REVIEWS: AKAI 4-TRACK • ROLAND REVERB • DBX MIC PREAMP • STEWART AMP

EQ

THE PROJECT RECORDING & SOUND MAGAZINE

TROPEA'S HI8 HIDEAWAY

DEC 1993

NEW PRODUCT BUYER'S GUIDE

LIVE SOUND GEAR FOR YOUR GIG

RECORDING U2

YESTERDAY & TODAY

BY DANIEL LANOIS & FLOOD

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With over 20,000 ADATs already in use all over the world, Alesis has made more digital multitrack tape recorders

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And with good reason. Alesis was founded on digital technology, so we know what it takes to make the best-selling digital multitrack. The Alesis ADAT® Digital Audio Recorder's sound quality, sample accurate synchronization capability (ADAT Synchronization Interface), fiber-optic digital interface (ADAT MultiChannel Optical Digital Interface), and wide range of peripherals available now, give ADAT owners the creative flexibility they need.

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Its revolutionary impact on the recording industry has made ADAT the de facto standard in digital multitrack. The enormous number of ADAT users worldwide, the fact that Fostex has licensed the ADAT format for their own digital recorder, and the growing list of leading companies focusing on industry compatibility by becoming members of The ADAT Group™, all mean that when you choose ADAT, you're compatible with a vast array of music and audio equipment, now and in the future. And, you're supported by a network of professionally trained Authorized ADAT Service Centers worldwide.

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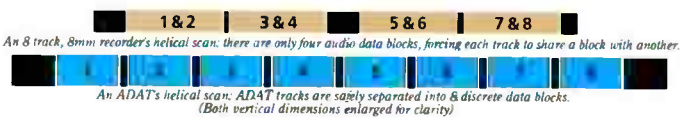
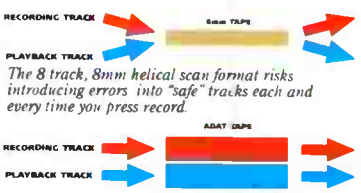
The ADAT Format – made for multitrack

ADAT records eight tracks of 16-bit linear, 48 kHz sample rate audio, with no data compression "tricks" or channel sharing. We chose Super VHS® (S-VHS®) tape as a foundation, then designed ADAT's data structure and heads specifically for the rough-and-tumble, back-and-forth, punch-in-and-out environment of multitrack recording. To make sure that recording one track wouldn't disturb any other track, we divided each helical scan into eight separate data blocks. Some digital recorders combine data from two different channels into the same data block on tape, which means that each time you record a track, another track must be read into a buffer and actually re-recorded even though it is in "safe" mode.



An 8 track, 8mm recorder's helical scan: there are only four audio data blocks, forcing each track to share a block with another.

An ADAT's helical scan: ADAT tracks are safely separated into 8 discrete data blocks. (Both vertical dimensions enlarged for clarity)



The 8 track, 8mm helical scan format risks introducing errors into "safe" tracks each and every time you press record.

The ADAT format records each track discretely, as all professional multitrack recorders should.

Bigger is Safer

Microscopic contaminants in the studio aren't just probable, they're statistically inevitable. If the format can't overcome them, they'll cause mistracking, noise, distortion, even total muting of the audio. Formats smaller than S-VHS are more vulnerable to contaminants, dropout, and misalignment, especially when exchanging tapes between machines. One 8mm digital format attempts to squeeze the same amount of sound into one-tenth the tape area that ADAT does. ADAT's S-VHS tape offers more total surface area to meet the demands of digital recording, and its wider 100 micron tracks are five times less vulnerable to being derailed by dust. Because even though technology makes it possible to make formats smaller and smaller, dust stays the same size.

Comparison of tape areas for 1 second of audio: ADAT (1,211 mm²) and the 8 track, 8mm helical scan format (133 mm²).

Actual microscopic comparison of the ADAT tape format and the 8 track, 8mm helical scan format (enlarged approximately 100 times).

