixed together into track 15, and faded in (the waveform shows the fade in).

- Take a percussion loop (e.g., tambourines, shakers, etc.) that is more accent-oriented than rhythmic and truncate an eighth note or quarter

continued on page 146

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World Radio History



The practical ins 'n' outs of timecode on the PC

BY DAVID MILES HUBER

So you just got a new piece of audio editing software for your PC and you thought that you'd try your hand at locking your new editor to your MIDI sequencer (or whatever you have around the house). Well congratulations — you've just entered into the magical mystery world of synchronization.

A QUICK TIMECODE PRIMER

The standard method of synchronizing various types of software, hardware, and tape-based media together in a production environment is via SMPTE timecode (Society of Motion Picture and Television Engineers). In short, the use of timecode makes it possible for audio and visual media to be precisely located and regulated in time by assigning a digital address to various media at specific intervals.

Just as your home address doesn't change, a timecode address (which is generally displayed in the form 00:00:00:00, representing Hours:Minutes:Seconds:Frames) will always represent a particular point in time and/or physical media location to an accuracy of between 1/24th and 1/30th of a second (depending upon the frame standards being used). (See fig. 1.)

The use of timecode within PC production often involves the use of digital audio editors, MIDI sequencers, digital 8-tracks (such as an ADAT or DA-88), analog tape machines, or VCRs. The whole



Sync'ing Your Software

idea behind SMPTE is for all of the software and hardware systems involved in a production to be at the same timecode address (or relative offset) at any one point in time. For example, if the current playback position of an analog tape recorder (which is supplying the source SMPTE reference) is at 00:11:24:03, then a digital audio editor and MIDI sequencer that is synchronized to this reference will also be at 00:11:24:03.

The three most common types of SMPTE timecode and absolute timing references that are found in the PC-based project studio are:

LTC: Timecode that has been recorded onto an audio or video cue track is known as Longitudinal TimeCode (LTC). This form of timecode, which encodes a signal onto an analog audio track as a modulated square wave signal, is generally recorded onto the highest track number at a level that falls between -5 and -10 VU.

Digital 8-Track Proprietary Sync: The sync in/out ports of a digital multitrack are designed to generate and respond to a digital proprietary sync code that can be read by certain hardware devices that can convert the code into SMPTE or MIDI timecode.

MTC: MIDI TimeCode provides a cost-effective and easily implemented way to translate SMPTE timecode into corresponding MIDI messages. It allows timecode address locations

and commands to be distributed throughout the MIDI chain to devices or instruments within a project studio environment.

THE THREE BASICS

There are three things you need to be most aware of to begin sync'ing external devices to your PC (or software applications within your PC, for that matter.)

Number 1. There can only be one "master" (the device that is generating the SMPTE timecode) within a single production system. On the other hand, there can be any number of active "slaves" (devices that accurately follow the master's generated timecode addresses). Here's the general rule: Analog recorders and VCRs are commonly master sync sources within a system; digital 8-tracks will generally be masters (except in specialized applications where the hardware allows them to follow an analog recorder, VCR, or hard-disk recorder);

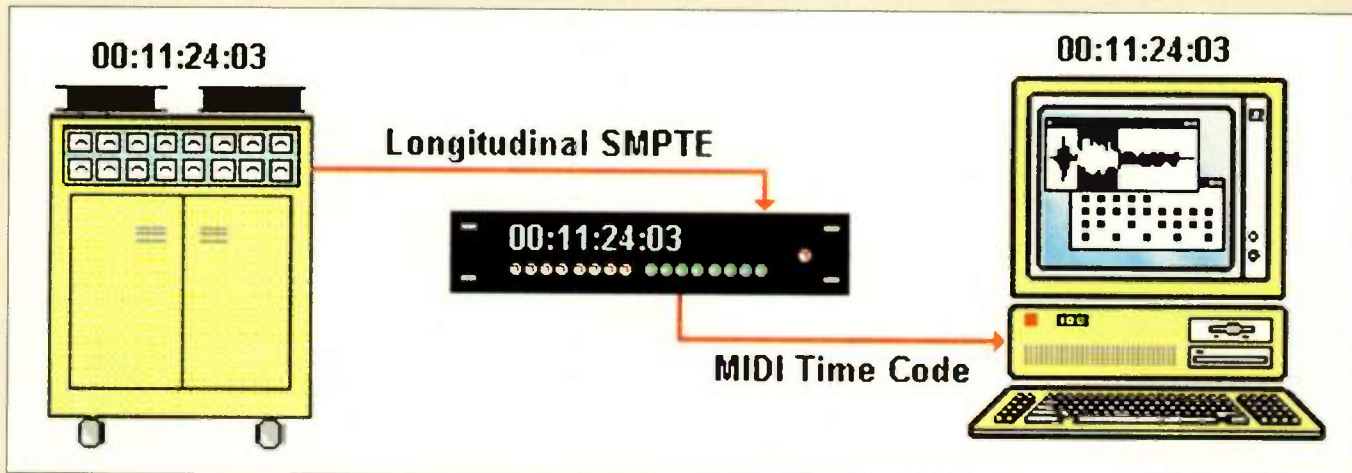


FIGURE 1

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hard-disk recorders can either be a master or a slave (depending upon the application); and MIDI sequencers will commonly want to act as a slave.

Number 2. Make sure that the frame rates of all of the slaves are set to the same frame setting as the master source. In the U.S., these settings will most likely be either 30 frames a second (fr/s) or 29.97 fr/s. Thirty fr/s (also known as nondrop code) is often used in music production that doesn't involve video production, while 29.97 fr/s (commonly referred to as drop code) is often used in production work where color video is involved. I

think that it can be safely said that if you work in-house on projects that don't involve video, you're secure with 30 fr/s. If you're working with a project that isn't in-house, *always* make sure that you know the original media's frame rate and stick with it. (When in doubt, always confer with the originating production house; mixed timecode rates can cause timing problems down the road that can be a real pain to fix.)

Number 3. In the real world of audio production, songs don't always begin at 00:00:00:00. Let's say, for example, that you were handed an ADAT tape that

needed to have a synth track laid onto track 7 of a song that goes from 00:11:24:03 to 00:16:09:21. Instead of placing over eleven minutes of empty bars into your sequencer, you could simply open up your sync dialog box and create an "offset" of 00:11:24:03. Basically, this offset "slips" the relative times between the master and the slave (in this case, the sequencer), so that bar 1 on the sequence actually begins at 00:11:24:03. Both timecode addresses will agree; you'll just be at the beginning of the sequence when the song starts. The same can also apply when sync'ing hard-disk tracks to an external source that doesn't begin at 00:00:00:00.

REAL-WORLD PC SYNC APPLICATIONS

How do you connect your new toys so they work in harmonious sync? The following common scenarios can help put your timing problems in the pocket.

Locking your PC to an analog tape track. When sync'ing a tape track to your PC, bear in mind that the tape machine should almost always be the master. Assuming that the tape has been properly striped with SMPTE, all you need to do is to plug your SMPTE Out track into the SMPTE In on your MIDI interface (if it doesn't have a SMPTE input, you'll need to get hold of a box that converts SMPTE to MTC and then plug that into a MIDI In port). From here on out, it's smooth sailing. Simply select the MIDI interface's SMPTE sync driver or selected MIDI In port (if you need an MTC converter box) as your sync source on the sequencer and/or editor, and you're locked.

Locking your PC to a digital 8-track. If you don't feel like losing a physical track to SMPTE (which is a quick-'n'-dirty option), you might want to pick up a digital 8-track sync interface (such as the JL-Cooper dataSYNC2 for the ADAT). By plugging this box into your MIDI interface (which can translate the digital 8-track's proprietary sync code into SMPTE or MTC), you can select the interface's SMPTE sync driver or selected MIDI In port (if you plug the MTC Out directly into a MIDI In port) to be your sync source on the sequencer and/or editor, and you're in biz.

Directly connecting your digital editor to your sequencer. The only digital audio editors I know that require their SMPTE sync in-

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puts and outputs to be directed to a dedicated hardware interface are the SAW and SAW Plus digital audio editors from Innovative Quality Software. In their case, you're pretty much required to dedicate a MIDI interface that can read and write SMPTE (such as the Opcode MQX-32M) directly to SAW. If you need to sync SAW to a sequencer (try saying that three times), you'll have to patch the SMPTE Out on the sync card directly to the SMPTE In on your MIDI interface.

Even though certain high-end sound card hardware systems may be designed to include SMPTE and MIDI ports that can be routed to the system's software, very rarely will you ever be forced to use these ports. In this day and age of software In, Out, and timing drivers, most software packages will be flexible enough to let you choose from any number of available sync sources (be they connected to a hardware port, MIDI port, or virtual sync driver).

Connecting digital editors and sequencers using a software sync driver (look, Ma, no cables). One of the cooler ways to lock a MIDI sequencer to a digital audio editor (which will act as the SMPTE master) is to use a Virtual MIDI Router. When using a "VMR," you can synchronize

your system in the software domain without the need for any external hardware whatsoever. All you need to do is install the VMR and select it as the Sync In source on the sequencer and the Sync Out on the digital audio editor and — *Shazam!* — the two are virtually locked in sequential bliss.

Currently, the only generic VMR (one that will work with most PC-based software systems) that I'm aware of comes packaged with Sonic Foundry's Sound Forge editor. The current version of Sound Forge (4.0b) comes with a 32-bit version that'll work on Windows 95 and NT, while previous versions come bundled with a 16-bit version. It's my un-

derstanding that Digidesign currently has a router that can be used to virtually lock their Session PC editor to a MIDI sequencer.

Everyone's a slave! Certain digital audio editors (such as Cool Edit Pro) can't act as the master in a system. Before you throw your hands up in frustration, though, relax. There's a simple jury-rig solution. When faced with an all-slave situation, you'll actually need a physical master for both the editor and the sequencer. This could be an digital 8-track or analog recorder. But what if you simply want to sync the two pieces of software together without a tape machine? The only answer that I can come up with is to use an external device (such as a MIDI interface that can generate timecode) as a master SMPTE timing source.

Most multiple port MIDI interfaces currently on the market are able to generate and route SMPTE directly to receiving software in a virtual fashion. For example, when using a Mark of the Unicorn Express XT interface, all you need to do is to select the XT's sync driver to be your Sync In source for both the editor and sequencer. By simply pressing the "Generate SMPTE" button on the front panel, the two programs

will lock to the master source, beginning at 00:00:00:00. When using my Opcode 8-Port SE, I had to plug the SMPTE Out jack to the SMPTE In jack. Once done, pressing the "SMPTE" button locked the two programs together in the same manner.

So what if my interface doesn't have SMPTE capabilities? If you have a device or box that can generate MIDI timecode, try connecting its MTC Out to a MIDI In port on your interface. Sync can be achieved by selecting the same MIDI In port to be your Sync In port on both programs. Often, where there's a will, there's a way! The best way to learn is by doing, so get locking! ■

In this day and age, most software is flexible enough to let you choose from any number of available sync sources.



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Some easy ideas to put your hard-disk projects on the fast track



BY DAVID MILES HUBER

Practical Editing Tips

Many *EQ* readers have been using hard-disk editing programs for quite some time. Nonetheless, since I've never been one to believe in that adage about teaching an old dog new tricks, here are some editing tips that can help make your tracks stand up, roll over, and beg to be noticed.

• **Cooling the Clips:** There's nothing worse than getting stuck with a soundfile that has occasional areas of overload distortion. Not enough to make the whole file sound distorted, but just enough that it slipped by during the recording without being heard. Maybe the original file or media is no longer available. Now we're stuck, huh? Not necessarily! One trick I found that seems to work on certain editors (most no-

lighted area should sound like (based upon the composition of the waveforms that are just previous to the region) and will "smooth" out the offending area. *Ta da!* The distorted area is gone — or at least a lot less offensive.

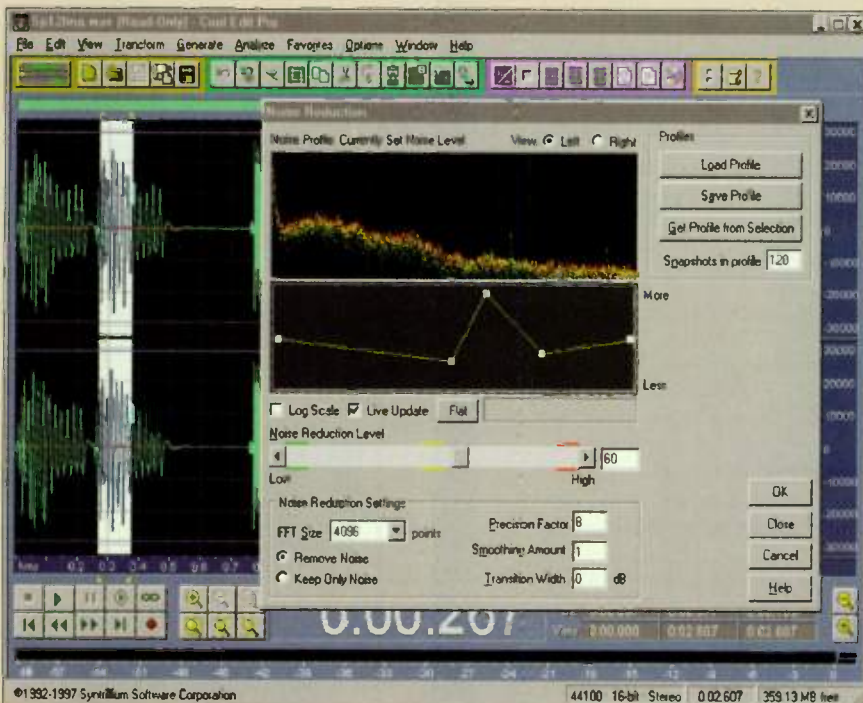
You may find that some of the highs

change the tonal balance of certain beats. Taking this trick for a creative spin can yield some interesting results.

• **Altered Noises:** Another effects trick using your noise reduction program or plug-in is to reduce certain "formants" that occur throughout any vocal or instrumental track. By formant, I mean those "vowel-like" sounds that are created by instruments that give them their characteristic sound. OK, let's say that we have this vocal track that's just begging for a eerie effect. Let's call up the noise reduction module and highlight the formant that you'd like to reduce or eliminate (such as an "ooh" sound in "... loosin' the bloos, while you snooze in the gooseberry fields"). By using this sound as your noise-reduction footprint, the processor will reduce the level of all the "ooh's" in the file — wherever they may appear. If you want to reduce them further, simply perform the NR process again. The results of this trick can be pretty wacky. As a bonus, you might even be able to use this trick as a cheap and effective de-esser for removing excessively sibilant blasts.

• **!tl esrever:** In the past, if engineers wanted to add a predelay or a pre-echo to a track, they had to physically flip the tape over and re-record the track through an effects processor. We, on the other hand, have it a whole lot easier. All we need to do is reverse the track, apply whatever processing our little hearts desire, and then flip it back in the forward direction again. If you want, you can apply pre-effects to just a single segment. Keep in mind that you may have to paste some additional digital silence before the beginning of the track so as to allow space for preprocessing.

• **Double Your Looping Pleasure, Double Your Fun:** I'm giving away one of my big secrets here! For those of you who are serious "loopologists," y'all know that repeating loops can be a bit boring. Well, check this out: Simply copy the loop into your favorite editor, pitch it down by an octave (making sure that the preserve duration option isn't checked), and save that loop as a new file. The new loop will be both an octave lower and twice as long. For



REDUCE IT: You can use noise reduction to create some interesting sounds.

tably Sound Forge) is to open up the click and pop removal module from your noise reduction program or plug-in, zoom in, highlight *just* the distorted area, and run the de-click function. That's right, the de-click function. This often works because certain de-clickers will interpolate (make informed guesses) as to what the high-

have been removed in the process. If this happens, you might want to undo the process and re-try it at various depth and region length settings. Once you're satisfied, you can move on to the next culprit. It's interesting to note that this same process can be used on percussive sample loops, or any other track for that matter, to



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those of you who have multitrack editors, you can simply paste the original loop in twice and on the track below it, paste the pitch-shifted loop so that they begin at the same time and press "Play." The loop's bass is heftier than a diesel truck and the interaction between the two loop versions is a lot more interesting.

• **Count Those Samples!:** Speaking of looping tools, I found that selecting the editor's horizontal timeline so that it reads directly in sample numbers (instead of SMPTE or time) is a big help when trying to match up loop lengths. For example, if you used the above trick to double a loop's

Some very interesting rhythmic patterns can be "discovered" using the Region Scrambler function as it lets you automatically break a loop into a series of defined regions.

length, a loop that was 1563476 samples in length would double to be exactly 3126952 samples long. Loops or segments that are introduced into the session that vary from the loop's initial length either won't match up or will eventually drift out of the groove's tempo. [Check out Craig Anderson's drum looping article on page 82 for more loop tips.]

• **Quick n' Dirty Maximizer:** For those of you whose editor has a "Normalize to RMS" function, you can maximize the average (RMS) loudness of several files or an entire program so that they'll have the same perceived loudness levels. This is useful for recalculating the overall levels of a CD project.

• **A Single Click Is Worth A Thousand Snippets:** For those editors that have an Auto-Trim or Auto-Cropping function, you record a number of dialog or musical takes into a single file and then tell the system to automatically create regions for all the phrases in that file. This is a real time saver if you need to save and catalog lots of effects or dialog takes. Depending upon your editor, the phrases will be automatically marked (on some, the silence between them may be deleted) or defining edit markers will be entered into the program's playlist. In either case, such a tool can save you the task of manually marking the edits.

• **Egg Beater?:** One feature that can be found on Sonic Foundry's Sound Forge that's too good to pass up is the Region Scrambler (a.k.a. the EggBeater). Some very interesting rhythmic patterns can be "discovered" using this function as it lets you automatically break a loop (or any musical passage) into a series of defined regions. Once done, you can randomly rearrange the regions from within the Playlist Window. The fastest and most fun way to do this is to randomly drag and drop each region up and down the playlist. Do this for about 10 seconds or until the regions are completely scrambled and then sit back and listen to your newly created loop or musical passage. It's sort of like what George Martin did to *Sgt. Pepper's* when he cut sections of recorded calliopes into little snippets, threw them on the floor, and told the engineer to randomly reassemble them.

Note: I'd like to thank John Feith at Sonic Foundry and Matt Diever at Syntrium Software (Cool Edit Pro) for their ideas, help, and never-ending support. ■

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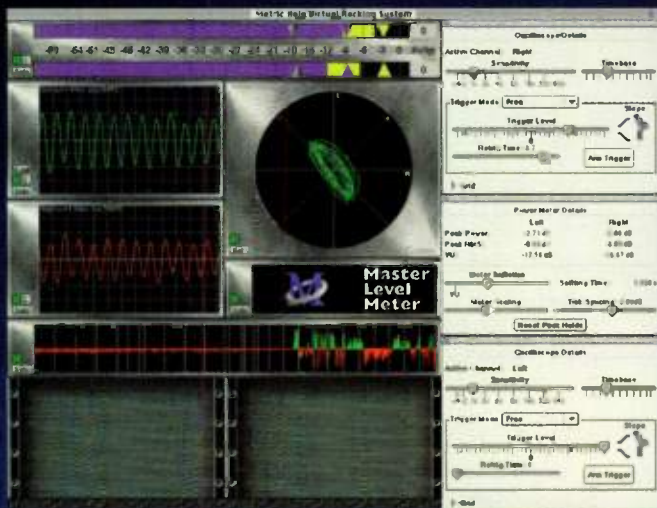
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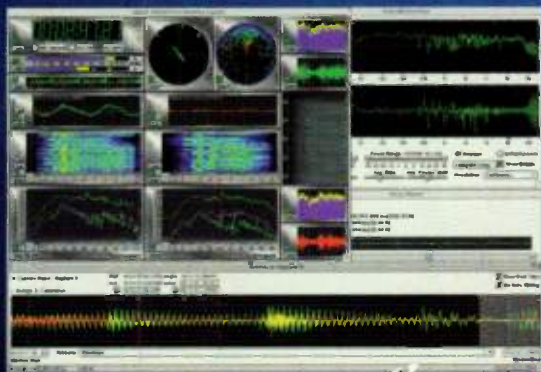
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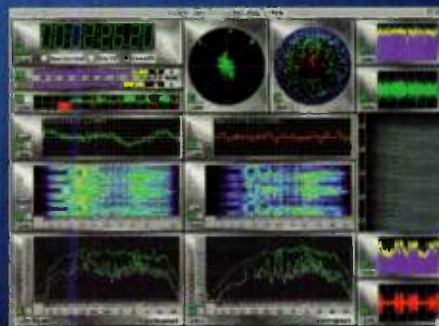
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Clean up your tracks with this noise-hum reduction software



BY TIM TULLY

MANUFACTURER: Arboretum Systems, 911 Cole Street, Suite 387, San Francisco, CA 94117. Tel: 800-700-7390. E-mail: info@arboretum.com. Web: www.arboretum.com

APPLICATION: Simple way to reduce/eliminate noise and hum from digital audio files.