ADAT's wide 100-micron tracks offer an extra margin of safety for digital audio.

The 8mm's 20-micron tracks squeeze more data into the same area, with little room for error.

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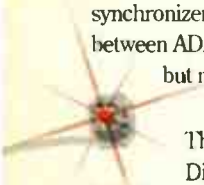
than any other company. More than Sony. More than Mitsubishi. More than Yamaha, Akai, and Tascam combined.

More than just a tape recorder– The ADAT System

ADAT, when combined with the BRC™ Master Remote Control, is a complete digital recording and digital editing system with features that no other recorder, analog or digital, can match. The BRC is a full-function autolocator and MIDI/SMPTE time code chase-lock synchronizer. Plus, it controls digital copying between ADATs, like a disk-based recorder, but much simpler to use.



A fiber optic cable for digital connection is included with every ADAT.

The ADAT MultiChannel Optical Digital Interface digitally transmits up to eight ADAT channels at once over a single fiber optic cable to any track on any ADAT in the system without repatching, all in the digital domain. Now you can "fly in" that perfect vocal part to multiple locations in seconds, with absolutely no generation loss. And our new QuadraSynth™ keyboard has an ADAT digital interface so you can record it without ever leaving the digital domain.

The BRC Master Remote Control, shown with optional RMB™ Remote Meter Bridge, supercharges your ADAT System by adding SMPTE and MIDI synchronization, storable autolocation points, copy and paste digital editing and more.

ADAT/BRC digitally stores important session notes

Unlike analog autolocators, the BRC can recall 460 points, storable on each ADAT tape for later recall, so you can keep your mind on the project instead of having to remember minutes, seconds and frames.

Instead of scribbling notes on cumbersome studio track sheets, the BRC lets you store 400 autolocation points, 20 Song start points, punch in and out points, MIDI tempo maps, SMPTE offsets, and more in the two-minute data header of the ADAT tape. The BRC's alphanumeric display lets you name each cue point and song. It even has a handy built-in list of 16 standard cue point names you can edit.

The ADAT Worldwide Network

Thousands of ADAT Worldwide Network™ multitrack recording group members are reaping the benefits of choosing The ADAT System. As WWN members, they are able to collaborate and exchange ADAT tapes with other talented musicians, producers, composers and engineers throughout the world. Alesis is proud that so many creative people worldwide are using this American-made product, making ADAT the most popular digital multitrack tape recorder in history. The recording professionals below don't endorse ADAT, they *use* it every day. Their credentials speak for themselves. Visit your Authorized ADAT dealer and see what the new standard in digital multitrack recording can do for you.

Dave Rouze
Technical engineer for Larry Carlton, currently using ADAT to record all Larry's live concerts. 2 ADATs and a BRC.

Jay Graydon
Two time Grammy® Award winning (twelve nominations) producer, engineer, writer, and guitarist. 4 ADATs and a BRC.

Owen Bradley
Country Music Hall of Famer. Producer of many legendary country music artists. 9 ADATs and a BRC.

Francis Buckley
One of the top dance and pop engineers in Hollywood. 4 ADATs and a BRC.

Web Staunton
Grammy-nominated chief engineer and studio owner. 3 ADATs and a BRC.

Mick Guzauski
L.A.'s leading platinum mixdown engineer. 4 ADATs and a BRC.

Andy Hilton
Owner and Chairman of the largest pro-audio equipment-for-hire company in the U.K. and Europe. Plenty of ADATs

Ray Benson
One of country music's hottest producer/arranger/writers. 3 ADATs and a BRC.

Tom Size
Has engineered and mixed a wide range of music from rock to legendary jazz. 3 ADATs and a BRC.

Russell Brower
Two Emmys (eight nominations). Sound designer and producer for film, television and major theme parks. 2 ADATs and a BRC.

Tim Wilson
Consultant and system designer for leading recording artists and songwriters. Has installed more ADATs than he remembers.