SUMMARY: Operates both as Adobe Premiere-compliant plug-in and Arboretum HyperEngine plug-in. Reduces tape hiss, vinyl or digital pops, and 50-Hz and 60-Hz hum.

STRENGTHS: Stone-simple interface; good results with minimal adjustments.

WEAKNESSES: Offers very few ways to tweak parameters; heavy noise reduction can induce distortion.

PRICE: \$99

EQ FREE LIT. #: 117

Arboretum Systems' Ray Gun is simple noise- and hum-reduction software for the Macintosh. It comes as both a standalone application and as an Adobe Premiere-format plug-in that works with such Premiere-

Arboretum Systems Ray Gun

who may not always need a professional degree of technical sophistication, but sometimes need a simple way to get rid of hum, pops, or tape hiss. "It's the 80 percent solution," Weare says, "unlike our other products that really let you tweak things."

In fact, Ray Gun's interface is simplicity itself. Three main buttons engage or disengage noise reduction, pop filtering, or hum removal. Sliders adjust the amount of

its host application as you'd expect a plug-in to, but, oddly, so does the standalone version. This is because the standalone is unfortunately misnamed, since it actually works as a plug-in to Arboretum's HyperEngine, an application whose sole function is to act as a host for Arboretum plug-ins. Once you understand that, the rest is easy. Essentially, both versions work identically.

I tested RayGun with pure 50-Hz and 60-Hz files, as well as with files where hum was present in a narration. RayGun essentially removed the pure tones entirely, with only occasional little burbles occurring. With the narration, the 50- and 60-Hz filters apparently decrease the level of hum by about half, adding neither distortion nor coloration to the voice. All I had to do was select the area I wanted to process, open the plug-in, and say "Go."

Noise reduction works almost as easily, though requiring a bit more care. Threshold and attenuation sliders, both measured in dB, set the level below which processing kicks in and the amount by which the noise is reduced.

I found that setting the attenuation worked well. More attenuation than that induced distortion in the program material, giving voices a "munchkinized" sort of character. Any attenuation greater than about 12 dB got into the realm of special effects, and would not be good for clients with no sense of humor.

The pop filter, according to Chris Weare, is not intended to be a professional restoration tool, but is designed "for pops and not crackle. It will get scratches off records and remove digital clicks, but it won't clean up the constant crackle of an old LP." (For that, Weare recommended cleaning the disk with solvents designed for that use.)

For people who need to do a fast but effective cleanup of the most common kinds of noise, RayGun is a neat tool. It requires almost no learning curve and gets rid of the worst and most common of the vagrant noises that plague production without damaging your program material. ■



FIGURE 1

compliant audio applications as Bias Peak, Macromedia Deck II, MOTU Digital Performer, Emagic Logic, and others.

According to Arboretum R&D Director, Chris Weare, Ray Gun is designed for users

processing for each function and the main output level. Other buttons start and stop playback, bypass or engage any processing, and apply the effects to the file. (See fig. 1.)

The plug-in version functions within

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ROCKING IN A
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WORLD: John Bush
of Anthrax uses his
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with a Shure SM58
capsule.

Wireless Basics, Tips and Techniques

Page 98



**NEW GEAR
PAGE 104**

FOOTLOOSE AND WIRE-FREE

TIPS AND
TECHNIQUES ON
GETTING STARTED
AND PROPER
USAGE OF ALL
THINGS WIRELESS

By JP
Armstrong

It was all there, summed up on the back of the blister pack.

"Rock on, and feel the power of wireless freedom!"

That's what it is. It is freedom to wander about, impinged only by my ability to successfully walk and chew gum at the same time. It is freedom to spin in an eternal clockwise motion whilst emoting. In this case, it is the freedom to click on the boom box and play my fave Gibson sans cables wherever I am.

It is a good example of what wireless doodads are to a musician — taking off the leash. My first wireless was an old low-band system, something like 49 Hz. It sounded like crap. I couldn't get more than 50 feet from the receiver. It picked up a religious AM station or the airport control tower, depending on the day of the week. But it was a wireless. This one is Nady's FM transmitter for guitars, the AX-1000. I've forgotten what it cost, but it was too cool to haggle over price. It does exactly what it should, and it has echo, too. It was just right for my coffee-break/jam-sessions.

I see wireless units in live performances of all types these days, from football stadium, to Broadway to Mom's garage. Some of the new units cost way more than my car...then again so does a



FREEDOM ROCK: Wireless mics, like the Sony 800 Series shown above, give the artist more room to move on stage, but offer challenges to sound engineers.

nice bicycle, which is sort of the point. The demands of audio fidelity vary tremendously from use to use, and when you get picky about fidelity, you're going to need deep pockets.

Wireless microphones, for example, can be nearly transparent. The expensive systems are almost better than a hardwire. Cheap units could make Pavarotti sound like an asthmatic at a smoker's convention. The reasons behind this disparity are classified. All of us who seek to learn the mystic ways of the radio wave are sworn to secrecy. Only those who will maintain the vow should read further.

ABCS OF TS, XS, AND RS

A wireless system is designed around a few circuits, the *transmitter/receiver (TX/RX)* itself, the *componder* section, and the *diversity* section. TX/RX circuits are fairly simple unto themselves, and essentially they are all the same. One important tech spec to look for is *signal-to-noise-ratio* or *S/N*. This describes the electrical difference between the loudest signal a transmitter can send with-

out distortion and the point where wireless/electrical noise is audible, measured in dB (larger S/N ratio is better).

Pay particular attention to the physical construction of the system, especially the *beltpack/handheld transmitters*. The component used for a system's tuning — usually a quartz crystal oscillator — is secured in the TX/RX circuits, but the road is hard on people and machines. If your budget allows, stick with rack-mounted receivers and learn to care for extremely delicate equipment. I send every wireless I expect to use back to the manufacturer to be tuned at least once a year, whether it seems to work OK or not. You can use a scanner or a frequency counter to check transmitters, but receivers need professional mojo.

Most wireless systems are built with a *componder* circuit hidden away from our prying little fingers. *Com-* for compressor and *-pander* as in expander. The idea is to compress the input so as not to distort the transmitter, then expand the signal to its original, pristine, fresh-from-the-artist state at

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the receiver. Success in this area is often limited. For some applications it isn't so important, but on a vocal microphone, excessive action from the compander can be quite annoying. Some transmitters will have an input trim on the transmitter (to allow for a whispering singer or a screamer who sings) and that's a good thing, but make sure it is recessed in the unit. It should only be adjusted once — after that you can generally forget it until you move the transmitter to a different use.

REMAIN DIVERSE

Most manufacturers today sell *diversity* systems. Diversity isn't really accurate. "This-or-that" is a more apt description of how they perform. (If it were truly diverse, it would be a wireless system *and* an espresso maker...) A diversity system uses more than one receiver on the same fre-

quency (usually exactly one more), and simply uses the best signal. There are a few ways to build diversity systems,

depending on the particulars of how it selects the receiver it will use, and on how it switches between them. I never noticed much difference between the styles, and, personally, I'd advise not to sweat it. You're better off trying to maximize signal strength.

Which brings us to the next major part of your system — its antennas. Antenna technique is overlooked more often than any other part of the wireless setup. A little attention to detail goes a long way when using wireless systems, especially in heavy-radio-traffic areas. Signal quality depends on the amount of background radio noise in your environment and on the efficiency of your antennas. Background noise is a tough one. Some systems will let you choose

FOR MORE INFORMATION

Of course, there is more to learn about wireless for those who are interested. I regret that there is no way for me to sufficiently cover these rather complex subjects. Instead, I've assembled a smattering of Web sites related to the subjects involved, and some search words for you to plug into your favorite search engine. I'm sure the lawyers would like me to remind you that the content of any Web site is the responsibility and property of its owner, not us, and I just found this junk on the Web. That said, try these sites.

Multiple Systems and Intermodulation (search words: intermod, intermodulation, radio, transmitter, receiver): Many things can affect wireless performance, including too many wirelesses. Multiple radio sources in an area can result in interference, but you can avoid it if you know how.

Heavy RF Areas (broadcast, frequency (-ies), wireless): Some places are good places to use wireless gear, some are not. Most places are rife with RF, especially larger cities. At least you can know about the predictable stuff. Running local stations' numbers with your intermod test never hurts.

Wavelength and Frequency (wavelength, frequency, spectrum, radiation): They're related, but they're not the same. Write this stuff down and start an argument. Frequency is constant, but wavelength depends on the medium. Learning the formula can help you to tweak those antennas.

Antenna Types (antennas, propagation, array, aerial): All this to avoid using a cable....The right antenna can make a difference. Different styles have pros and cons, and knowing the difference can help you understand how they work.

- www.lis.pitt.edu/~sochats/tele2058/spectrum — A nice overview of the frequency spectrum
- home1.gte.net/k4lk/info/ntscfreq.htm — A chart of the American television frequencies (ch. 2–83 and cable 14–61).
- osm7.cs.byu.edu/people/dubois/antenna.html — Somebody's list of antenna text references. Now that's entertainment.
- www.arrl.org/tis/bibs/ — Technical information from the American Radio Relay League, the home of ham.
- www.lectro.com/wg/wgfront.htm — Lectrosanics has a very informative site, with enough info to make you dangerous.
- www.shure.com/app-scanners.html — Shure Bros. has posted a page of helpful information for using RF scanners to help troubleshoot multiple-wireless systems.

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That describes the experience of the well-known producer Richard Dodd, at his Nashville studio.

Dodd has engineered for the Traveling Wilburys, Bob Dylan, Tom Petty, George Harrison, Joan Baez, and many others.

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can supply your facility with 20 amps of 120/60V single-phase balanced AC power, using the common-mode cancellation effect to drastically reduce hum and buzz caused both by ground currents from power supply filtering and by radiation from AC supply cables. In turn, this can reduce the need to adopt cumbersome and expensive star-ground systems or use massive bus bars or heavy ground rods. There is no need to "lift grounds" or compromise the integrity of safety ground wires to achieve hum reduction. Furthermore, balanced power is safe and legal. It is now recognized for technical power applications in the US National Electrical Code (Article 530). And the IT-1220 itself is UL listed.

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

the safety ground connected to the center tap), whose difference is 120V.

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

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the quietest of two or more frequencies (I have 160 frequencies on one system), and that's the best solution, i.e., find the clearest frequency available to you.

There are many different types of aerials, and most systems allow you to remove the antenna and replace it if you wish. Antennas are based on wavelength, which is a function of frequency, so antennas are "tuned" to the general bandwidth of the system. Most of the time, changing the aerials isn't nearly as helpful as we'd like, but every little bit helps. Shure Bros. sells a series of half-wave antennas for the VHF bands that are cost-effective. For UHF systems, the little rubber antennas that come with the system are usually enough. Diversity systems need to have two antennas, which are "seeing" different instances of the same wave.

Antenna propagation is murky stuff, but the gist of it is simple: a radio wave (or some harmonic interval thereof) must be acting on the antenna to cause oscillation. Radio waves and antennas at right angles to one another have no interaction. Therefore two parallel antennas will (or won't) "see" the same wave at approximately the same strength, especially if they are less than one wavelength apart. This is often noticeable with VHF rack-mount rigs where the aerials are 18 inches or so from each other. [Double-secret bonus antenna tweak: point both antenna straight up, then pull one antenna toward yourself 45 degrees, then turn it clockwise (or counter-clockwise) 45 degrees. In this position, the antennas share no planes, therefore maximizing the possibility of one antenna being able to dredge up a useable signal.]

Antennas can be changed and moved, but there are two big rules to follow: [1] Always try to maintain line-of-sight to the transmitter. Steel beams, scaffolding, air conditioner ducts, poles, people, Polish people...anything between antennas and transmitter can cause trouble. Radio waves, like sound waves, may also "phase" due to reflection,

continued on page 147

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ROAD GEAR



Spirit Folio FX16

SPIRITED CONSOLE

A flexible four-bus mixer, the Spirit Folio FX16 16-channel mixer features a specially-designed 16-program Lexicon effects section with dual-effect capability (including Chorus and Reverb, Chorus and Delay, and Reverb and Delay), as well as fully editable/storable programs and parameters. The console itself includes 16 mic/line inputs and 26 total inputs to mix (including FX returns and tape return to mix). In addition to the mix outs, two subs allow groups of instruments to be sent to multi-track recorders or additional speakers, or subgrouped to mix. The FX16's 16 direct outs are individually fader pre/post switchable. All of the Folio FX16's 16 mic/line inputs are equipped with Spirit's UltraMic preamp, which provides a full 60 dB of gain range and +22 dB of headroom. There are four auxiliary sends, including a dedicated Lexicon effects send, one prefade send and two pre/postfader selectable

sends. The FX16 is available for \$1199.95. For more information, contact

Spirit
By
Soundcraft, Inc.,
4130 Citrus
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CAP OFF!

The new AKG WMS 60 wireless microphone system offers the choice of four interchangeable transducer capsules — the D 880, D 3700, D 3800, and C 5900, each of which is identical acoustically and mechanically to the hard-wired versions of those mics. The D 880 capsule comes from AKG's Emotion Series of microphones, and is a dynamic supercardioid capsule. The D 3700, part of the AKG Tri-Power Series, is a dynamic microphone capsule. The D 3800 capsule utilizes AKG's patented moving magnet system for handling noise compensation. The TPC-1 condenser capsule is used in the Tri-Power C 5900, which features an ultra-thin, gold-sputtered, double-stretched diaphragm. Each of these transducer elements can be

interchanged in the AKG WMS 60 wireless system. Prices are below \$500, depending on capsule choice. For more information, contact AKG Acoustics, 1449 Donelson Pike, Nashville, TN 37217. Tel: 615-399-2199. Circle EQ free lit. #110.

DAS RIGHT

DAS Audio's new PF Series incorporates the same transducer design found in the company's top-of-the-line Sound Touring Series. The line uses large 3-inch voice coils spun on high temperature Kapton formers. The PF-112 and PF-115 models use 250 W, 12-inch and 300 W, 15-inch low-frequency transducers, respectively. The PF-012 and PF-015 models offer the same specifications in an angled cabinet for floor use. The PF-215 utilizes a double 15-inch woofer cabinet with the M-5 driver and CD horn to handle 500 W of power in situations that require more output. The last component in the series, the SWB-15 subwoofer, incorporates a 5-inch driver to make it more transportable. The CT-1 active, stereo two-way crossover

network with mono-summed low-frequency output allows the systems to be used in either the full range or two-way active modes with discrete EQ for each mode of operation. All models will retail below \$600, except the PF-215, which will retail at \$800. For more details, contact DAS Audio, 1 Enterprise Dr., Old Lyme, CT 06371. Tel: 860-434-9190. Circle EQ free lit. #120.

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U.S. Patent No. 5,640,314 (other patents pending)

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World Radio History

CAPTURING THAT “LIVE FEEL”

OUTSPOKEN

SOUNDMAN BUFORD

JONES OFFERS

ADVICE ON RECORDING

BANDS LIVE

By JP
Armstrong



In 1970, Buford Jones took a job fixing power amps for a little audio company in Dallas called Showco.

Twenty-seven years later, his laptop occupies a central location on his ATI Paragon, atop the rarely used group-out EQ section, with a copy of his “Tour Stack” Hypercard-Mac program running. Aside from the MIDI-patch change tasks it fills during the show, the program he developed dutifully records daily information, venues, system used, and show length — and it prompts Buford for his assessment of the band’s performance, as well as his own.

His resume reads like a K-Tel superstar hits compilation, and he’s erased more board tapes than most of us will ever see. ZZTop, Three Dog Night, David Bowie, Jackson Browne, Linda Ronstadt, Pink Floyd, Faith Hill, Eric Clapton, and Travis Tritt have all sent him to man the FOH position (among others; actually it might be easier to list the acts he hasn’t mixed), and over the years he’s collected a few pointers for making every night count.

“In 1982,” he explains, “Jackson Browne came and stayed at my house for three days while we went over a year’s worth of show tapes. It was an unbelievable task.” He nods at the laptop. “Ever since then, I’ve kept really close track of that sort of stuff, so when somebody from the band comes to me and asks, ‘What’s a good show tape?’, I can break it down by set list, band performance, my performance, mix quality, or, of course, overall.”

He sits in front of the computer and says, “I designed this program to do all the

stuff I can’t, which is basically remembering everything for me. As soon as all the paperwork is in, I’d like to see if anyone else wants to use it.” Adding a smile, he says, “For a price, of course.”

With his gratuitous plug complete, we get down to business...

EQ: What sort of things affect the live recording process from the technical end — before the day of the show?

Jones: You need to know who the producer is and who the mixer is. In cases where it’s me, I’ll sort things the way I want it. If it’s a producer and they’re there, I’ll ask them how they’d like it, but they may not be as familiar with the instrumentation of the show or of how it should be laid out for mixdown.

There are so many different track formats these days. Ten years ago it was 2-inch, 24-track, and now you see a lot of the ADATs and the 8-track Sonys — multiple machine systems. Some of the high-end professional trucks are running 48-track Sonys or 32-track Mitsubishi’s. Knowing your track format is the first thing to deal with, but you don’t want the live recording to interfere with the show. The show is the show, and the tape should reflect that. **Do you ever see additional channels or other things for a recording that are not part of the usual show?**

Yes, often the recording engineer would like to have something different to put on

tape, and the signal just goes straight to the truck, so it doesn’t impact me or the show. Generally, I think miking techniques are pretty close — live you simply don’t have as many options as far as isolation and experimenting with different listening positions. With that many instruments going on at one time, it’s pretty much all close-proximity microphones. We can vary the microphone and get different effects. I find there’s less and less of that going on these days. Most engineers just try to stick with what the live show has been running.

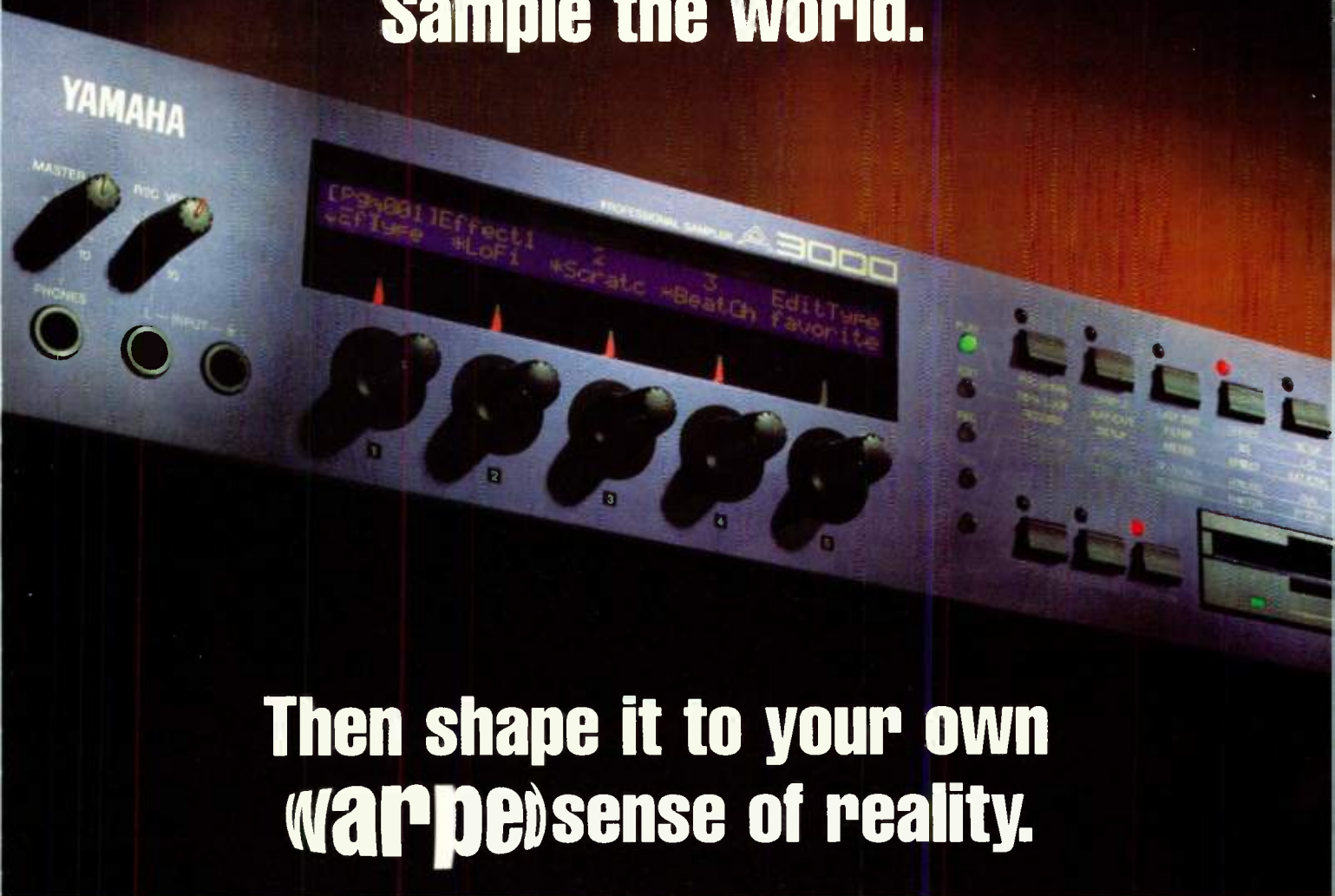
How do you deal with a truck mixer, like on a “live-to-air” or “2-track-to-tape” show, or how do you assure yourself they’re getting what you want?

Most mixers tend to go from the album if they have time. I think a show tape is a great place to start. You can pass on what you’ve learned about the show and the musicians. Any sort of cue sheet that you have, with solos or instrumentation on them, will help — unless you have a producer representing the artist’s music, or even the live engineer, who might do different versions of the song. Live shows are often different from the original recordings; breakdowns, audience participation, background vocals, and even cover tunes in a set need to be pointed out.

Do you ever mix in the truck, leaving the hall to an assistant for the night?

When I have that option, definitely yes, al-

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World Radio History



though most artists prefer that I stay out in the house for their own peace of mind. Many of these festivals, especially the Live-Aid and Farm-Aid and so-forth, can have huge listening audiences, and often the guy in the truck has only a CD and an input list to work from. Often the truck people will fit your inputs to their input list, especially if they're doing several bands in a day. What about compromising inputs or combining channels for guitars and so forth? The only thing I want to see combined are drum channels, and that's hard, too. I want to have all the flexibility when remixing a

live multitrack that I would have in the house. A certain amount of submixing is okay, so long as there's an even or "average" EQ so I can do what I'd like to them later. I don't mind a little compression either, say maybe 8:1, no more than 3 dB of compression, just to keep the peaks out. Besides that, I'd prefer to save all the effects until the mixdown. What about audience microphones? I like to see audience mics way above the stage, over the front truss or something, so they don't get any sort of localized noise, where they're in time with the stage and the PA. Otherwise they can't be brought in

at any significant level without the time lag being apparent. I use them pretty sparingly, too. I hear many live recordings where it seems like they might have been trying to re-create the fact that there were 80,000 people in a stadium. When I'm listening as an average listener, I'd rather hear the quality of the recording. Anything else? The hardest part is tracking. When the tape goes down it is so hard to try to change that feeling without a lot of overdubbing, and once we've done that, I feel we've taken the energy out. It's great if you can get live tracks down and not have to doctor it too much.

There is another angle to this subject. I firmly believe that it is possible to mix a live album directly to 2-track. Not everybody agrees with that, especially live engineers. The trick is isolation. I have had a couple of opportunities to mix the FOH in isolation. It's only a matter of voicing the PA in the main room and then voicing the control room, be it a dressing room or truck or what have you, to match the main room. If you can get them both flat, or at least to an equal response, one will translate to the other.

I don't think it works so well where you have a high SPL coming off the stage, like say a metal band, because we tend not to put those instruments as hot in the audience mix. Mixing in isolation provides more definition in what is happening in the room. It allows me to make adjustments without guesswork. Of course, you'll need someone in the house with a third-octave EQ to make adjustments in the system that crop up during the show, like overall volume and maybe a little EQ here and there. So should we be looking for a 2-track live album with your name among the credits?

No, not yet, but I believe that it is a solid, cost-effective alternative to hiring out a big truck and crew and all the what-not that comes with it. A nice truck and all can run you over \$10,000 a night. Not much room for error when the tour guarantee is barely twice that. It's so easy to have a bad night or broken string in a solo. You give a good engineer a chance and 60 or 70 shows, and you'll get a good tape, and you'll get a mix that captures that "live feel" that artists are looking for in a live album.

JP Armstrong is a live-monitor specialist, a part-time musician, and a generally dangerous individual. Send e-mail to jparmstrong@mind-spring.com.

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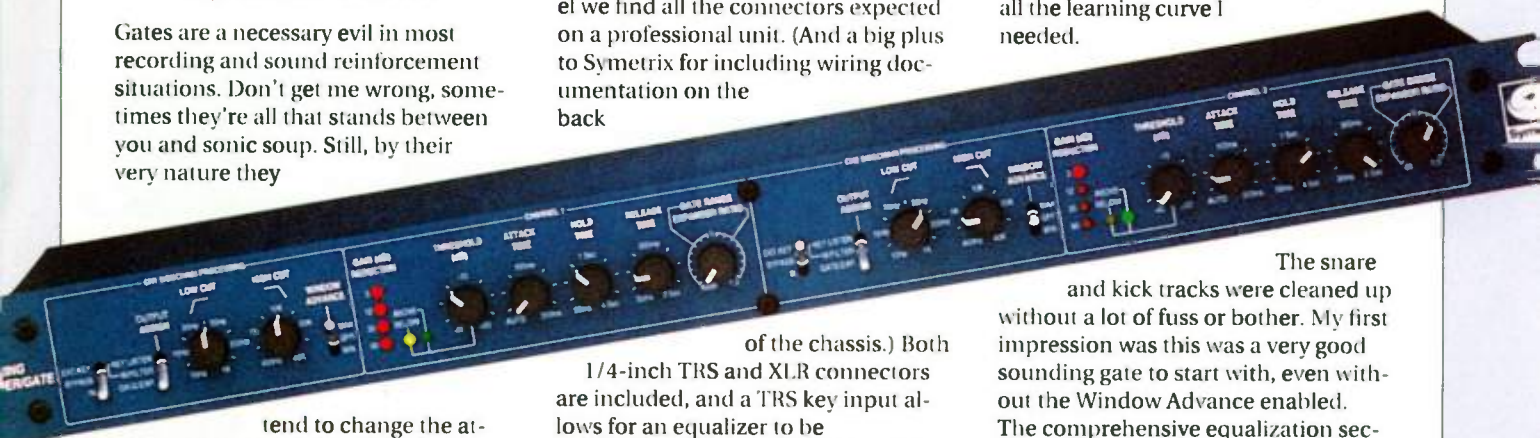
SYMETRIX 562 WINDOWING EXPANDER/GATE

By **MIKE SOKOL**

Gates are a necessary evil in most recording and sound reinforcement situations. Don't get me wrong, sometimes they're all that stands between you and sonic soup. Still, by their very nature they

First, the basics: On the back panel we find all the connectors expected on a professional unit. (And a big plus to Symetrix for including wiring documentation on the back

time. A few minutes of tweaking were all the learning curve I needed.



tend to change the attack and decay characteristics of a musical instrument or voice. What we really want is a way to trigger the gate "on" a few milliseconds before the desired sound starts. In a studio playing back a tape you can accomplish this by providing a trigger signal from an earlier tape monitor patch, usually from the record head in a three-head tape deck. But in a live music situation there's no way you can know in advance when you want a gate to open. Being able to predict that would either require rewriting the laws of physics or having a powerful enough computer algorithm that could "learn" the song and its beat pattern in real-time and then open the gate just before the beat. But even that would get fooled when the tempo changed rapidly.

So when Symetrix sent me its 562E Windowing Expander/Gate. I was more than a little skeptical. The 562E's manual states: "It [Window Advance] virtually creates the impossible: a gate that opens just ahead of the audio signal. It creates this impression by moving the statistical energy center of the gated signal forward in time." Brave words, indeed. This was either a true advance in signal processing, or a bunch of advertising hype. I love these challenges. So I e-mailed the engineering group at Symetrix some design questions, and then patched the unit into my ADAT-equipped studio for a mixdown session.

of the chassis.) Both 1/4-inch TRS and XLR connectors are included, and a TRS key input allows for an equalizer to be sidechained for better gate discrimination. When properly adjusted, it allows the gate to ignore the sound of a nearby kick drum and only listen for the crack of the snare to trigger on. The front panel includes both high-pass and low-pass sweepable filters for the discriminator circuit. A Monitor switch is included with a "key listen" position that allows you to listen to the effect of both the built-in filters and sidechain equalization while adjusting the unit... a very nice feature.

I loaded in an ADAT tape of a jazz-rock recording I did about a year ago that had a standard drum kit with traditionally miked kick and snare tracks. The kick track was very isolated since it used an RE20 mic inside the drum, but the snare track used a top-placed SM57 that picked up too much of the hi-hat and toms. Since the 562E is a stereo unit, I could process the two tracks independently at the same

The snare and kick tracks were cleaned up without a lot of fuss or bother. My first impression was this was a very good sounding gate to start with, even without the Window Advance enabled. The comprehensive equalization section for the detector made setting up the gating action pretty painless, and I could have patched in an external equalizer if needed. Also included were front-panel controls for Attack, Hold, and Release times, as well as Expander-Ratio/Gate-Range and Threshold adjustments. An LED gives you a visual indication of the gating action, which really simplifies the setup procedure. I also tried it on vocal tracks, both singing and narration,

ROAD TEST

MANUFACTURER: Symetrix, Inc., 14926 35th Avenue West, Lynnwood, WA 98037. Tel: 425-787-3222. Web: www.symetrixaudio.com

APPLICATION: Stereo expander/gate for live and studio applications to improve track isolation.

SUMMARY: Professional level gate with both XLR and phono connections. Fully adjustable for Attack, Hold, and Release times, as well as expansion-ratio/gate range. Sidechain path included.

STRENGTHS: Window Advance processing allows for tighter sounding trigger on live material without hunting and popping artifacts; unprocessed material is virtually transparent.

WEAKNESSES: None.

PRICE: \$579

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and was impressed with the amount of room-tone I could get rid of without affecting the attack and decays of the vocals. This is a great unit for cleaning up background noise.

Being more than a little curious about the advance windowing feature, I engaged the switch and listened carefully. There seemed to be little difference on the kick track, probably be-

cause it didn't have a steep attack to begin with. On the other hand, the attack of the snare seemed to tighten up, and there was subtle "fattening" of the sound. It did *sound* like the gate opened up a little sooner, but my test rig said it really didn't. After scratching my head a little, I received e-mail back from Symetrix detailing how it works. (See the sidebar for a technical review

of how they accomplish this.)

The Symetrix 562E is an excellent sounding gate with easy-to-use but comprehensive controls. It would be at home both in the studio and on the road. The "Window Advance" feature is a pretty subtle effect on live material, but would probably be very useful in the studio with challenging percussive material. It's a useful addition to an already solid piece of gear. **EQ**

WHAT'S IN A NAME?

The first thing I did upon receiving the Symetrix 562E for review was read the literature. What caught my eye was a reference to the Window Advance feature. As mentioned in the review, the manual states: "It [Window Advance] virtually creates the impossible: a gate that opens just ahead of the audio signal. It creates this impression by moving the statistical energy center of the gated signal forward in time." Now, this sounded impossible on paper, so I set up a little test where I sent a square-wave pulse signal through two separate paths and captured them into a stereo sound file. One path went through the 562E and the other was a hard-wired pass-through. This would allow me to directly deduce timing and phase relationships between the original and gated signals.

There didn't seem to be a real delay in the audio signal. It appeared to be a phase shift of some kind. E-mail from the

technical department at Symetrix confirmed my suspicions. To quote them: "The Window Advance feature subtly delays the signal energy by linearly dispersing phase as a function of frequency. The linearity of the phase dispersal is key, because that's what prevents discontinuities in the gated signal." To translate, by applying a careful phase shift to the audio signal before it gets to the gate, it's possible for the gate to open on the first part of the signal without producing a popping noise, which is a common problem to most gates. The phase shift really doesn't hurt the tone of the sound; in fact, it's probably what I heard as a slight "fattening" of the snare sound.

Window Advance seems to be an innovative way of making a gate appear to open sooner by essentially delaying the wavefront of the signal with a phase shift so it can get the gate open in time. It's a pretty cool technique. —Mike Sokol

HEADPHONE MIX BREAKTHROUGH

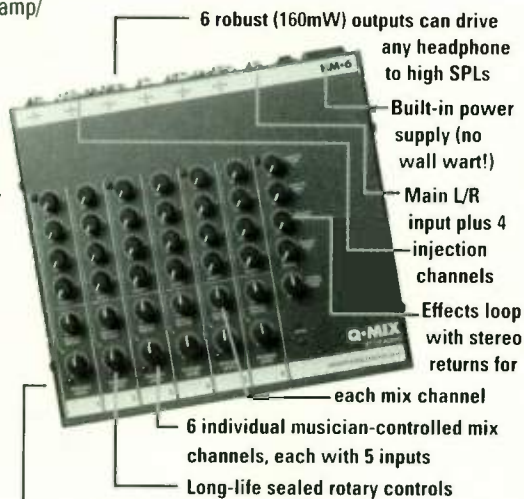
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World Radio History

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World Radio History

Akai MPC2000 *MIDI Production Center*



If painless sampling
and editing is
what you're looking
for, your search
is over

BY CRAIG ANDERTON

Akai has pretty much dominated the "groove box" market, where drum machine, sequencer, and sampler all meet in one device with an optimized user interface. Not a keyboard, not a computer, the MPC2000 is designed to lay down grooves — fast — using 16 oversized pads and lots of dedicated buttons. Four banks of sounds let you access 64 sounds total, memory permitting (nor are you limited to just drums).

Since time is of the essence, these boxes have to strike a balance between feature set and ease of use, which is al-

ways a tough fence to straddle. Let's see how the MPC2000 stacks up.

THE BASICS

The MPC2000 is no slimmed-down box. It uses the Akai S2000 sampler's 32-voice/44.1 kHz/16-bit stereo sampling engine, can expand memory from the stock 2 MB to 32 MB, and features a high-density floppy drive, SCSI interface, 248 X 60 backlit LCD, pressure/velocity sensing pads, two independent MIDI outs for 32 channels, and an ingenious "beat loop" function that makes it easy to sync rhythm loops. I particularly like the real-time fader control for any one pad that controls pitch, attack, decay, or 12 dB/octave resonant filter (however, you can record the real-time control movements for as many pads as desired by doing overdubs). Expansion options include the IB-M20T SMPTE reader/generator, more outputs (from 2 to 10 outs, plus S/PDIF, with the IB-208P board), FMC01 8 MB Flash ROM board, and the EB16 4-bus effects board. Goodies include a head-

IB-208P board), FMC01 8 MB Flash ROM board, and the EB16 4-bus effects board. Goodies include a head-

EQ LAB REPORT

MANUFACTURER: Akai, 4710 Mercantile Dr., Ft. Worth, TX 76137. Tel: 817-831-9203. Web: www.akai.com/akaipro.

APPLICATION: Create grooves rapidly, using sequencing and sampled sounds.

SUMMARY: More than an overgrown drum machine, the MPC2000 is a compositional tool for those who don't want to mess with a lot of gear.

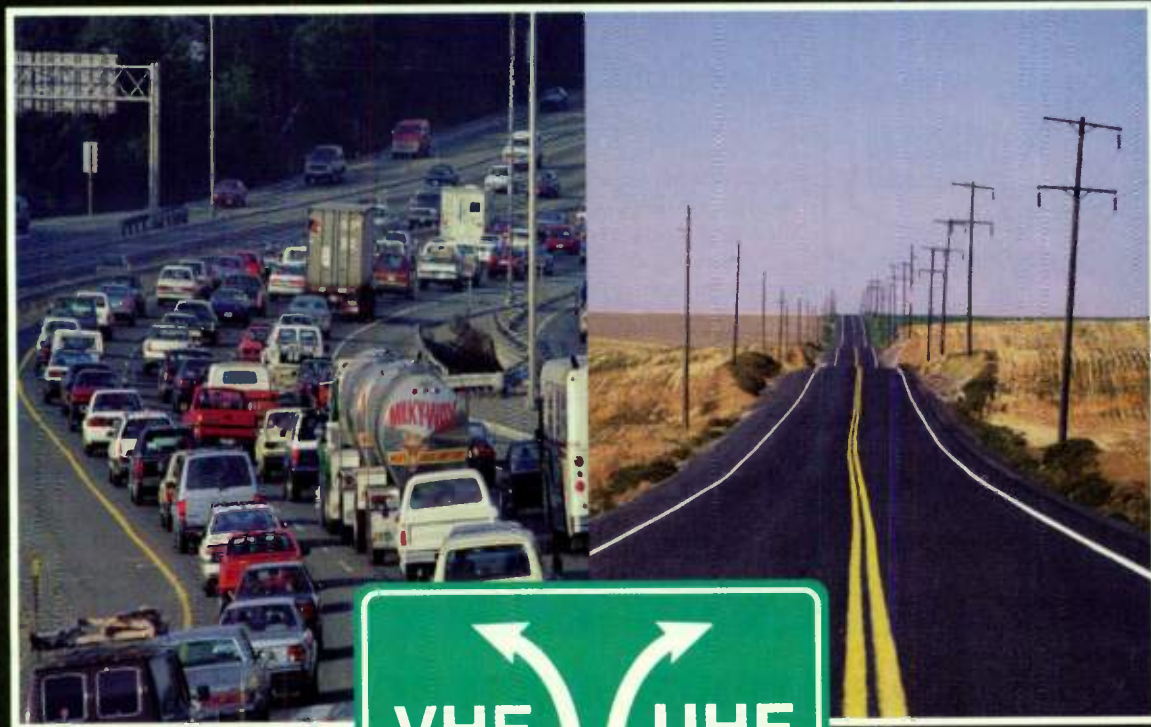
STRENGTHS: Highly expandable; compatible with many sample formats; built-in SCSI port; backlit display with graphic waveform editing; lots of dedicated buttons; programmable slider for real-time expression; easy tempo changes; fast, simple interface; tap tempo available.

WEAKNESSES: No SMDI support or "groove quantize" options; without the Flash ROM option, sounds must be reloaded after powering down; supplied with only three sound disks; no per-track looping, only global.

PRICE: MPC2000, \$1499; MPC2000 Studio (adds extra analog/S/PDIF outputs and SMPTE), \$2099; MPC2000 Studio Plus (adds effects processor to Studio model), \$2499.

EQ FREE LIT. #: 123

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SEE US AT NAMM BOOTH #515

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Granted, groove boxes serve a fairly specialized market, but for many musicians, this level of integration and ease of use means love at first sight (or touch, as the case may be). If you're shopping around for a new drum machine or module, take a detour and spend some time with the MPC2000. You just might find that it's what you really needed all along.