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adat ALESIS STUDIO ELECTRONICS

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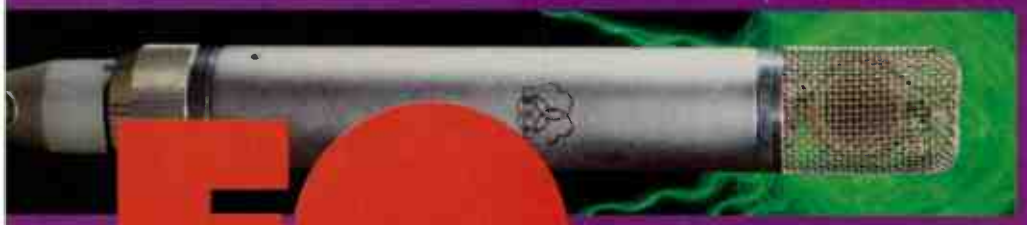

EQ

PROJECT RECORDING
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VOLUME 4, ISSUE 6
DECEMBER 1993

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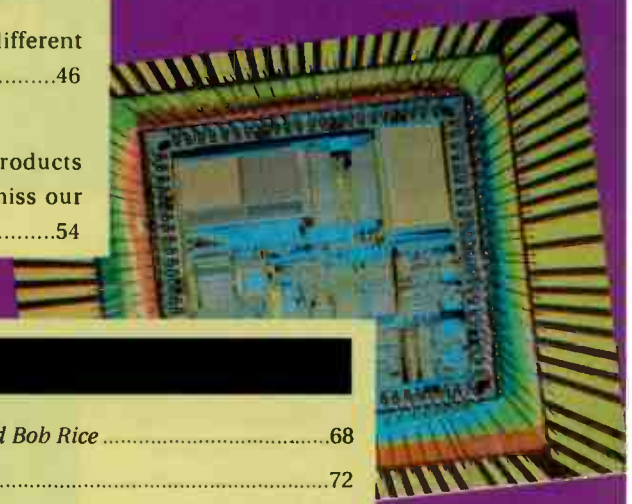
AT HOME WITH U2

Producers Daniel Lanois and Flood talk about getting two decidedly different types of U2 down on tape 46

AES BUYER'S GUIDE

Whether you made it to Javits or not, *EQ* has your guide to all the hot products that are sure to improve project studio recording (Tie-In Plug: don't miss our Blue Ribbon picks for best in show on p. 18) 54



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On the cover: U2 by Richard Pasley/LGI; John Tropea by Peter Monroe

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It's nice to know an AKG studio standard isn't over anyone's head anymore.

Even among pros, there are times when your talent exceeds your budget. That's why we created the new AKG C3000. It has the warmth, clarity and character of the most popular AKG studio mic in the world — at about half the price. In fact, when you hear it you'll be amazed what a large, gold-coated diaphragm will do for your sound. The C3000 gives you all the quality of an AKG without having to pretend it's an AKG. It is.

AKG

Bean, from D'Cückoo, whose new "Umoja" CD is on RGB Records.