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phone output, stereo record input, and two merged MIDI inputs.

Regarding the interface, most functions have dedicated buttons, although the keypad functions are labeled with tiny type on a dark background, so you better have good lighting. My favorite

VERSION 1.5

Version 1.31 added support for the SMPTE, Flash ROM, and effects boards, as well as mix automation, automatic timecode detection, and support for hard disks greater than 1 GB. Version 1.50 (downloadable for free from

Great River MP-2 Mic Preamp

You have plenty to gain by using this mic pre

BY EDDIE CILETTI

Looking for a quiet microphone preamp? At \$1200, the dual-channel Great River MP-2 is an affordable sonic contender that delivers the best noise specs of any preamp I've tested.

uum tube guitar amp. In a very general sense, the Great River MP-2 has sonically more in common with preamps by John Hardy or API.

The Woodchippers, a four-piece rock and blues ensemble, squeezed themselves into a 10- by 15-foot rehearsal space where I symmetrically rearranged them as shown in fig. 1. The stereo mic, a Neumann RSM 191, was

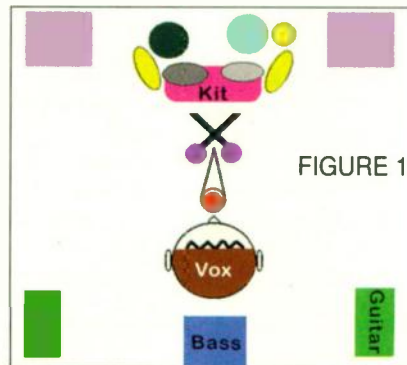


FIGURE 1

pretty much within the mix — not eat-the-mic intimate, but not disembodied.

The microphone has a built-in 10-dB pad, which was necessary in this situation. Even so, enough level was delivered so that the MP-2's

gain control "lived" at the 30-dB setting (8:30 rotational position) without its 15-dB pad (on the MP-2) and at 46 dB (1:30) with the 15-dB pad engaged. Either way, the sonic character remained intact.

Admittedly, an "amplified" ensemble might not have been an acid test for the MP-2, but the experiment yielded useable results nonetheless. The diverse assortment of simultaneous sound sources came together when the band was on the money. Both the mic and the MP-2 met the challenge with gobs of gain and headroom to spare. Another plus, the rotary

continued on page 147



Assuming you've got a suitably quiet place to record, you will find that this preamp can deliver a useable 64 dB of gain, enough to capture the most delicate pianissimo.

At the front end is a Jensen transformer (an output transformer is optional) plus a quarter-inch high-impedance instrument input for added versatility. The circuitry is all discrete. There are no ICs or custom chips. The MP-2 is one rack space high with a gold-plated rotary Gain switch plus Pad, Polarity, and Phantom switches. A four-channel version is also available.

"Neutral" best describes the sonic character of the MP-2. It's clear, clean, and open at the top and completely solid at the bottom. Its modern Class A circuitry provides a symmetrical signal all the way to clipping. In this way it differs greatly from vintage Neve (1066/1073) preamps, which, when overdriven, will asymmetrically distort like an old vac-

placed about foot behind the lead vocalist's PA mic. The MP-2 fed a Sony PCM-R500 DAT recorder via Crane Song's HEDD (see review on page 124), a 20-bit digital converter.

The band was sensitive enough to play to the small room rather than attempt arena levels. The mic/preamp combo delivered a punchy sound from the drums, aided by players who tastefully coaxed the cymbals rather than initiate another El Niño. Not bad for "distant" placement — the drums were actually *behind* the mic! The vocal sat

EQ LAB REPORT

MANUFACTURER: Great River Electronics, 3056 East 65th Street, Inver Grove Heights, MN 55076. Tel: 612-455-1846.

APPLICATION: Dual-channel microphone preamplifier.

SUMMARY: Discrete Class A "solid state" circuitry with Jensen input transformers.

STRENGTHS: Extremely low noise; the rotary gain switch provides precision level adjustment in 2-dB steps; all critical contacts are gold-plated; components are hand-selected.

WEAKNESSES: None.

PRICE: \$1200, 2-channel; \$1900, 4-channel. Add \$150 per channel for Jensen output transformers.

EQ FREE LIT. #: 129

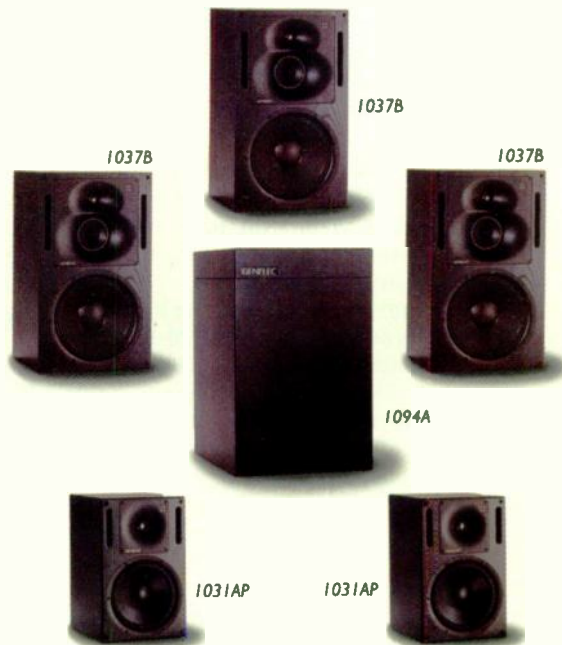


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CIRCLE 237 ON FREE INFO CARD

Apogee AD-8000 *Digital Converter*

Apogee-quality converters in an affordable package

BY DAVID FRANGIONI

The release of Apogee's AD-8000 has triggered another true breakthrough in affordable digital recording for the masses. Why, you may ask? The answer is simple, yet very complex. As many EQ readers understand, digital recording can only be as good as the converters used in translating

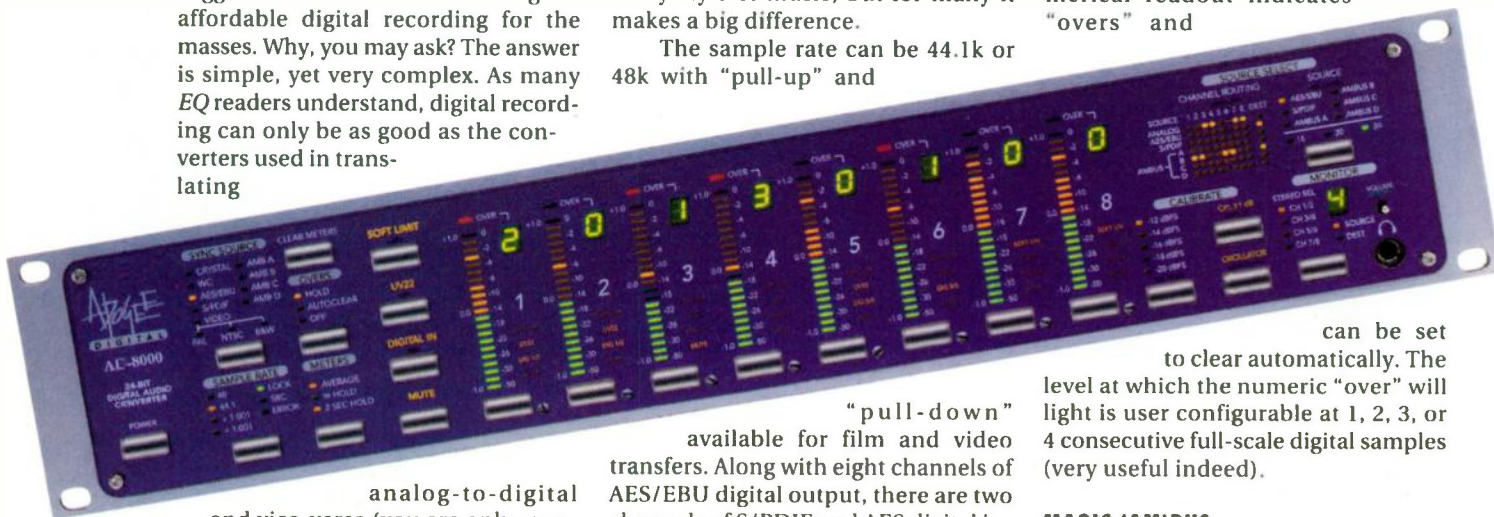
TODAY'S FEATURES, YESTERDAY'S PRICE

The AD-8000 comes standard with eight channels of 24-bit A/D conversion in the form of balanced, XLR-F connectors. The incoming analog signal can be processed with Apogee's acclaimed UV22, as well as with "Soft Limit." This is a familiar sound to previous Apogee users. It really pushes the air of the sound, creating a very "punchy" sound field. It's not for every style of music, but for many it makes a big difference.

The sample rate can be 44.1k or 48k with "pull-up" and

be used with an optional 24-bit 2-channel or 8-channel D/A. This is a great addition to any studio that wants to do (or is doing) mastering. Instant sonic enhancement with world-class A/D, D/A, and digital throughput in one box!

The metering on this unit is very comprehensive, offering eight bargraph meters with simultaneous average and peak readings. A one-digit numerical readout indicates "overs" and



analog-to-digital and vice-versa (you are only monitoring your digital tracks within the accuracy of the digital-to-analog converters as well). Not only are good converters hard to come by, they are expensive. Until now...

Previously, some of the best converters available were the 20-Bit pairing of the Apogee AD-1000 and DA-1000. These were 2-channel units capable of many trick features, but primarily offering high-quality conversion available for *any* digital source. The cost of the pair was over \$6000 for two channels. At a retail price of only \$5995 for eight channels, the AD-8000 is the answer to most professional demands in the ever-expanding digital world. Considering that many of you are using the ADAT and/or DA-88 format, I concentrated my efforts on this aspect of the AD-8000. This unit can do so much that it would take an entire volume to document every feature that it possesses (or will possess).

can be set to clear automatically. The level at which the numeric "over" will light is user configurable at 1, 2, 3, or 4 consecutive full-scale digital samples (very useful indeed).

"pull-down" available for film and video transfers. Along with eight channels of AES/EBU digital output, there are two channels of S/PDIF and AES digital input and two channels of S/PDIF output. Why two channels of digital input? There are two main reasons that I can think of: The digital input can be processed with the UV22 and can also

MAGIC (AM)BUS

One more very important feature of the AD-8000 is its expandability. This level of design engineering and user upgradability is rarely, if ever, seen in the world of digital recording. We

EQ LAB REPORT

MANUFACTURER: Apogee Electronics Corporation, 3145 Donald Douglas Loop South, Santa Monica, CA 90405. Tel: 310-915-1000. Web: <http://www.apogeedigital.com/>.

APPLICATIONS: Digital converter for the project studio.

SUMMARY: Eight channels of high-quality conversion for a price comparable to Apogee's high-end 2-channel converters.

STRENGTH: Works like a dream.

WEAKNESSES: Noise floor with all eight channels of analog input open is good — not great; headphone output doesn't sound as good as main outputs.

PRICE: AD-8000, \$5995; AMBus interface cards, \$495; 2-channel D/A card, \$495; 8-channel D/A card, \$1295 (price goes to \$1595 1/31/98).

EQ FREE LIT. #: 124

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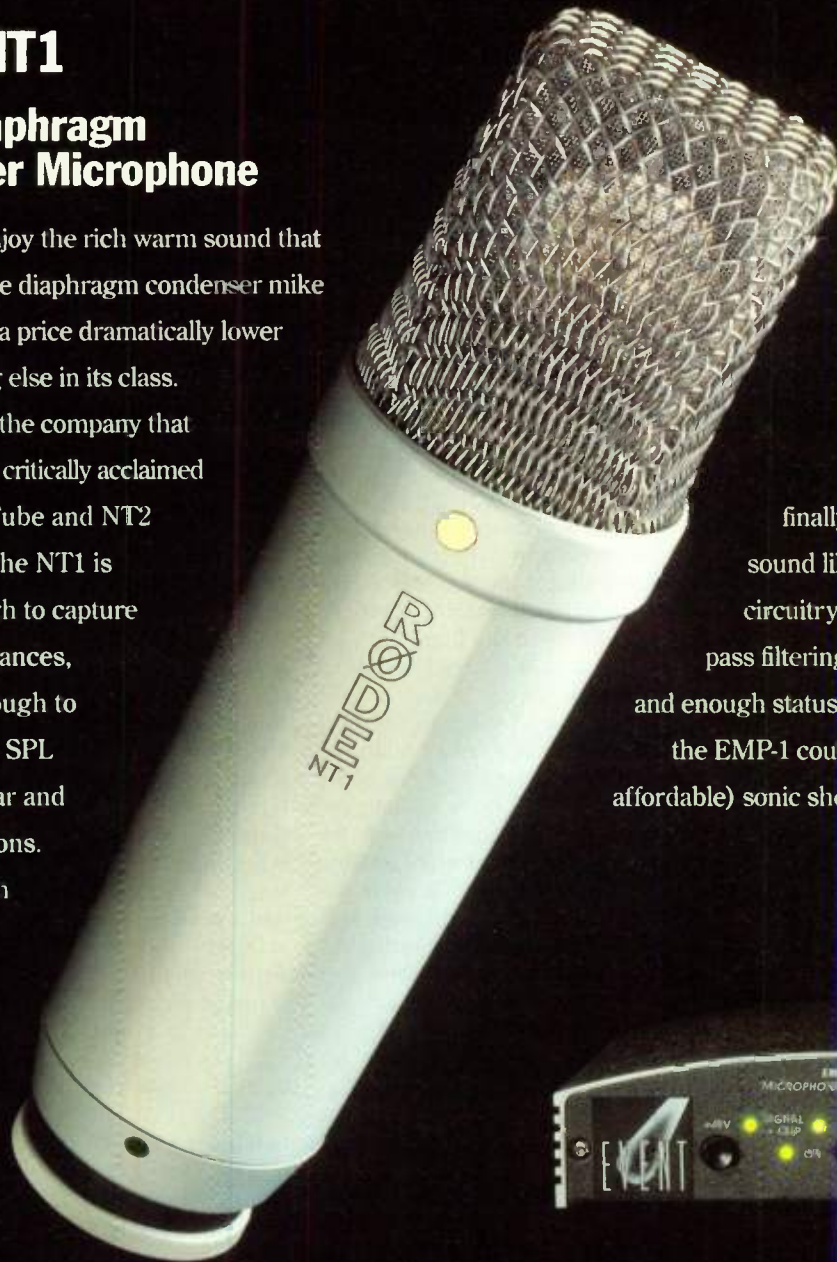
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Nady's rugged, all metal HT-1 transmitter (shown actual size)

CIRCLE 89 ON FREE INFO CARD

take it for granted that our computers will be just as useful tomorrow as they are today, provided that we're willing to invest in processor upgrades and the like. This is exactly the type of "upgrade when you need it" philosophy that Apogee has incorporated. The AD-8000 uses a new technology called "AMBus," which stands for Apogee Multimedia Bus. The AD-8000 has four AMBus slots on the back, which can house any of the optional AMBus cards — now and in the future. As formats change, so will the AD-8000. This is virtually limitless (within the current 24-bit architecture, of course) and should keep the AD-8000 from becoming obsolete any time this decade.

Apogee currently offers three AMBus cards (with many more to follow). There is an ADAT optical card (which I tested) that offers Bit-Splitting. As most EQ readers know, Bit-Splitting allows a 16-bit, 8-track digital recorder to record either four tracks of 24-bit audio or six tracks of 20-bit audio recording. Thereby giving you fewer tracks, but much higher bit resolution. (This option was not implemented in the unit I tested, so I cannot comment on its sonic offerings. I have, though, used the Rane Paq-Rat Bit Splitting, and it's sonically better than 16-bit recording.)

There are also a TASCAM TDIF card (also with Bit-Splitting) and a really innovative Pro Tools card. The Pro Tools card allows the AD-8000 to actually replace an 888/24! This is possible by adding the Digidesign interface AMBus card for connection to the PT card in the Mac and the optional 8-channel AES digital input card. The result is the 888 you wish you always had. When you compare the cost of the new 24-bit 888 (or the original 16-bit for that matter) to the functionality and ease of use of an equally equipped AD-8000, it's a no-brainer. Especially considering that AMBus cards will retail for \$495.

HOW DOES IT SOUND?

My setup consisted of an ADAT XT, Pro Tools 3 (NuBus) w/888, Yamaha 02/R console, original Apogee AD500E (18-bit converter), Otari UFC-24 format converter, TASCAM DA-88, MOTU Digital Timepiece, Panasonic SV-3700, and TASCAM DA30 DAT machines connected through a digital patchbay custom wired with Monster Silver digital and Apogee Wyde Eye digital cable (an often overlooked but critical com-

ponent in the digital studio). All devices were slaved to a common word clock generated from the AD500E (by the way, the AD-8000 can slave to Word Clock, Video (PAL, NTSC, B&W), S/PDIF, or any of the inputs of an AMBus card). I always use a common Word Clock as the master so that any device can send to any other without the concern of which unit is providing a master clock.

It's fair to assume that project studio owners will want to use this unit as replacement for their stock converters. Most studios have at least one 8-track digital recorder, DAT machine, and possibly a CD-R and/or hard-disk system. It's amazing how many uses there are for great converters when you really think about it. My AD-8000 was tested with an ADAT AMBus card and a 2-channel D/A.

In extended listening tests, the comparison between the AD-8000 and "stock" converters was very obvious. On the ADAT, the Apogee greatly enhanced the nuances of recorded material, both analog and digital in source. For instance, I used a 2-track digital master of Jenna Drey, a songwriter for whom I recently finished a record. I was very familiar with the sound and performed a blindfold test to judge which was the original direct onto ADAT and which was converted with the Apogee. I could hear the difference every time. The AD-8000 made its biggest improvement in the soundstage imaging and warmth of the music. Tracks sounded much fuller and had a greater sense of presence. Phase accuracy was more clearly defined, with pinpoint imaging and a wide, warm presentation.

This is a marked step above any unit's stock converters. Even when compared to the DA-88, the original AD-500E, the (16-bit) 888, and various DAT machines, the AD-8000 was audibly better. One common scenario that comes to mind is that of an artist wanting to cut finished tracks in his/her project room. Until now, there was a substantial difference between tracks cut on a digital 8-track and those recorded on higher-end machines (Sony 3348, etc.). Well, your wish has come true. No need to worry of inferior sound due to average converters. The AD-8000 has changed the playing field of the project studio.

continued on page 146

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CIRCLE 12 ON FREE INFO CARD

Crane Song HEDD *Digital Audio Converter*

Do more than convert
your sound — warm it
up with HEDD

BY EDDIE CILETTI

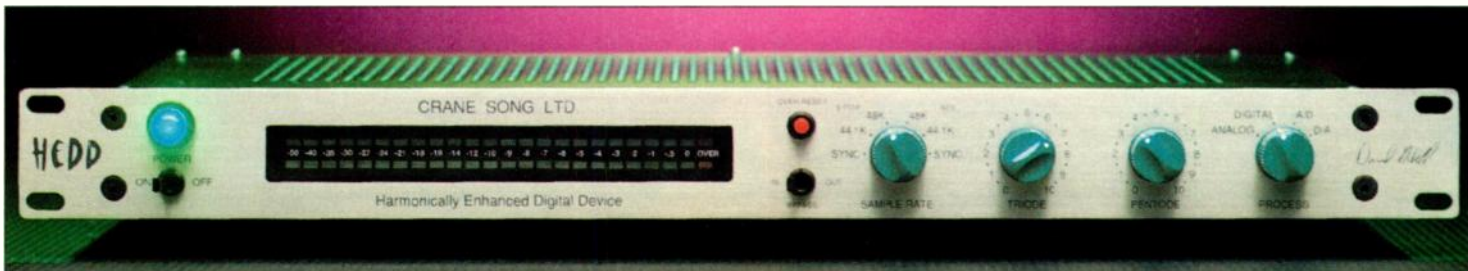
If you've been struggling with the "sound" of digital, Crane Song's HEDD

source material will dictate whether Triode (even harmonics) or Pentode (odd harmonics) will be appropriate.