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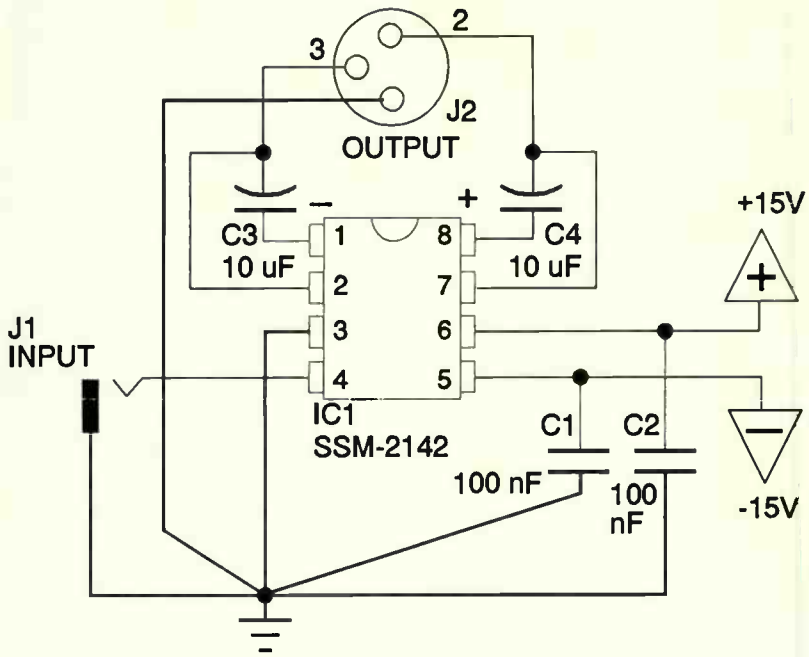

DO-IT-YOURSELFER: Figure 1

DO-IT-YOURSELFER

Thank you for the August 1993 issue of your magazine. I find it very informative and entertaining. I especially enjoy the "Do It Yourself" section. There is some additional information, however, that I would like to add to Jules Ryckebusch's design of the Balanced Line Driver circuit.

First of all, it is important to note that the SSM-2142 supplies a gain of 6 dB to the output. This decreases your system headroom and, in the case of a sound reinforcement system, the gain before feedback. There should not be anything to worry about here, but the user needs to be aware of it.

Also, in my experience with using the SSM-2142, the possibility of an output DC voltage offset exists. To eliminate the potential condition, I always include a coupling capacitor on each output, and each cross-coupling feedback loop is taken after this capacitor. This modified circuit is shown above (fig. 1).

I hope this adds valuable information to everyone who uses this excellent circuit.

Stephen J. Marks
Mark IV Audio, Inc.
Buchanan, MI

YOUR CHIP HAS COME IN

We have received inquiries regarding the Analog Devices AD1890 sample rate converter from those who had seen the article in the October issue.

Here, in no particular order, is a list of companies presently using the AD1890 sample-rate converter: Z-Systems, Fostex, Gambit, Harmonia Mundi, Zaxcom, TOA, Corporate Computer Systems, AMS/Neve, nVision, Digital Domain, BEC Technologies, and RE Technologies. Sony also uses the AD1890 and demonstrated a recording console that uses it at AES. We are helping several other manufacturers design it in. We are also considering customized versions for some "big-name" consumer product manufacturers.

Peter Predella
Audio Marcom, Mgr.
Analog Devices
Norwood, MA

VENT OF A WOMAN

Re: The letter from Jennifer Monnar in the October *EQ*.

I've been a subscriber to your magazine for a little over a year, and unless I

WRITE TO US

EQ wants to dialogue with you. Write to: Letters to the Editor, EQ, 939 Port Washington Blvd., Port Washington, NY 11050. Letters must be signed, and may be edited for clarity and space.

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missed the issue where you bashed women, I feel that Ms. Monnar's comments about your magazine are a bit harsh and somewhat unwarranted.

I have worked in technical theater for over 25 years. Two years ago I crossed over into live sound. From my first days, I acknowledged that I was in a male-dominated field. Many times I was the only woman on the crew. In retrospect, I wouldn't have had it any other way. It was cruel and frustrating at times, but it taught me resolve, patience, and forced me to be my best. And when the occasional sexist comment was made, more often than not, my male co-workers took more offense and sprang more readily to my defense than I did. I learned to look beyond the words to the meaning. It is irritating to have a promoter say, "Gee, hon, you really work hard," but I can also hear in those words praise and affirmation. And when a musician tells me, "Sweetheart, my monitor mix was great!" I don't mind in the least that my name isn't "sweetheart."

I consider myself a feminist, but there are more men working in the field than women, hence the majority of articles are going to be written by men or about men. I have never been offended by anything printed in *EQ*. The only thing that will anger me will be if you succumb to putting a female on your cover only because she is a female.

My only demand of any co-worker is that they share my commitment to give to the artist the very best sound reproduction possible. Anything less is not acceptable and everything else is not important.

Alicia Walters
Baltimore, MD

PEOPLE ARE PEOPLE

I can't believe Jennifer Monnar wants women recognized in *EQ* just for being a "woman in the music industry."

Sure, there are women out there making history, but why force a magazine to specifically print articles on women when it's not the sex of a person that justifies them being there.

We live in a society that demands recognition for each type of category we care to place ourselves in. Why can't people be people?

The recording industry is made up of many types of people working together to make music, period. When you think about it, we are people first and type or interest group second.

I'm sure the women Jennifer mentioned are good at what they do, but I've never heard of them. Now Roger Nichols and Bob Clearmountain have been on the cutting edge of recording since the early '70s, and it'll be hard to bump them for not being a certain color or sex.

Being mostly Indian, I can say I enjoy people being people — not types or categories.

Daniel B. Plunkett

WE'RE SORRY

We incorrectly listed the choices of *EQ*'s resident tipster Dave Brody in our TEC Award picks section of the October issue. Dave's correct choices are as follows.

Acoustics/Facility Design Company
Harris, Grant Associates, Iver, UK

Audio Postproduction Facility
Howard Schwartz Recording, NY, NY

I thought our eighteen hours of work had gone right down the drain. What sounded OK at 2AM just wasn't making it the next morning, and now my client was on a plane. To Japan. For three weeks.

So I hooked up my new Dolby Spectral Processor. It didn't take long to get the vocals popping back out of the mix, the horns punching, the bass cutting through. It even added the final sparkle to the master that made the recording.

It saved the session.

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Microphone Technology
Sony C-800/C-800G tube mics
Studio Monitor Technology
Boxer Five (F) Film Monitoring Sys
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Signal Processing Technology
Avalon EQ
Recording Devices/Storage Technology
Digidesign Pro Tools Rev. 2.0
Recording Console Technology
SSL 8000 Series

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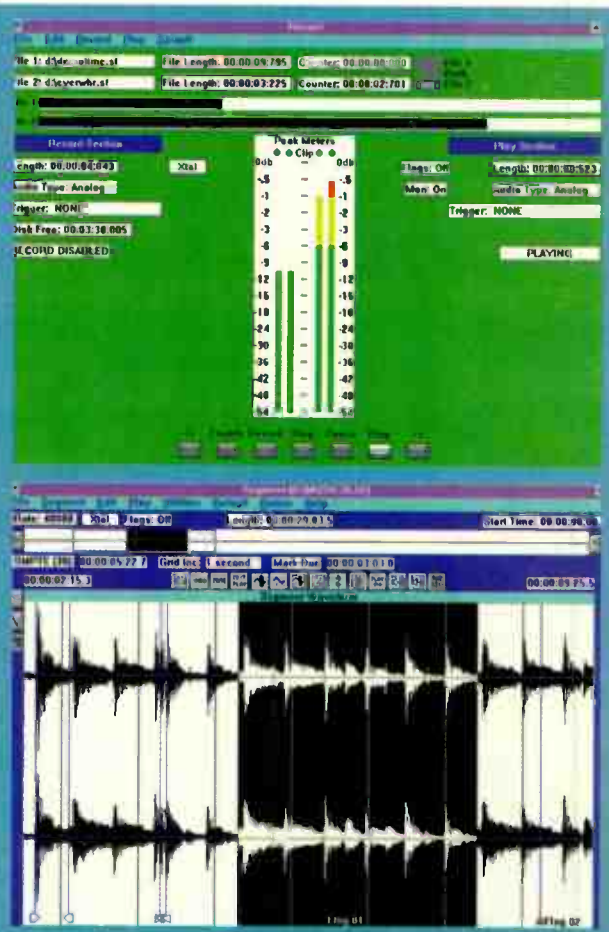


OUR PRINTER'S SORRY

What, you've never had an off month? In the October issue, the figures that ran in the MicroTechnology Unlimited's MicroSound Digital Audio Workstation review were unreadable due to a printer's error. Here is how they were supposed to look (from top to bottom: figures one, two, and three):

World Radio History

1 5 0 0
SERIES

WHATEVER YOU DO — DON'T BUY THE WRONG MIXER.