I had been working on a 24-track mix of a song called "Wild Love," all within the environs of a Soundscape workstation. The track — which consisted of live drums, bass, guitar, mandolin, and triolian — was very dynamic. Soundscape's built-in mix bus compression and EQ helped contain the mix, but the song still wasn't quite

cat, and that was that! This is the type of control that should have an "eleventh" position.

I also used HEDD for a live stereo recording using the Neumann RSM 191 stereo microphone and the Great River Class A Mic Preamp (also reviewed in this issue). In between the preamp and the converter was the Crane Song STC-8 — a discrete Class A compressor/limiter — to smooth things out. HEDD fed a Sony PCM-R500 DAT deck.



(Harmonically Enhanced Digital Device) can coax magic from your tracks. HEDD starts out as a 20-bit digital audio converter with an upgrade path to 24 bits. But this product is much more than a bridge between the planets of Analog and Digital. This box has knobs that communicate with the sonic universe!

Classic compressor/limiters — such as the Neve 2254, the Teletronics LA-2A, and the UREI 1176 — have that certain *je ne sais quoi*. Merely passing a signal through them will add harmonic artifacts — a.k.a. distortion — often in a more desirable way than the intended dynamics processing alone. HEDD has that kind of magic power.

It should come as no surprise, then, that this is a distortion generator. Of the four green knobs on the front panel, the center pair is labeled "Triode" and "Pentode." There are no vacuum tubes, but inside is the heart and soul of designer David Hill, whose previous accomplishments include the blood and guts of the Summit product line.

The Pentode control seems to raise the gain and add warmth as it is turned clockwise. HEDD mixes in harmonics and ultimately squeezes 20 bits into 16 bits. Transients hit a virtual sonic airbag; there is no dithering or noise shaping at the other end. The

aggressive enough to live up to its title.

Digital gets the blame for not being exciting and sometimes even irritating, but that's what being L-I-N-E-A-R is all about. Our ears don't work that way...Analog tape and minimalist circuitry — tube or transistors — are all inherently nonlinear, like the ear. With "Wild Love," I needed to "center" the dynamics of the mix between the open spaces of the verses and the dense packaging of the choruses without losing control. It is hard to do this with compression alone.

HEDD to the rescue! Using mix bus compression ahead of HEDD gave it plenty of room for expression. I turned it up to "10" with complete success and, in doing so, the track got progressively more phat, I was happy as a

Again I found the Pentode control had the most dramatic and positive effect. It increased the apparent loudness, adding substantial warmth to the "mix" at mid-rotation (5) of the control. Further clockwise rotation — in this instance — yielded distortion artifacts that were not quite so complementary.

The Triode control yields a far more subtle effect that is only slightly more obvious when the Pentode control is also engaged. For example, I remember hearing it add warmth during the live session, but in my production room I was not able to find a suitable source to turn into sonic gold. The manual states this and encourages experimentation.

The documentation is personally informative. Since HEDD and its

EQ LAB REPORT

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

APPLICATION: Twenty-bit digital audio converter with a twist.

SUMMARY: XLR balanced analog inputs and outputs, AES and S/PDIF I/O, plus Word I/O.

STRENGTHS: Triode and Pentode controls add analog character.

WEAKNESSES: No Data integrity lights.

PRICE: \$2750 **EQ FREE LIT. #:** 125

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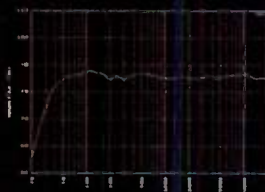
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CIRCLE 66 ON FREE INFO CARD

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WISH LIST

While reviewing both the Crane Song digital audio converter and the HHB CD recorder (see page 136), I noticed that certain boxes communicated with each other better than others did. While analog products will hum, buzz, and distort when unhappy, their digital cousins give no indication whatsoever of their relative unhappiness except for not output any audio. Perhaps at least two LEDs might be used to indicate Phase Lock and Valid Data. A third LED might indicate the presence of signal or be a warning that its character may be in question.

The Digits Of Digital

As you may know, our current 16-bit digital standard delivers 96 dB of dynamic range. Each bit extends the dynamic range 6 dB and a single bit being 2 to that power. For example, in a 2-bit system (that's 25 cents, I think), 2 to the 2nd power is four ($2 \times 2 = 4$). That means there would only be 12 dB of resolution from the "loudest" to the "softest" signal and only 4 steps with which to do it. There are 65,536 steps in a 16-bit system.

Using 18-, 20-, or 24-bit converters only increases the accuracy of the Least Significant Bit (LSB); bit 16 represents the noise floor. Signals that are at or below 96 dB will toggle the LSB on and off, generating distortion, albeit at a very low level. Dither adds low-level noise so that soft signals will disappear into the noise floor rather than get lost in absolute "darkness."

Noise shaping is used to shift the spectrum of the noise away from the range where the ear is most sensitive. Sony's Super Bit Mapping (SBM) and Apogee's UV-22 are examples of this technique. By using 20-bit converters, HEDD can grab the information below 96 dB and then let the "virtual tube emulator" do its soft-clipping thing.

operator's manual are made in the USA, there are no translation anomalies. The level display is so large and bright, you might be tempted to locate the unit in an easy-to-view location and use it as the primary metering system.

The AES and balanced analog I/O are on XLR connectors. S/PDIF I/O is on RCA connectors while Word Clock I/O uses BNCs. The HEDD process can be applied to any digital signal as well as during the internal A/D or D/A conversion.

There is one feature that I would like to see on all digital products. Just as some digital tape machines have an easily accessible error rate display, all digital products should also have Data Integrity indicators. It might help minimize HEDD-aches. (Can you believe I waited this long to turn the product name into a pun?) Check out the sidebar for more information.

For those who have reluctantly accepted the sound of digital in exchange for its editing and manipulation powers, there may no longer be any sonic trade-off. HEDD is a versatile product that has a very analog interface as well as a remarkable analog sound. **EQ**

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Motion Sound R3-147 Speaker Simulator



End your backaches while getting solid speaker emulation

BY CRAIG ANDERTON

The classic rotating speaker produces a complex collection of effects: as the horn and bottom speaker swirl around, you hear Doppler effects, delays, phase shift, filtering, and amplitude modulation. Then there's also the tube preamp circuitry, which is often slightly overloaded, so throw some distortion into the equation, too. Given all this, it's no wonder that all-electronic attempts to emulate rotating speakers usually fall just shy of the mark. As a result, musicians have been willing to drag around the traditional, heavy rotating speaker cabinet because nothing else sounds quite like it.

Until now, that is. The Motion Sound R3-147 puts an actual rotating horn into an acoustically isolated, 4U rack-mount package, miked with four separate mics. The lower speaker section is electronically emulated using analog techniques, but this part of the sound has always been less critical than the upper rotor. And the crucial preamp section uses a 12AX7 tube that you can overload for that classic "growling" sound. Overall, the effect is highly realistic.

The front panel has five main sections:

preamp, upper rotor, lower rotor, mics, and mixer. The preamp has both low-level and high-level mono 1/4-inch inputs (sorry, no stereo). The input impedance is 100k; I'd prefer something more like 220k to ensure there's no high-frequency dulling with passive guitar pickups, but 100k is acceptable.

There are controls for input gain, output level, and "contour" (a pre-tube, high-cut filter). An overload indicator indicates when distortion occurs, although some distortion can sound great. Finally, there's an effects loop whose send level is tied to the output level. You can bypass the tube preamp section by feeding your input directly to the loop return jack.

Upper rotor controls include fast speed, slow speed, acceleration rate (about 7 seconds maximum), and deceleration rate (about 5 seconds maximum).

Pressing a footswitch (included) toggles between the fast and slow settings, and can also stop the rotation completely. An LED flashes to indicate the current speed, and a Disable switch stops rotation.

The lower rotor has the same control complement as the upper rotor, but adds three controls to tailor the simulation: AM (periodic level change in mono mode and, in stereo, determines left/right mic separation); "FM" (which controls a fairly complex set of parameters), cabinet open/closed emulation; and a Stereo/Mono switch.

Each mic pair has an associated "Placement" control that varies continuously between "close" and "distant," and it really does make a difference. Finally, the mixer has controls for the left and right mic pairs that vary between the lower and upper rotors. For example, you could have all lower rotor sound in one channel and all upper rotor sound in the other, both in the middle, etc. The stereo outs are parallel XLR and 1/4-inch phone jacks.

Take off the top, and you'll see lots of sound-absorbing acoustical tile, foam rubber blocks for the mics, and a wire mesh screen to minimize wind noise caused by the speaker rotation. The degree of isolation isn't perfect — you can hear a little bleedthrough from the outside, and putting the box next to a really loud speaker can cause feedback — but Motion Sound claims 40 dB of isolation, and I believe it. There is, however, no noticeable bass bleed at all.

EQ LAB REPORT

MANUFACTURER: Motion Sound, 4426 S. 450 West, Suite G, Salt Lake City, UT 84123. Tel: 801-265-0917.

APPLICATION: Create rotating speaker effects with a portable, rack-mount package.

SUMMARY: It really works, and you will no longer need quantity discounts from your chiropractor because you carry around a huge cabinet.

STRENGTHS: Nails "that" sound; compact, compared to the real thing; lots of controls for tailoring the sound; tube preamp.

WEAKNESSES: Mono input only; 100k input impedance slightly low for guitar.

PRICE: \$1099 with dual footswitch pedal. Gas Pedal, \$149.

EQ FREE LIT. #: 126

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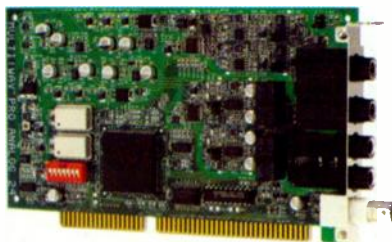
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CIRCLE 50 ON FREE INFO CARD

THE R3-147: A PLAYER'S VIEW

By David Bryan

The first thing that comes to mind when you're moving a Leslie cabinet is, "Who's gonna help me move this heavy piece of #@&." The Motion Sound R3-147, on the other hand, is unbelievable at four rack spaces. (And the four built-in mics make it even more convenient.)

I remember seeing the prototype at NAMM last year. The body was made out of Plexiglas so you could see the insides. All the parts were very well thought out, and extra heavy duty to take that road abuse.

When EQ sent me the unit, I first pulled out the manual and set the knobs to the starting position. Then I plugged the unit into my mixing board. Then I plugged my Hammond XB-2 into it and, last but not least, powered up the R3-147.

I played along to a song I was working on with the sequencer running. The R3 worked beautifully. The initial settings are pretty much the standard to go as a starting point. The amount of sound with the speakers off and just the R3 on will hardly interfere with recording live mics in the room (for those small studios). The pregain control gives you more than enough of that good distortion, and the contour control will certainly give you all the brightness you will ever need.

The effects loop is good if your organ doesn't have effects or if you're

continued on page 160

An optional "Gas Pedal" footpedal allows continuous speed control. It's also sort of a remote, as you can set the fast and slow speed trim at the pedal and switch between the R3-147 and another amp. You can also control the speed via MIDI, which duplicates the basic footswitch function using controllers 68 and 74.

The R3-147 is not cheap; there are a bunch of multieffects out there with rotating speaker algorithms that do a reasonably good job. But this box goes beyond "reasonably good" to really nail that famous rotating speaker sound, and it can do some useful variations on that theme as well. If you've been carting around a cabinet because the electronic boxes didn't do it for you, cart this sucker around instead. It delivers all the phat, with half the calories. **EQ**

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Audio RNC1773 Compressor

Compression at a near-unbelievable price-performance ratio

BY CRAIG ANDERTON



Does the world really need another compressor? After all, there are tube compressors, high-end compressors, digitally modeled compressors, optoisolator-based compressors, budget compressors, and, of course, air compressors. But human ingenuity applied to the pursuit of squeezing dynamics knows no bounds, and, surprisingly, this latest compressor actually manages to do something that other compressors don't — and for very little bucks.

The RNC1773 (RNC stands for "Really Nice Compressor") is a 1/3-rack-size minibox, but has a full complement of controls: Threshold (-40 to +20), Ratio (1:1 to 25:1), Attack (0.2 to 200 ms), Release (0.05 to 5 seconds), and Gain (-15 to +15 dB). The front panel also has eight LEDs to indicate gain reduction, a "Super Nice" button for entering an alternate compression mode (described later), and a Bypass button. Both buttons have associated status LEDs.

The back sports 1/4-inch phone jacks for the left and right inputs and outputs, a sidechain jack (tip/ring), and jack for the "wall wart" power sup-

ply output. Each input jack also has the output appear on the ring connection, so you can use a stereo cable to patch the RNC1773 into console insert jacks (cool!) as long as tip=send and ring=receive. However, you can also hook up regular mono cables for the inputs and outputs, just like standard devices. All inputs and outputs are unbalanced.

rienced with other low-cost compressors (especially on bass). With more rational settings, the sound quality and compression action is, in a word, superb.

In Super Nice mode, all the buttons turn into smiley faces. Just kidding! Amazingly enough, "super nice" is actually a pretty accurate technical description of the compression action. I took the unit apart to see what was happening, but one obviously crucial chip had its markings taken off to, well, prevent magazine reviewers from spilling the beans about what makes the compressor sound super nice (I could tell the board is well-constructed, though).

From what I gathered, this mode works by layering three compressors together to minimize artifacts (although not using multiband techniques), so the resulting action is very gentle. Super Nice is optimized for program material, but it also works well with individual signals that need to be compressed in as kind a manner as possible.

Interestingly, the controls still work in Super Nice mode, so you can tailor the sound. There is no "auto" mode, so the compression character-

The RNC1773 has two modes: "Normal" and "Super Nice." Normal mode acts functionally like a standard compressor, giving effects that range from "is-this-thing-really-compressing?" to major pumping and breathing. However, even with extreme settings the compression action is well behaved, with little or none of the popping and distortion sometimes expe-

EQ LAB REPORT

MANUFACTURER: FMR Audio, 5400 Brodie Lane, #1270-205, Austin, TX 78745. Tel: 800-343-9976. E-mail: eds10@flash.net.

APPLICATION: Add two different types of compression/limiting to program material or individual signals.

SUMMARY: It's hard to believe something at this price point can be this good, but it is.

STRENGTHS: Absurdly cost-effective; compact; includes TRS sidechain jack; "Super Nice" mode is extremely good with program material and voice; even with reasonable amounts of compression, somehow avoids screwing up attacks.

WEAKNESSES: No way to unlink channels for dual mono operation; single LED meter for both channels; unbalanced inputs only.

PRICE: \$200

EQ FREE LIT. #: 127

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The Electronic Project Recording & Sound Buyer's Guide

istics depend solely on the knob settings, not on the audio passing through it.

The RNC is a stereo compressor, with both sections permanently linked, although using it as a mono compressor works just fine. However, if you feed independent mono signals through the box, they will be linked and there will be some level "pulling." So, think of this box as a mono compressor or a stereo compressor, but not dual mono.

I tried the RNC1773 on drums, guitar, voice, bass, synth, and program material. For individual instruments, Normal mode seemed most appropriate when you want the instruments to "sound" compressed (however, I definitely preferred vocals with the Super Nice mode). The compression was smooth and controllable; no complaints there at all, and by properly abusing the controls, you could get some suitably overcompressed sounds. With drums, the attack grabs the signal immediately — no clicks, pops, or unwanted intruders, even with a pretty hefty amount of compression.

I've never heard any compressor

produce something like Super Nice mode, which was definitely the way to go with program material. The effect reminded me of what you get with something like a "loudness maximizing" software plug-in, but with a more analog character. With loud passages, switching between bypass and compressed made little difference, but with quieter sections, you could definitely hear the difference. It's almost as if someone "compressed" the program material by bringing up the faders a bit on the lower-level signals. It's that subtle, yet that effective.

It was hard to get really rude sounds with Super Nice mode (it figures), but if you want those giant sucking drum sounds of the '60s, you can always select Normal mode and set an insanely short release with lots of compression. Of course, as with any compressor, proper control settings are crucial to getting the right sound (especially the attack and release controls, as there's no auto mode that sets these for you).

About halfway through this review, I started to feel I was in some par-

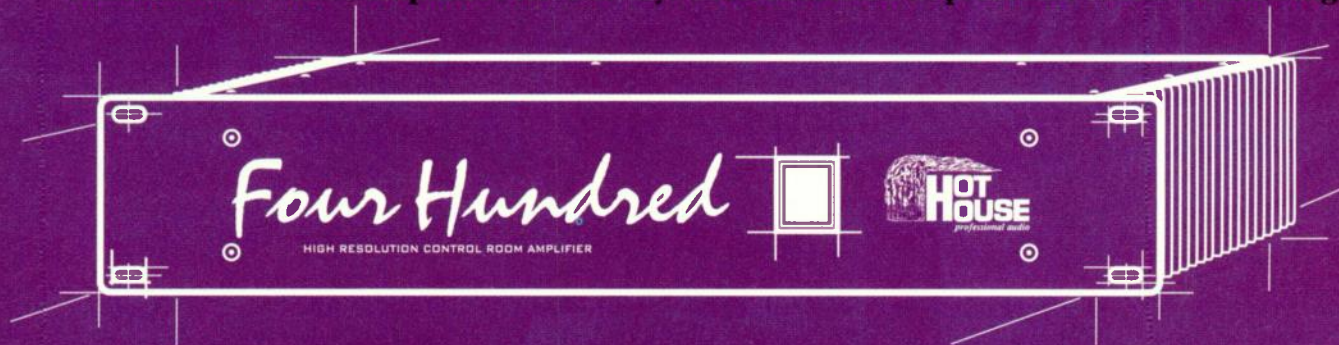
allel universe where compressors didn't have the problems we normally associate with budget models (and even with some high-end types). After a while, it became a challenge to try and come up with something the RNC1773 couldn't handle. I finally gave up when I was able to get 8 dB of compression with an 8:1 ratio on electronic drums, and not only did it sound huge, *it didn't screw up the attack*. And guitar...well, my axe just hummed along. Vocals? Instant smooth.

This compressor came as a major surprise to me. It is musical and controlled, without relying on tubes, optoisolators, or other "magic" components. As a result, there's also a clarity often missing with vintage compressors, which sometimes thicken the sound. And at this price you really can't go wrong. If the RNC1773 were a car, it would take corners at 120 mph, get 50 miles per gallon, and if you slammed into a wall, it would just bounce off harmlessly.

Bottom line: This box is awesome. Have a nice day!



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CIRCLE 02 ON FREE INFO CARD

HHB CDR-800 CD Recorder



All-in-one ease for CD writing

BY EDDIE CILETTI

Wow! This one word describes my enthusiasm for the HHB stand-alone CD recorder. "W-O-W" could even be an advertising acronym for "With-Out-Worry" or "With-Out-Wrestling." On the surface, it might appear that the *à la carte* approach to CD writing via computer is more affordable — it isn't — nor is it easier. Especially for the technology-shy, the CDR-800 is the way to quickly create your own audio CDs.

I literally had the laser burning its way into a blank CD within ten minutes of the unpacking ritual. I didn't quite intend to do so, but the Digital Synchro feature makes light work of record initialization and Track IDs (details in a moment). The CDR-800 has AES, S/PDIF, optical and analog inputs plus the intelligence to know what to expect from each port. There are also SPDIF, Optical and -10 dBV analog outputs.

Put in any CD. The CDR-800 analyzes the disc, knows if it's a blank, a work-in-progress or not. That's right, record one track or many, this box picks up where you left off. House-keeping chores are transparently han-

dled — keeping track of and incrementing Start IDs is completely automatic — unless, at user option, it is preferable to manually entering same. The unit does not have the ability to write indexes within a track.

The absence of a Table of Contents (TOC) makes a CD-R unreadable in a conventional player, but for the CDR-800, no TOC identifies a CD-R as a work-in-progress. Once all of the tracks are recorded, pressing the "Finalize" button (no relation to the TC signal processor) pops up TOC in the display. Pressing Pause initiates the TOC "countdown" which lasts about four minutes.

Even the sample rate doesn't matter because the CDR-800 has a built-in converter (bypassed when receiving a 44.1 kHz data stream). Almost any digital signal is welcome, from 32 kHz to 48 kHz, CD, DCC, DAT, DVD — even digital satellite broadcasts! The benefits of sample rate conversion are that any jitter in the source is "cleansed." However, while recording, the unit digitally outputs the "unconverted" signal.

I used an Aardvark D/A converter to monitor the CDR-800. While writing a CD from a 48 kHz DAT, the Aardvark did not or could not do its thing and so I monitored the burner via headphones. (It did not interfere with the CD burning process.) The same difficulty was observed when the signal in question was routed to a Sony PCM-R500 DAT deck. In contrast, no problem was encountered when the signal was routed to the Crane Song HEDD, a 20-bit converter with adjustable vacuum tube artifacts (also reviewed in this issue) or my own beloved Soundscape workstation.

From this experience I can not emphasize enough the importance of data integrity indicators on all digital products. Even with the help of the Z-Systems Detangler, the inconsistency of "communication" among the vari-

EQ LAB REPORT

MANUFACTURER: HHB Communications USA, 626 Santa Monica Boulevard, Suite 110, Santa Monica, CA 90401. Tel. 310-319-1111. Web: www.hhb.co.uk.

APPLICATION: Stand-alone CD recorder.

SUMMARY: As easy to use as any DAT deck, accepts all flavors — AES, S/PDIF, Optical, and Balanced and Unbalanced Analog. Outputs S/PDIF, Optical, and -10 dBV analog.

STRENGTHS: Built-in sample-rate converter; can write one track at a time until TOC is written; full-featured IR remote; hard-wired remote connector on rear panel.

WEAKNESSES: No Error Rate or Data Integrity Display.

PRICE: \$2195

EQ FREE LIT #: 128



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*1994 EQ reader survey

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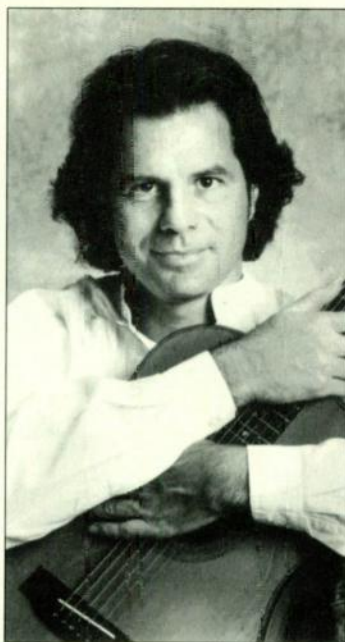
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Terry Wallman - Guitarist/Music Director,
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CIRCLE 23 ON FREE INFO CARD

ous boxes was a detour that I have yet to fully resolve. One resolution for the New Year is to get to the bottom of this issue.

HNB Communications is a British-based firm with offices in LA and Toronto. The CDR-800 is a Japanese product with an operator's manual that is well laid out, with good illustrations, though sometimes a bit circuitous in explanation. The warranty is one-year parts and labor.

All input choices are from the front panel. The only back panel option is a DIP Switch that sets the copy protection: off, none or one. In Digital Synchro mode, the CDR-800 uses CD and DAT Start IDs (from optical and SPDIF but not from AES) to switch from pause into record and also to increment Track numbers. In analog mode, the track numbers can be incremented automatically (the threshold is adjustable) or manually via front panel button. The full-featured infrared remote is supplied. There is also a rear-panel wired remote port.

Via Z-systems Detangler, I routed the optical output from a Technics CD player into the optical input of the CD Recorder. As mentioned, my first CD track was accidentally initiated. I had pressed the Digital Synchro button and then started the source CD player just to make sure the connection was good. Oops! The CDR-800 went right into record as soon as it saw information from the player. I was startled at the simplicity and thrilled to have Track IDs precisely transferred from the source.

In addition to the obvious, I can think of several other really good excuses to own a stand-alone CD Recorder. Digital workstations have improved the more mechanical tasks of mastering, such as editing and cross-fades. All potential idiosyncrasies aside, however, a computer burning a CD becomes a dedicated piece of hardware for the duration of that process. Once created, however, you can put the master CD into a player and let the CDR-800 free your workstation from the drudgery of dupe duty.

Are you on the fence about buying an analog cassette deck? With the street price of blank CD-Rs hovering between two and four dollars, buy a CDR-800 instead and know your clients are taking home a better representation of your facility's capabilities. Need a second DAT deck? A CDR-800 would increase your options while also providing a means to make digital backups.

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A Trip In L.A.



PHOTO BY STEVE JENNINGS

Sitting in on a talk about the rights of songwriters on the Web

BY JON LUINI
& ALLEN WHITMAN

"Los Angeles...he walks again by night." —
The Firesign Theatre

In a pink meeting room in North Hollywood, the FezGuys sit on the floor in front of members of the Society of Composers and Lyricists (SCL), providing balance. Balance to the relaxed and informal chat of a highly placed record company executive. Balance to a dense monologue by the director of legal affairs for a huge publishing rights organization. Balance to the confident amiability of a senior lawyer in music publishing. Balance to the men who stand while they speak. We sit because everybody else is sitting.

In the past, we FezGuys have focused on addressing the concerns of independent musicians in the popular music world. It's evident that, in our emerging online world, composers for TV and movies are applying the sometimes awkward lessons learned by pop music groups and their labels. But the environment is different from that of a band.

The members of the SCL don't necessarily need the services of a record label. They're well-versed in the art of being independent contractors. When members negotiate a contract, it's not necessary to start with an explanation of the usefulness of the Web. They know. They have e-mail addresses and Web access. Most have Web sites. Most of the members own the publishing rights to most of their music. They're established artists within an industry that's ready to acknowledge the value of the Internet. And they benefit from the work of large publishing rights organizations that clear the path to online commerce. It's an exciting time for this group. This column is about and for these people, but the information is relevant to all.

Music for movies and television represents 20 to 40 percent of total publishing revenue (depending on who you ask). These composers were gathered in front of us and other speakers to learn more about the opportunities the Internet provides. Some wanted to know how their rights are being protected. Others simply wanted to be better informed about payment through online distribution. Everybody wanted to know how to get more work.

Providing music for television and movies is a highly evolved and very competitive market. Composers are, more often than not, offered contracts that do not include any rights to publishing. It's a one-time fee, take it or leave it. Many composers take it, but they're not happy about the status quo. How can this unique community of established musicians benefit from the Internet?

CASE HISTORIES

Roger Bellon composes music for the *Highlander* television show. He hired a Web master to create a comprehensive Web site about himself and his work, therefore marketing and retailing in one succinct package. He owns and manages his own publishing. An associate supervises manufacturing and distribution. People surfing for info about the *Highlander* series are directed to his site by search engines. In a text statement at his site, Mr. Bellon offers that taping the music from a television broadcast may be "free," but the sound is inferior to a CD of the material available by mail-order. He has sold somewhere in the neighborhood of 10,000 albums and, due to thousands of requests, has just released a follow-up second volume.

A word about piracy paranoia here: Many independent musicians know from ex-

perience that unauthorized distribution can actually assist in the marketing of their product. This free, word-of-mouth advertising always leads new fans back to you, the source. People who like your music want your music. If you provide access to your material, listeners will buy it from you. Be easy to find and simple to deal with. The rule of thumb concerning the protection of intellectual property rights is: Protect yourself from copyright infringement by being the most accessible example of your musical catalog. That way fans will think of you first.

Back to Mr. Bellon...His site has a variety of soundclips. These samples are delivered using HTTP buffering so as to avoid lofty streaming server costs (which might result in driving the price up for CDs available from the site). There is biographical information and lots of interesting tidbits about his work on the show, all delivered in a distinctly non-corporate setting. Cue sheets and relevant links are included. Mr. Bellon invites e-mail; he clearly wants to know who his fans are. The CDs (cassettes are available, too) are offered at \$13.98, and he doesn't accept credit cards.

Alf Clausen composes and arranges the music for *The Simpsons* television series. He has a smart-looking Web site that features a complete discography and credits list. He doesn't sell any physical product from the site, but merely scanning the list will likely di-

THINGS THAT ARE NEW AND RELATED

Related Links:

National Music Publishers' Association (and The Harry Fox Agency):

www.nmpa.org

ASCAP: www.ascap.com

Society of Composers and Lyricists:

www.filmscore.org

Roger Bellon's Bellchant Music:

www.bellchant.com

Alf Clausen: www.alfclausen.com

Things That Are New

Apple Computers announced a profit!

rect fans to other material which, if he is the copyright holder, will benefit him through increased retail sales in the traditional way. Where else can a rabid fan find out that Mr. Clausen orchestrated music for the movie *The Beastmaster*? The site is an excellent re-



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CIRCLE 09 ON FREE INFO CARD

World Radio History

source for people who appreciate his work.

Jay Chattaway, the composer for the television series *Star Trek: The Next Generation*, related the story of an unauthorized posting of a complete song from the show that received over two million hits. Though obviously illegal, the posting prompted his publishers to actually print sheet music for the piece. The Internet made it rather obvious that there was a market for this material. Mr. Chattaway's and his publishers revenue is thereby increased.

The point is made again: be the loudest

voice of your song. Fans prefer to get the music from you. They will pay you money to do this. The Internet makes the exchange pretty straightforward.

VARIOUS AND SUNDRY

During the course of the panel discussion it was learned that publishing rights organizations intend to audit ISPs like Compuserve with the same fervor usually reserved for major labels. But the intention seems not to be about clamping down on the transfer of music. It appears the attitude "if you can't beat

'em, join 'em" has caused the giant rights organizations to request a dialog with Webmasters about how a solution can be realized that is fair to all. We've been harsh critics of these self-described "collection societies" in the past, and it's gratifying to hear them (at least) say they don't want to squash growth. The publishing organizations are willing to listen to the rank-and-file (that's us!) about Internet use and abuse. These organizations recognize that only by having the "willing cooperation" of Webmasters using a "nonproprietary method" of tracking music can any kind of standard for online audio commerce be successful.

One practical way to make your voice heard is to negotiate your contracts with an eye to Internet distribution and promotion. It's interesting to note that mechanical royalties are currently set by the U.S. government at 6.95 cents per song. Synchronization rates (the price paid when setting a piece of music to a visual medium), however, are not set by congress. This gives you the ability to negotiate on a case-by-case basis. This ability opens the door to active participation that stimulates the growth of online distribution. Negotiate higher rates for those with more money, but consider offering a cut rate to those nervous about online use. Ask to retain your rights to the distribution of your music on the Internet. Hell, demand (or merely insist) your right to distribute and promote on the Web. When your opposition flatly refuses, offer a compromise. By now you have made your point.

ASCAP currently defines every transmission of copyrighted music on the Internet as a "public performance." This definition feels overly broad. Are listening booths at Tower Records a "public performance"? Will a musician have the right to stream an audio performance of their own music? What happens if the musician includes a cover song in their set? When everyone on the Internet can potentially be a broadcaster, is everyone expected to have a license for every single transfer of an audio file? How much power should an independent agency have over artistic output? We're all looking for an ethical and universally accepted standard. It will take the willing cooperation of Webmasters, writers, and publishers to find a solution that makes sense to all. Unenforceable laws clog the already constipated judicial system and restrict artistic freedom. You have the power to influence these decisions.

We jump up and down when you get involved in the online community. Visit us at: www.fezguys.com.

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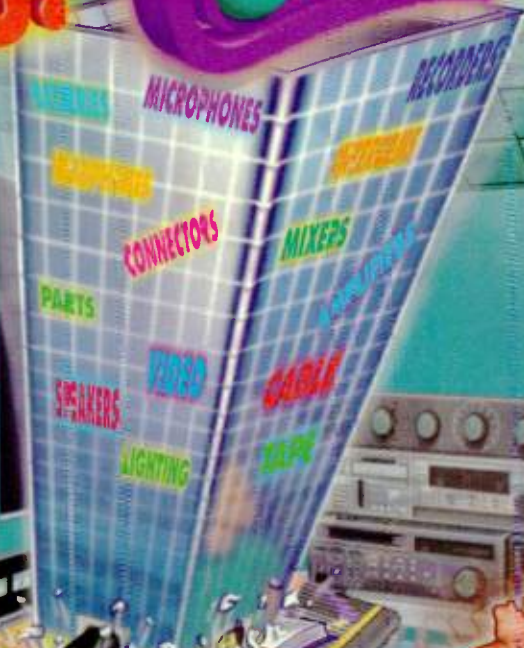


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CIRCLE 24 ON FREE INFO CARD

Spring Fever

The right way to work with screws and screwdrivers, not to mention a couple of spring adjustments



BY EDDIE CILETTI

Before I explain how to extend head life and improve pinch roller pressure, let's make sure our screwdrivers have been blessed by the Electron Goddess. More than a few machines make it to my shop with missing screws, loose screws, and screws in all the wrong places. This eventually leads to broken screws. Sound like a country song?

ERROR

The most common do-it-yourself error is using the wrong tool for the job. The screws encountered on tape machines may look small, but don't pick an undersized driver like the one shown in fig. 1. You might think I'm being silly, but it's not worth risking damage to the screw or the driver. This is especially true of screws that have been over tightened. Fig. 2 shows a driver with the proper fit, which should be snug.

The first rule of Phillips screw extraction is to press down on the screw (with the driver) before turning. If you let the driver slip out of the screw head

once, the damaged screw may be near impossible to extract without surgery. On the left of fig. 3 are two standard Phillips drivers and on the right are two Pozidrive types. Their shapes are unique, Pozidrive types being common in British-made gear.

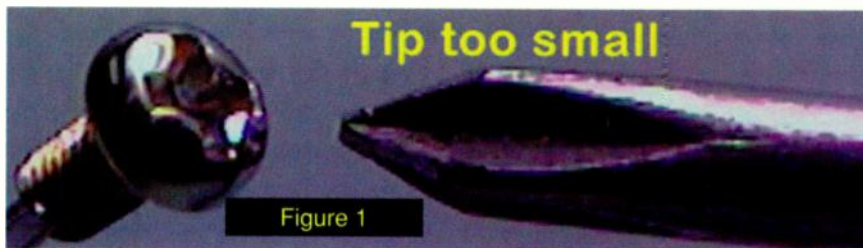
The yellow arrow points out the tip damage. This is as much a fault of the driver (the metal is too soft) as it is abuse. Spend a little extra money on better tools. It's worth it. A sticker on the side of a cash register at Dale Electronics says, "Good things are not cheap. Cheap things are not good." It's sad to see cheap grab-bag tools after they've been used to poke holes in sheet

rock. Please don't use those on your audio gear.

MA SHEEN'S CREW

Notice the fine threads of fig. 4. (You were expecting maybe a suit?) Three are classified as machine screws because their fine threads come in handy when trying to make precision adjustments. ISO sizes are metric-based, while SAE types are referenced to the American system of measurement. For example, a 10-24 screw has 24 threads to the inch.

Modern metric screws have a "dot" stamped on their heads. In fig. 5, they are "mated" with a "screw checker," which is a handy gauge for sorting un-



known sizes. The worst case of cross-pollination is when an American Standard screw ends up in a foreign product. (If this sounds like a toilet bowl you once worshipped, keep that idea.) ISO and SAE are not compatible.

Nuts! That's the one thing both types of machine screws have in common, although most times, you're likely to see a chassis tapped to accept a machine screw. This is why, if a screw resists turning, you should reverse direction and try again. Don't force the issue, in fact, avoid using power tools because they can quickly get you into a jam. Screw material is soft; using force will break the heads right off.

The odd screw in fig. 5 is designed to mate with raw metal. No nuts required. There may even be a little resistance to rethreading at first, but that's normal only for sheet-metal screws. Now you know how to keep your hardware in order. Let's chow down on some tape deck tartar.

DISTRICT ATTORNEY: ATE E. ATE

Wanna know how to extend DA-88 head life? Pop the hood and check the position of the tension spring. In fig. 6, the arrow indicates the direction the plate must be shifted to achieve minimum tension. If it's not in this position, there's a chance the tension may be higher than necessary. A check-up at 250 hours may seem premature, but an early evaluation and a possible correction could save a life.

Warning: You can try sliding the plate to the left (after loosening the screws), but not before checking the total head hours as well as the error rate. Worn heads require more tension to keep the error rate down, but new heads need

almost no tension. If you do make the adjustment, immediately check the error rate, not just of a previously recorded tape (you'll see only half the change), but also on a tape formatted post tweak.

ROTATING TIRES

Lots of ADAT users regularly change their pinch roller along with other rubber parts. If you've got an Original Formula black-faced ADAT, it may be time to change the pinch roller pressure spring — especially if the machine has 3000-plus hours on it. At the time this article was being written, the part number for the spring had not yet been solidified. Call Alesis Technical Support at 800-525-3747 for an update.

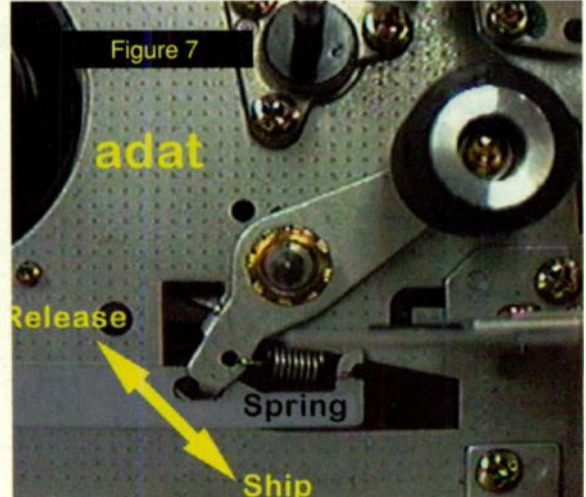
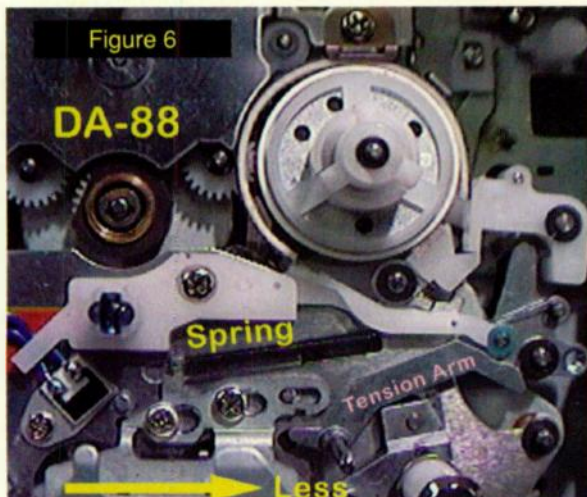
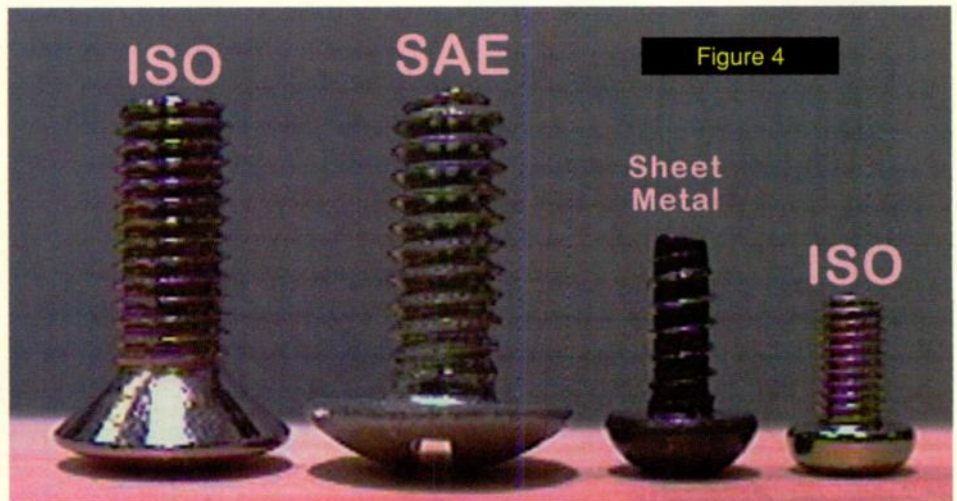
Fig. 7 shows the direction the pinch roller arm must be shifted to release it from the chassis. Nudge the arm until its claw clears the space cut out for it in the chassis, then lift up. If dirty, clean off the contact areas with a cotton swab. Lu-

briplate, a white lithium grease, is available at Radio Shack and MCM. Be sure to reapply lube that might have been removed by cleaning. Replace the spring and snap the assembly back into place. Errors encountered toward the end of the tape should now be resolved.