Especially if you're doing multitrack recording — whether digital or analog. Fact is, a mixer that's not specifically configured with the features essential for multitrack recording just isn't a recording mixer. Bottom line is, general purpose mixers make multitrack recording a nightmare.

You see, mixers that aren't designed and engineered for multitrack recording will torture you with the endless hassle of patching and repatching — every time you track, overdub or mixdown. It's frustrating, wastes valuable time and leaves you tangled in cable.

So before you choose a mixer for your studio — be sure it has the features of a dedicated recording mixer.

IT'S NOT A RECORDING MIXER IF IT DOESN'T HAVE THESE FEATURES.

MULTITRACK DECK CONFIGURATION

If you don't have dedicated inputs and outputs for your 8-track deck, where do you plug it in? Without this basic recording configuration you'll be repatching day and night and you won't be able to record an 8 tracks at once. With these inputs, tape monitoring is as simple as pressing a switch. Also, because the TASCAM M1500 is a true 4-buss mixer, you can mix any combination of your input signals to any of the 4 output busses directly to tape.

SWEEPABLE MIDRANGE EQ

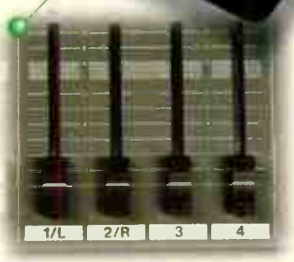
Ask for it. Because when it comes time to tailor your sound, you need the flexibility where the action is — in the midrange. The M1500's sweepable midrange lets you isolate specific mid frequencies allowing you to make the subtle tonal corrections you want.

DIRECT OUT AND GROUP OUT ASSIGNMENT SWITCHES

You gotta have these. Because without them you can't directly send a single input to tape, or record several inputs to one track. But with them, assign your inputs anywhere by pressing a few switches. Best part is, you'll never have to refer to any complex patch diagrams.

ELABORATE MONITORING

In a recording environment you need to hear what's going through your board at all times. With the M1500's comprehensive monitoring matrix you are able to hear any sound source at any time — inputs, tape, AUX sends, anything — it's your choice, just press a switch.



IN-LINE MONITORING

A sure sign of a recording mixer. This lets you monitor your tape tracks at any time without sacrificing an input channel. Just press a switch. With the M1500's dual section not only can you monitor tape tracks, it can be used for additional effects sends, or to double your inputs for virtual tracking at mixdown. And do any of this by flipping a switch.

TRUE TRANSPARENCY AND LOW NOISE

In recording, your signal goes through the mixer several times. And each time it goes through, it is important not to lose or gain anything. Especially an identifiable "mixer sound." Test any mixer for its transparency. Take any signal and bounce it 3 or 4 times on your favorite digital recorder. With the truly transparent M1500, you'd be hard pressed to differentiate between the bounced tracks and the original signal.

At TASCAM, we've been making multitrack recording equipment for more than 20 years. We pack that experience into every mixer we make — and we make more recording mixers than any other company in the world.

For our M1500 Series of recording mixers, the result is an affordable mixing console configured for 8-track recording. A truly transparent mixer that makes tracking, overdubbing, and mixdowns easy. An extraordinarily flexible console loaded with the features and specs you'd expect on consoles costing thousands more.

But the M1500 Series of recording mixers are priced less than many general purpose mixers on the market. They're available in a 16-channel/32-input tabletop version (M1516) and a compact rack mountable 8-channel/16-input version (M1508). So if you're involved in digital or analog 8-track recording, you've just found the best recording console value in the industry.