The really cool part about changing the spring is that you'll see why Alesis created a "shipping mode" for the XT. Ship mode automatically positions the arm so it won't come loose during shipping. I've seen machines after being handled by the United Rough-Riders Express Kompany of America (U-R-R-E-K-A). The sound of loose hardware always freaks me out.

Well, that's it for now. Be sure to visit www.tangible-technology.com for updates and even more information.

As you can tell, Eddie rarely sees the light of day. The one perk to this lifestyle is that he doesn't get depressed during the dark days of winter.



WIRELESS TIPS

continued from page 102

but a good line-of-sight policy will usually allow the direct signal to be received clearly. [2] The less cable and the fewer connections between receiver and antenna, the stronger your signal will be. Adapters, 1-meter extension cables, and those pretty rack-mount panel jacks cost signal strength. A few of these little problems in the same room can cause unpredictable behavior, including distortion, drop-outs, and smashed transmitters.

The most important part of a wireless system usually comes in the box from the manufacturer, but it always wears out. Every freaking-day, sometimes twice-a-day, these things have to be replaced. That's right: I mean the battery. Wireless systems pretty much suck without them. Do yourself a favor by buying the good ones. Cheap batteries are cheap because they don't measure up. There is no sense in screwing up any gig that pays for want of a \$2 battery.

Now I'm sure some of you are wondering about wireless personal monitors. Should you get them? Are they cool? Who makes the best? No, yes, and I can't tell you. What's best is different for everyone. Hard-wired personal monitors can sound great, and even the best wireless systems sound pretty darn good at best. Wireless should only be considered by those who absolutely must run amuck, or by those with enough money to buy one of everything. That notwithstanding, body-worn receivers need to be insulated from the artist's skin, receiver antenna go outside the costume, and you should at least use ground-plane antennas for transmitting. Wireless PMs require a careful touch to squeeze a good mix into a limited S/N range. Compression at the monitor desk is your friend. Try to drink lots of water. Besides that, treat them like all other wirelesses.

If you decide to buy a new wireless system, decide what your budget is before you start shopping, do some research, then shop around. Good, functional, inexpensive wirelesses can be found. Being informed can only do you good. You can build an FM transmitter kit from a hobby store for ten bucks and use it with a boom box. The top-of-the-line systems start around five-grand. Freedom has its price and, hey, it's your money.

JP Armstrong is a live monitor specialist, a part-time musician, and a generally dangerous individual. E-mail him at jparmstrong@mindspring.com.


GREAT RIVER

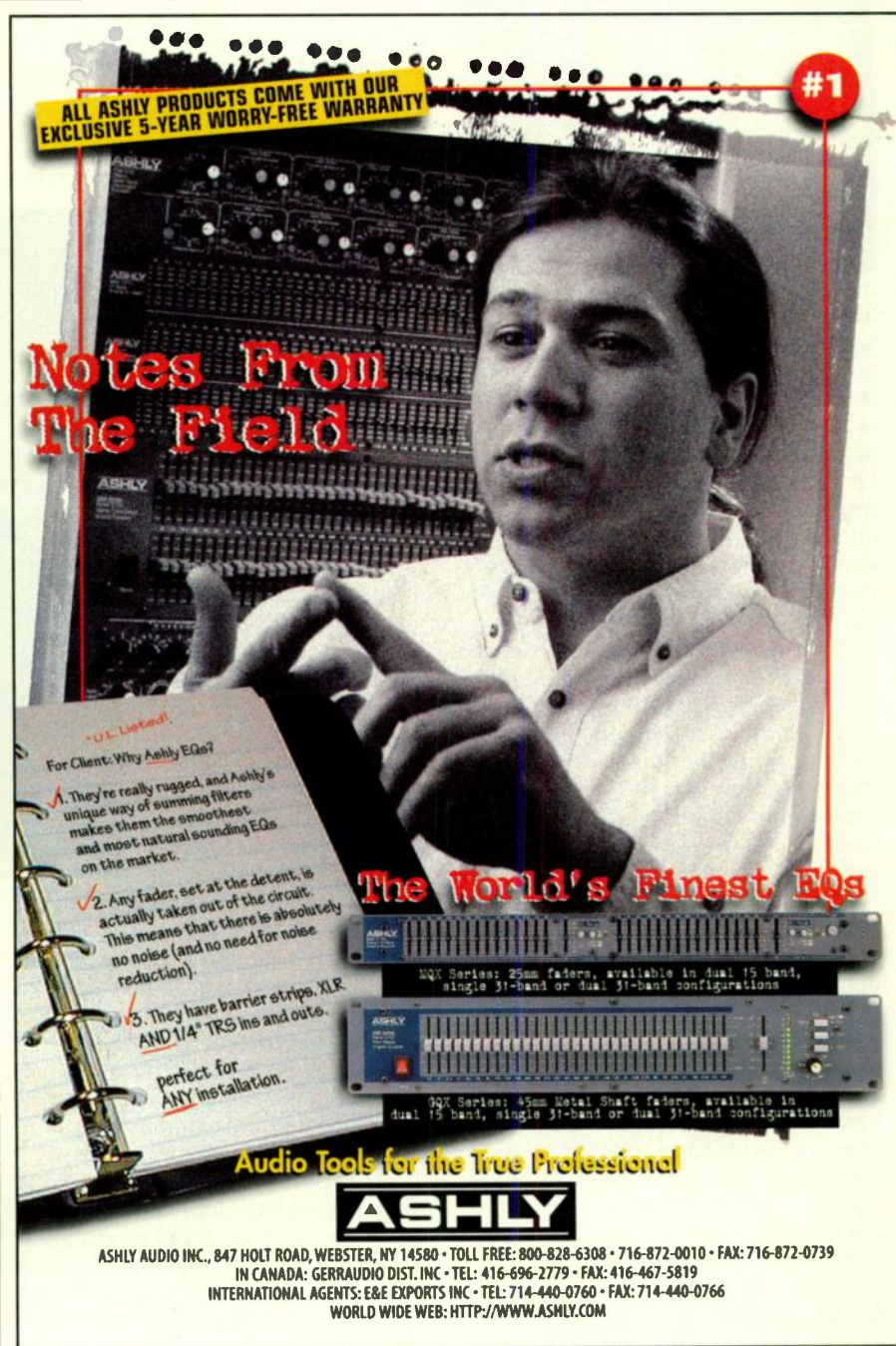
continued from page 118

gain switches allow you to confidently change level while maintaining channel balance.

I tested the MP-2 on the bench and found that it indeed met its unweighted Equivalent Input Noise (EIN) spec of -129 dB when measured at a gain setting of 40 dB. With an input resistor of 200 ohms — to simulate the mic's source impedance — EIN is the measured noise floor plus the actual gain of the circuit.

The MP-2 delivers 24.5 dBm (that's 40 volts peak-to-peak) effortlessly into a 600-ohm load. Remove the load, and the level comes up a mere quarter of a dB. This means you can drive nasty lengths of cable without losing clarity. Even at max gain (64 dB), the unweighted noise, -57 dBm, yielded a signal-to-noise of 82 dB or an EIN of better than 121 — without any bandpass filtering — which means there are no nasty noises outside the range of human hearing.

So, if you find yourself reaching for gain and getting noise, it's time to invest in a Great River MP-2. (The Neumann RSM-191 isn't too shabby either....) 



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Warranties: *Real and Implied*

How much protection
are you getting?

BY MARTIN POLON



In the good old days of professional audio (and they may well have been very good indeed), one would buy a piece of audio equipment such as a tape recorder, mixing console, limiter, power amplifier, or loudspeakers from companies that were more likely than not family-owned, that had little or no entrepreneurial management trying to maximize profit, that had small or nonexistent legal departments, and that placed customer satisfaction above profitability. In that now-historical environment, if a piece of equipment failed, the warranty was as frequently honored in its absence as in its presence.

In some cases, equipment would have an actual lifetime warranty. Customer telephone support would be both copious and unlimited, and would include access to members of the engineering department. Solving the customer's problem was the most important issue to all concerned. Dealers would allow customers to take products on "trial" and to be able to return products within "a reasonable time frame." Manufacturers would work with dealers to support both the customer and the product, the latitude providing extra insight about the product's strengths as well as weaknesses. This is not to say that all companies were as egalitarian as this, but there was certainly a different style to the various flavors of customer support.

Today, it is, in general, a quite different world of warranties, return poli-

cies, and telephone customer support — not to mention the issue of after-care policies. The audio industry has changed and the computer industry has become a part of the audio community. The net result is that today you may get what you pay for as far as equipment value is concerned, but you have to shop far more diligently for aftermarket support.

This is, after all, the era of: "This is the limited warranty offered by the equipment maker. All other warranties promised or implied are null and void. Only the considerations expressly delineated within the limited warranty are cogent to any claims filed for specific categories of equipment failure or outages." If you understand this, you are working in the wrong business and should immediately apply for a scholarship to law school.

Consider the following issues:

1. Short Term Returns:

This is a dealer service area, but manufacturer policies supporting the dealer heavily influence this category. It is far less expensive for all concerned if defective products are identified by the user within the first 10, 15, 20, or 30 days and product exchanged or returned for full credit at the dealer level. Needless to say, the longer the return period, the more time the end user has to evaluate the product.

2. **Warranties:** A careful reading of the actual warranty is a vital part of the purchase transaction. This may be resisted by dealers who either have to open a box or fax you the warranty, but it is required by federal code that the warranty be available in its totality prior to purchase. Read it carefully, note the exclusions, and carefully weigh the length and terms of the warranty.

3. **Technical Support:** This service can be offered for as little as 90 days from the date of purchase or can be a free and unlimited benefit of buying a particular product. On the professional audio side of the universe, technical support is

still more or less free and unlimited, although many companies feel it should be the dealer's prerogative. The closer one goes to the computer side of the universe, the shorter the term of free telephone technical support and the more one has to pay per minute or per service issue after the free support period expires.

Even worse, some computer equipment makers have unilaterally abrogated their offer of free and unlimited lifetime technical support after the product has been purchased. So part of the purchasing equation is to check the "buzz" on the street and on the Web about equipment makers you are thinking about buying from.

4. Parts Availability:

No matter what you are told by dealers or others involved in equipment sales, federal law requires five years of parts availability for any product sold in the United States.

5. After-Care Policies:

These policies, found most usually offered by third parties through dealers of computer equipment, do provide a longer term backup of equipment purchases as long as the policy is purchased at the original point of sale for the equipment in question. These can be a useful item of protection since the price of such policies is measured in the hundreds of dollars on computer equipment whose repair costs from micro-

processors, logic boards, CRTs (cathode ray tubes), and hard drives far exceeds the cost of the service policy.

Although the periods of two, three, and five years are offered by such service policies, they do incorporate the nominal one year or longer warranty provided by the equipment maker. For those contemplating a two-year policy purchase, the use of a credit card with doubling purchase protection for the one-year warranty offers the same thing.

Ultimately, one can only fall back on the standard Latin prescription for consumer protection, "Caveat Emptor" — let the buyer beware. **EQ**

You may get what you pay for as far as equipment value is concerned, but you have to shop far more diligently for aftermarket support.

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HARD DISK RECORDING

digidesign



A Division of Avid Technology, Inc.

ProTools Project™ Digital Audio Workstation for Macintosh

ProTools Project is designed to provide ProTools functionality at a more affordable price. The system includes an audio card as well as award winning ProTools software and you choose either an 888 or an 882 I/O interface to complete the package. Project also features 8 tracks of record/playback, 4 bands of digital EQ, MIDI record/playback and Quickpunch. Digidesign also has an upgrade path when your ready to expand your system.

REQUIRES-

- Qualified NuBus or PCI Macintosh CPU
- 24MB RAM minimum
- Hard Drive, system software 7.1 or greater
- 14" monitor (17" recommended)

ProTools 4.0 Software-

ProTools version 4.0 software provides the next step in the evolution of Digidesign's award-winning digital audio production software for the Mac. Fully Power Mac native, 4.0 features noticeable improvements in every major area. ProControl™ support, improved automation features, relative fader groupings & group nesting, plug-in MIDI personality files, multiple edit play lists, Sound Designer II™ functionality, Finder-style searching & sorting, and mmmore.

Session 8™ Digital Audio Workstation for Windows

Session 8 is a professional quality digital audio recording, editing, & mixing system created specifically for personal and project recording studios. Designed to operate with Windows 95 or Windows 3.1, Session 8 offers professional recording features, powerful random access editing, automated digital mixing, & unparalleled integration with most popular MIDI sequencers.

FEATURES-

- 8-channel direct to disk digital recording
- Random access, non-destructive editing
- Automated, intuitive digital mixing environment
- Built-in volume & pan automation
- Complete SMPTE frame rate support
- Digital parametric EQ
- Frame accurate sync with built-in AVI video playback window
- Support for multiple hard drive partitions
- Auto sample rate convert to 44.1 or 48 kHz mono WAV file format
- Choice of audio interface options



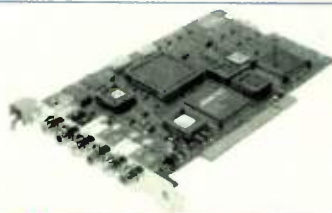
digidesign



A Division of Avid Technology, Inc.

Audiomedia III™ Digital Audio Card

Available for both Macintosh and Windows OS systems, Audiomedia III will transform your computer into an powerful multitrack workstation. Compatible with a wide variety of software options from Digidesign and Digidesign development partners, Audiomedia III features 8 tracks of playback, up to 4 tracks of recording, 24-bit DSP processing, multiple sample rate support and easy integration with leading MIDI sequencer and other software programs.



PORTABLE HARD DISK RECORDING

Roland VS-880 V2

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

FEATURES-

- Auto Mixing Function records and plays back your mix in realtime
- Process the inaster output with a specific inserted effect such as total compression
- Simultaneous playback of 6 tracks in MASTER MODE
- 10 additional effect algorithms (30 total) including Voice Transformer, Mic Simulator, 19-band Vocoder, Hum Canceller, Lo-Fi Sound Processor, Space Chorus, Reverb 2, 4-band Parametric EQ, 10-band Graphic EQ, and Vocal Canceller.
- 100 additional preset effects patches.
- In total, over 20 powerful and convenient features in exciting/sync sections have been added. Some require the optional effects expansion board

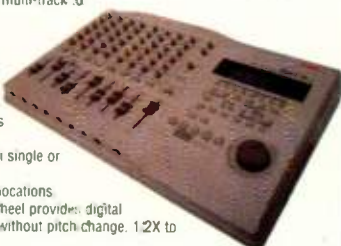


Fostex DMT-8 VL

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

FEATURES-

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



CD & CASSETTE DUPLICATION

marantz CDR615 / CDR620 Compact Disc Recorder

Both next-generation stand-alone write-once CD recorders, the CDR615 & 620 offer built-in sample rate conversion, CD/DAT/MD/DCC subcode conversion, and adjustable dB level sensing. They also feature adjustable fade in/out, record mute time & analog level automatic track incrementing. A 9-pin parallel (GPI) port, headphone output with level control and RC620 remote are also included. The CDR620 adds a SCSI-II Port, XLR (AES/EBU) Digital In/Out and Digital cascading, 2x speed record, Index Recording and playing and defeatable copy prohibit and emphasis.



Telex ACC2000/ACC4000 Cassette Duplicators

Designed for high performance & high production, Telex duplicators offer easy maintenance and operation. The ACC2000 is a 2-channel mono duplicator while the ACC4000 is stereo. Each produces 3 copies from a cassette master at 16x normal speed & by linking additional copy modules, you can duplicate up to 27 copies of a 60 minute original in under 2min!

ACC2000XL / ACC4000XL

The XL Series feature "Extended Life" cassette heads for increased performance and wear characteristics. They also offer improvements in wow and flutter, freq. response, S/N ratio & bias.



STUDIO DAT RECORDERS

SONY PCM-R500



Incorporating Sony's legendary high-reliability 4D-D Mechanism, the PCM-R500 sets a new standard for professional DAT recorders. The Jog/Shuttle wheel offers outstanding operational ease while extensive interface options and multiple menu modes meet a wide range of application needs.

FEATURES-

- Set-up menu for preference selection. Use this menu for setting ID6, level sync threshold, date & more. Also selects error indicator
- Includes 8-pin parallel & wireless remote controls
- SBM recording for improved S/N (Sounds like 20bit)
- Independent L/R recording levels
- Equipped with auto head cleaning for improved sound quality

TASCAM DA-20/DA-30mkII



- Multiple sampling rates (48, 44.1, and 32kHz)
- Extended (4-hour) play at 32kHz
- S/PDIF Digital I/O, RCA Unbalanced In/Out
- SCMS-free recording, Full function wireless remote
- DA-30mkII Additional Features-
- Variable speed shuttle wheel
- Digital I/O featuring both AES/EBU and S/PDIF
- XLR balanced and RCA unbalanced connections
- SCMS-free recording with selectable ID
- Parallel port for control I/O from external equipment

Panasonic SV-3800/SV-4100



The SV-3800 & SV-4100 feature highly accurate and reliable transport mechanisms with search speeds of up to 400X normal. Both use 20-bit D/A converters to satisfy even the highest professional expectations. The SV-4100 adds features such as instant start, program & cue assignment, enhanced system diagnostics, multiple digital interfaces and more.

Fostex

D-15tc/D-15tcr



The new Fostex D-15 is the least expensive timecode DAT on the market. It has a host of new features aimed at audio post production and recording studio environments. The D-15tc comes with the addition of optional chase and sync capability installed. It also includes timecode reading and output. The D-15tcr comes with the further addition of an optional RS-422 port installed, adding timecode and serial control (Sony protocol except vari-speed)

FEATURES-

- Hold the peak reading on the digital bargraphs with a choice of 5 different settings
- Set cue levels and cue times
- Supports all frame rates including 30of
- Parallel interface



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E-300

Studio Condenser Microphone

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

Shown with optional ZM-1 Shockmount



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



AT4050/CM5 Cardioid Capacitor Microphone

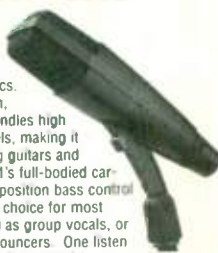
The AT4050 multi-pattern condenser expands upon the AT4033 to set the standard for studio performance mics.

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



MD 421

For over 20 years, the MD 421 has been one of Sennheiser's most popular dynamic mics. The large diaphragm, dynamic element handles high sound pressure levels, making it natural for recording guitars and drums. The MD 421's full-bodied cardioid pattern, and 5-position bass control make it an excellent choice for most instruments, as well as group vocals, or radio broadcast announcements. One listen and you'll know why it's a classic.



MIXING BOARDS



Get on the 8-Bus!

Since its introduction, Mackie Designs' 8-Bus Series consoles have proven that excellent sonic quality, practical features and extreme durability can be affordable. All 3 versions offer extensive monitoring, 4-band EQ, accurate, logarithmic taper faders, and expansive headroom. The 24x8 and 32x8 can be expanded using Mackie's 24-E Expander console which consists of 24 input channels and tape returns and may be daisy chained to provide 128 or more total input channels.

Available in
16x8, 24x8, & 32x8 versions.

FEATURES-

- Each channel includes Mackie's well-known Mic pre-amp and a -10/+4 switchable tape return
- 8-assignable submasters and a L/R mix master
- 4-band, true parametric EQ

- Extensive routing capabilities
- Optional Meter Bridges available
- Optional 24-E Expander console available
- Rugged all-metal chassis
- In-line monitoring effectively doubles input channels



TASCAM M-1600

16 & 24 Channel 8-bus Consoles

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

FEATURES-

- XLR Mic inputs w/phantom power on 8 channels.
- Signal present/overload indicators on each channel.
- Balanced & Unbalanced tape returns & Balanced Group/Direct outputs using D-sub connectors.
- TRS Balanced Line Inputs on all channels.
- 3-band EQ with sweepable mids.
- 5 Aux Sends (1 stereo)



- 4 assignable aux returns.
- Perfect for use with DA-88 and ADAT setups

MINIDISC MULTITRACKS

TASCAM

564 Digital Portastudio

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

FEATURES-

- Self-contained digital recorder/mixer.
- Uses low-cost, removable MiniDiscs.
- 2 AUX sends / 2 Stereo returns.
- 4 XLR mic inputs.
- Channel inserts on inputs 1 & 2.
- 5 takes per track, 20 patterns, 20 indexes per song.
- Random access and instant locate.



- Non-destructive editing features with undo capability include: bounce forward cut, copy, move.
- Full-range EQ with mid-range sweep.
- S/PDIF digital output for archiving.
- MIDI clock and MTC.



SONY

MDM-X4 MD Multi-Track Recorder

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

FEATURES-

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



STUDIO MONITORS

ALESIS

Monitor One

The award winning Monitor One provides the just critical link in the recording studio's signal chain, giving you an accurate reproduction of what is being recorded.



FEATURES-

- Excellent image and transient reproduction, powerful bass, and smooth, extended high frequency detail.
- Exclusive SuperPort speaker venting technology
- Ferrofluid cooled 1" silk-dome driver

TANNOY

PBM 6.5II

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

FEATURES-

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



JBL

4206 & 4208

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

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



SPIRIT

Absolute Zero

Absolute Zero monitors maintain a wide frequency response at high and low listening levels, both on and off-axis for consistent results everytime.

FEATURES-

- High definition linear phase design
- Wide, controlled dispersion
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- Custom designed drivers
- Long throw 170mm LF driver
- 25mm soft dome HF unit on proprietary waveguide



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PORTABLE DAT RECORDERS

TASCAM DA-P1

- Rotary 2 head design, 2 direct drive motors.
- XLR mic/line inputs (w/phantom power)
- Analog and S/PDIF (RCA) digital I/O.
- 32/44.1/48kHz sample rates & SCMS-free recording.
- Built in MIC limiter and 200B pad.
- TRS jack w/ level control for monitoring.
- Includes shoulder belt, AC adapter & battery.



PDR1000/PDR1000TC



The PORTADAT has fast become an industry standard location DAT machine. Popular for film and video production use, as well as ENG/EPG, the PDR1000 features a large backlit display, 4 motor transport and AES/EBU and SPDIF digital ins and outs. The PDR1000TC adds the ability to record, generate and reference to timecode as well as jam sync to convert absolute time to timecode.

FEATURES-

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

PDR1000TC Additional Features-

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

NEW Options-

- **MS1000 Master Sync module** ensures drift will be no more than 1 frame every 10 hours
- **HW1000 Headphone Matrix** provides a rotary switch for selection of Stereo, Mono Left, Mono Sum, & M/S (mid-side) Stereo modes.

SONY TCD-D10 PROII

A reliable, high-performance DAT recorder. The portable TCD-D10 PROII is designed with rugged professional use in mind. It has many enhanced features including absolute time recording, allowing immediate use of the tapes as source material for Sony's PCM-7000 series DAT editing system.



Fostex PD-4 V.2

The second-generation portable, professional TC DAT recorder from Fostex. Version 2 software includes many features and functions for improved performance in the field.

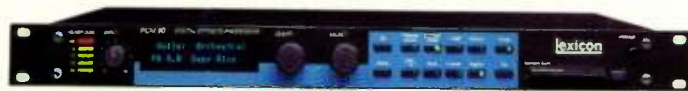
FEATURES-

- 4-head design • Punch-in/out
- Pre or post stripping of SMPTE/EBU timecode
- 3 in X 2 output mixer with 3-position pan functions
- Selectable 48V phantom powering and variable low-cut filters



EFFECTS PROCESSING

Lexicon PCM-80 & PCM-90 Digital Signal Processors

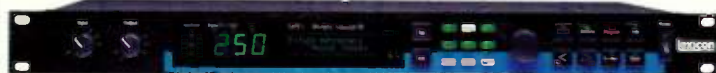


A great combination for any studio owner with an ear for the best. The PCM-80 delivers high quality multi-effects based on the legendary PCM 70, maintaining Lexicon's high standards for sonic clarity and extraordinary processing power. The PCM 90 is a digital reverb with its roots stemming from the studio standard 480L and 300L effects systems. Reverbs from telephone booths to the grand canyon, the PCM 90 is incredibly realistic, an excellent addition to any rack mount arsenal.

Buy a PCM-80 from B&H before December 25th, 1997 and receive a FREE Pitch FX Card & \$100 - a \$350 Value!

Buy a PCM-90 from B&H before December 25th, 1997 and receive a FREE Dual Reverb Card & \$250 - a \$500 Value!

Lexicon MPX-1 Multi-Effects Processor



Lexicon's latest addition to their Digital effects family, the MPX-1 features top-quality effects in an easy-to-use, 1 rack space unit. With 56 Pitch, Chorus, EQ, Modulation, Delay, and world-class reverb effects accessible from the front panel, as well as TRS and XLR balanced I/O and complete MIDI implementation, the MPX-1 creates a new standard for cost and quality in a multi-effects device.

t.c.electronic

Wizard M2000 Studio Effects Processor



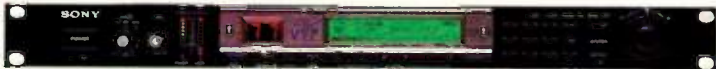
The M2000 features a "Dual Engine" architecture that permits multiple effects and 6 different routing modes making it a great choice for high-end studio effects processing.

FEATURES-

- 250 factory programs including reverb, pitch delay, chorus, flange, phase, EQ, de-essing, compression, limiting, expansion, gating and stereo enhancement
- 20-bit A/D conversion, AES/EBU and S/PDIF digital I/O.
- "Wizard" help minus, 16-bit dithering tools.
- Tap and MIDI tempo modes
- Single page parameter editing, 1 rack space

SONY

DPS-V77 2 Ch. Master Effects Processor



Sony's latest effects processor, the DPS-V77 yields excellent sonic quality combined with realtime control, a digital I/O and many more features that will put a smile on the face of any discerning studio engineer.

FEATURES-

- 199 preset & 198 user-definable programs.
- Control up to 6 parameters in realtime via MIDI information and an optional foot pedal
- Use the AES/EBU & SPDIF digital I/O to link multiple V-77s together & when working with digital mixers
- 10-key pad input
- Shuttle-ring equipped rotary encoder allows for quick patch changing
- A noise gate circuit is provided ahead of the input for guitar players and other instrumentalists who want top quality effects without sacrificing tone.

Roland

SRV-330 Dimensional Space Reverb



The SRV-330 provides exceptional sound quality, using proprietary Roland Sound Space technology to achieve three-dimensional spatial effects with conventional two channel playback.

FEATURES-

- Discrete stereo reverb algorithms for independent processing per channel
- 30 bit internal signal processing for a clear and accurate sound
- 280 preset and 100 user patches
- MIDI and realtime control via remote control and expression jacks

PRO HEADPHONES



K240M

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SONY MDR 7506

The Sony 7506's have been proven in the most trying studio situations. Their rugged, closed-ear design makes them great for keyboard players and home studio owners.

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- Frequency Response 10Hz to 20k Hz
- 1/4" & 1/8" Gold connectors
- Soft carrying case
- Plug directly into keyboards



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DT 770 Pro

These comfortable closed headphones are designed for professionals who require full bass response to compliment accurate high and mid-range reproduction.

- Wide frequency response
- Durable lightweight construction
- Equalized to meet diffused field requirements
- Padded headband ensures long term comfort



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HD 265/HD580

The HD-265 is a closed dynamic stereo HiFi/professional headphone offering high level background noise attenuation for domestic listening and professional monitoring applications. The HD 580 is a top class open dynamic stereo HiFi/professional headphone that can be connected directly to DAT, DCC, CD and other pro players. The advanced design of the diaphragm avoids resonant frequencies making it an ideal choice for the professional recording engineer.





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KEYBOARDS & SOUND MODULES

Roland A-90EX Master Keyboard Controller



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

- FEATURES—**
- Master Volume Slider and Global Transpose features
 - Proprietary 88-note hammer-action, velocity sensitive keyboard with aftertouch
 - 2 types of stereo-sampled grand pianos, various acoustic and electric pianos (including a great classic Rhodes)
 - Stores up to 64 Performances

Roland JV-2080 64-Voice Synthesizer Module

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



- FEATURES—**
- 64-Voice / 16-part multitimbral capability
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 - 6 outputs, Main Stereo and 4 assignable
 - **NEW** patch finder and Phrase Preview functions for easy access to all patches
 - Large backlit graphic display
 - Compatible with JV-1080, XP-50, & XP-80

KURZWEIL

K2500 Series Music Workstation



Building on the same features that made the 2000 series popular, the 2500 utilizes the acclaimed V.A.S.T. technology for top-quality professional sound. Available in 76-key (K2500), 88 weighted key (K2500X) and rackmount (K2500R) configurations, the K2500 combines ROM based samples chosen from the best of Kurzweil's collection, on-board effects, and full sampling capabilities on some models (K2500S, K2500RS & K2500XS).

- FEATURES—**
- True 48-voice polyphony
 - Fluorescent 64 x 240 backlit display
 - Up to 128MB sample memory
 - Operating system stored in flash ROM (for software updates via floppy disk and SCSI)
 - Full MIDI controller capabilities
 - 32-track sequencer • Dual SCSI ports
 - Advanced file management system
 - Sampling option available
 - Optional DMTI Digital Multitrack interface for data format and sample rate conversion with ADATs/DA-88s

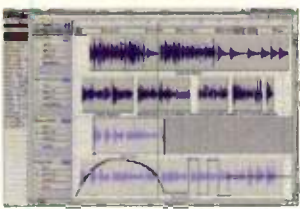
MIDI SOFTWARE

Digital Performer 2.1

Mark of the Unicorn Macintosh MIDI Sequencer w/ Integrated Digital Audio

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

- FEATURES—**
- MIDI Machine Control, Quicktime Video playback
 - Sample rate conversion
 - Spectral effects, pitch correction
 - Real-time editing and effects processing



- Full featured Notation section that rivals dedicated notation software programs
- Playback using Quicktime Musical Instruments
- Virtual automated mixing
- Non-destructive MIDI output processing

SAMPLING

E-MU E-mu Systems, Inc.

e-6400 Emulator

The e-6400 offers the power of E-mu Systems' renowned Emulator Operating System (EOS) and superb audio quality in a package perfect for the budget-minded professional. The e-6400 comes with stereo sampling, 4MB of RAM and is fully upgradeable to E-mu's top of the line Emulator sampling synthesizers, the E4X, and E4XTurbo.



- FEATURES—**
- 64 voice polyphony (expandable to 128)
 - 4MB sound RAM
 - 2 CD-ROM's included (400MB of sounds)
 - 8 balanced analog outputs
 - Onboard graphic waveform editing
 - Load while play
 - Stereo phase lock time compression.

T H E N E W M P C !

AKAI MPC2000 MIDI Production Center



Whether your producing rap or hip-hop, sequencing a rack of MIDI modules, or performing live, the MPC2000 gives you powerful tools to make your music shine. It's the NEW MPC!

- FEATURES—**
- Large 248 x 60 LCD Graphic display
 - 64-track, 100,000 note sequencer with linear drum machine style programming
 - 16-bit, 32-voice stereo sampler
 - Standard SCSI interface
 - Soft keys, Data/Digit wheels, cursor control and more
 - Keypad for directly entering sample points
 - Note variation slider gives you real-time control of any sound's tuning, attack, decay, or filter frequency
 - Floppy Disk Drive
 - Powerful expansion options.

MIDI HARDWARE



MIDI Time Piece™ AV 8x8 Mac/PC MIDI Interface



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

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



Digital Time Piece™ Interface



Think of it as the digital synchronization hub for your recording studio. The Digital Timepiece provides stable, centralized sync for most analog, digital audio, and video equipment. Lock together ADATs, DA-88's, ProTools, word clock, S/PDIF, video, SMPTE, and MMC computers and devices flawlessly. It ships with "Clockworks" software which gives you access to its many advanced features and remote control of some equipment settings such as record arm.



OPCODE

Studio 64X Cross Platform Interface



The Studio 64X is part of Opcode's new Studio X Series. This 64 channel MIDI interface is compatible with both Macintosh and Windows and features SMPTE synchronization as well as OMS (Open Music System) compatibility for total integration with any OMS compatible application.

- FEATURES—**
- Cross-platform Mac and Windows compatibility
 - 4 MIDI inputs and 6 MIDI outputs, 64 MIDI channels
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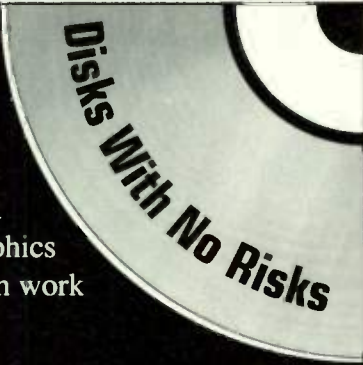
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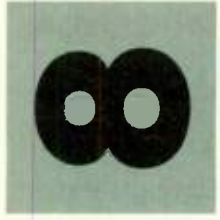
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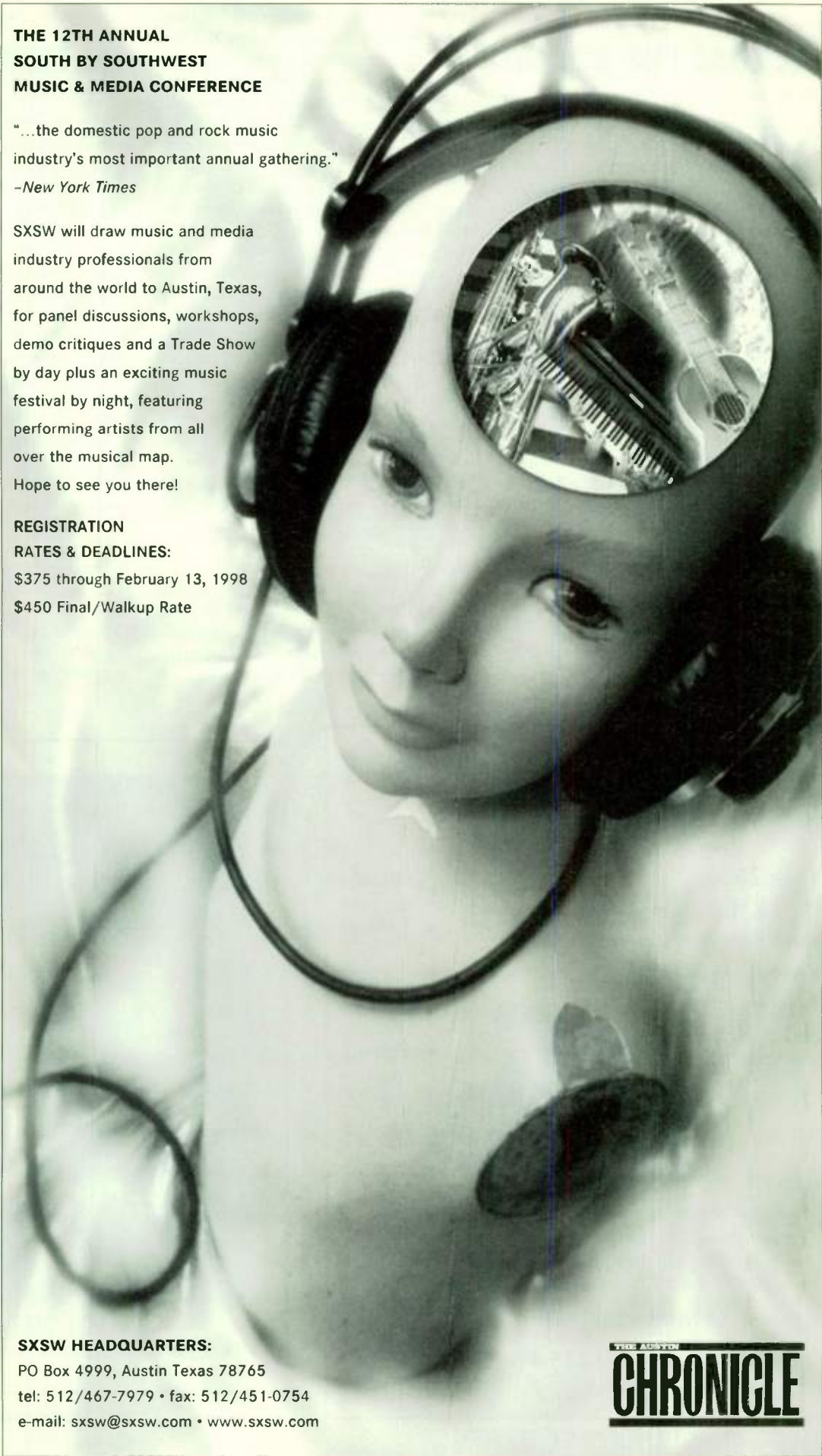
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ACROSS THE BOARD

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Back in the analog Steely Dan days, we never made copies, because an analog tape copy was so inferior that we never wanted to be tempted to use it. One day a tape got erased. It cost over \$40,000 to try to cut the song again, but it never came out good enough to use. If digital recording had just come two years earlier...

NAMM

Did you enjoy the NAMM show? I just found out what NAMM stands for: Not Available, Maybe March, or Maybe May. I guess that would be NAMMMM. Oh well.

YAMAHA 02R

I have been getting a lot of questions in my e-mail about 02R tips. I plan on adding some every month or so. Maybe March. Most tips pertain to mixing in general and can be applied to other digital consoles as well.

Q: I go through a lot of effort to get the levels as hot as possible without clipping when I record on my digital machine, but when I mix, all of the faders end up near the bottom and it seems like I don't have much control over mixing levels.

A: Analog and digital consoles both have line trims that allow you to turn the level down as it enters the console so that the mixing fader can be run in the "sweet spot," which is around 0 or -5 dB. Automation in consoles doesn't know about dB, it just moves the fader a certain number of steps from all the way down to all the way up. On a Neve Capricorn, or Flying Faders, or an SSL, or GML automation, there are 1024 steps. On an 02R there are 118 steps. On a Sony Oxford there are about 2000 steps. When the fader is in the "sweet spot," a step of fader movement can be less than a tenth of a dB. When the fader is down near -30 dB or -40 dB, that same step can be 1 dB or 10 dB. It would be very hard to ride a vocal when the smallest fader move is 10 dB.

On the 02R, the trim is located on the EQ page and is stored as part of a snapshot. This control is not automated, so you can change it while the mix is running. The increments are in whole dB steps, but it can let you try ballpark-level tweaks without messing up your mix.

OUT-O-HEAR

That's it for now kids. Note my Web site has changed location. I am going to be doing some work on it — a new garden, extra parking, a new Bar-B-Q — that sort of thing. It is now at www.rogernichols.com. ■

MOTION SOUND

continued from page 130

a guitar player and would probably add effects at this stage in a live performance. The low rotor simulator works fantastic. I was switching between stereo and mono for a little difference in the stereo field with all the other instruments playing. In mono, it made the organ sound closer, while in stereo, it sounded a little more spread out. The parameters for the speed control on the top rotor and the bottom are useful to time the rotations with the tempo of the song you're using it in.

Overall the R3 has an obvious weight advantage over a Leslie cabinet, and for the little space it uses up, really gives you the "Leslie-type sound" without having to get a back operation. I'm using a Motion Sound Pro3 in my studio with it miked in a closet, and it works fine. But the R3 makes life even better because, when I would monitor at a low level, the Pro3 was blaring in the closet, but now that's not even a factor.

David Bryan is the keyboardist for Bon Jovi and a fine artist in his own right. Check out his keyboard recording tips in the Dec. '97 issue.

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