$999
M1516 $1599

Get your hands on a true recording mixer today: the TASCAM M1500 Series. There's one waiting for you at your authorized TASCAM dealer. Go ahead — test it and play with it. It's your next recording mixer.

TASCAM.
Take advantage of our experience.

© 1993 TEAC America Inc. 7733 Telegraph Road, Montebello, CA 90640 (213) 726-0303

CIRCLE 86 ON FREE INFO CARD

World Radio History

EQUAL TIME

Q *Since most stage setups require the main house PA amps to be set off to one side of the stage, is there a timing problem when using unequal length speaker cables; say 80 feet feeding the stage left speakers and 20 feet feeding stage right?*

Chuck Carlley
Jackson, MS

A Your concern regarding arrival time differences due to the cable lengths in your sound system is, fortunately, unfounded. Audio in a wire is an electrical signal, which travels at slightly less than the speed of light. The difference in arrival time between the 20-foot cable run and the 80-foot run would be insignificant at audio frequencies. Audio signals, however, travel at a mere 1120 feet per second in air (at room temperature) and once the sound leaves the loudspeaker, a healthy concern over path length differences is warranted.

You should consider the impedance of the loudspeaker cables. This should always be less than five percent of the minimum impedance of the loudspeaker, on even your longest run of cable. This prevents the cable from having a negative impact on the power available to the loudspeaker and the control the amplifier can exhibit over it.

Usually the greatest area of concern in multipair loudspeaker cables is the reliability of the connector and breakdown of the cable near the connector. This is the most common cause of open or short circuits on amplifier outputs and the loss of signal at the loudspeaker. After choosing the right connector and cable, regular inspection of these components can have the greatest impact on when (if ever) the signal reaches either of your loudspeaker stacks.

Wade McGregor
Contributing Editor
EQ

VIVE LA DIFFERENCE

Q *I want to replace the TL072 dual op amps in my console with quieter, higher-performance parts. Do you have any suggestions?*

Claude Roldu
Paris, France

A Here's a comparison of three dual op amps:

Type	Noise	Slew Rate	Current (no load)
TL072	18 nV/root Hz	13 V/µS	3 mA
NE5532	5 nV/root Hz	9 V/µS	8 mA
SSM2139	3.2 nV/root Hz	11 V/µS	4 mA

Although the SSM2139 is much quieter, the tradeoff is that external compensation is required for gains below 3. The NE5532's tradeoff is the relatively high current consumption, which can be as much as 16 mA (figures given for all parts are typical ratings). If you're replacing several op amps, this could put a major strain on the power supply. One option would be to replace only the mic preamps with improved performance chips, since this is where the difference would be most dramatic, and you could probably get away with the moderate increase in current consumption.

Be aware that any modifications may have unforeseen ramifications due to board layout, grounding, and so on. Change the chips in one channel and work with the mixer for a few days before committing to dealing with the rest of the mixer, and be extremely careful about exceeding the power supply specs.

Craig Anderton
West Coast Editor
EQ

DON'T FORGET THE TIP

Q *In your June 1993 issue (page 43), engineer/producer Bruce Swedien mentioned that he used conical speaker stands called Tip Toes™ to mount nearfield monitors to his console's*

The mike designed for those of us tired of going nowhere.

Introducing Gemini's VH-180 Wireless Microphone—designed to give you the freedom you need.

If you're ready to really cut loose on your next gig, start with our VH-180 wireless mike. It gives you up to 150 cable-free feet of wireless mobility, features our exclusive no-pop "silent" on/off switch and includes a vinyl carry-case and screw-on antenna. And thanks to our exclusive RF-signal enhancement system, your signal will kick through loud and clear in situations that would make other wireless mikes snap, crackle and pop. If you're ready to start going places, start with the Gemini VH-180.

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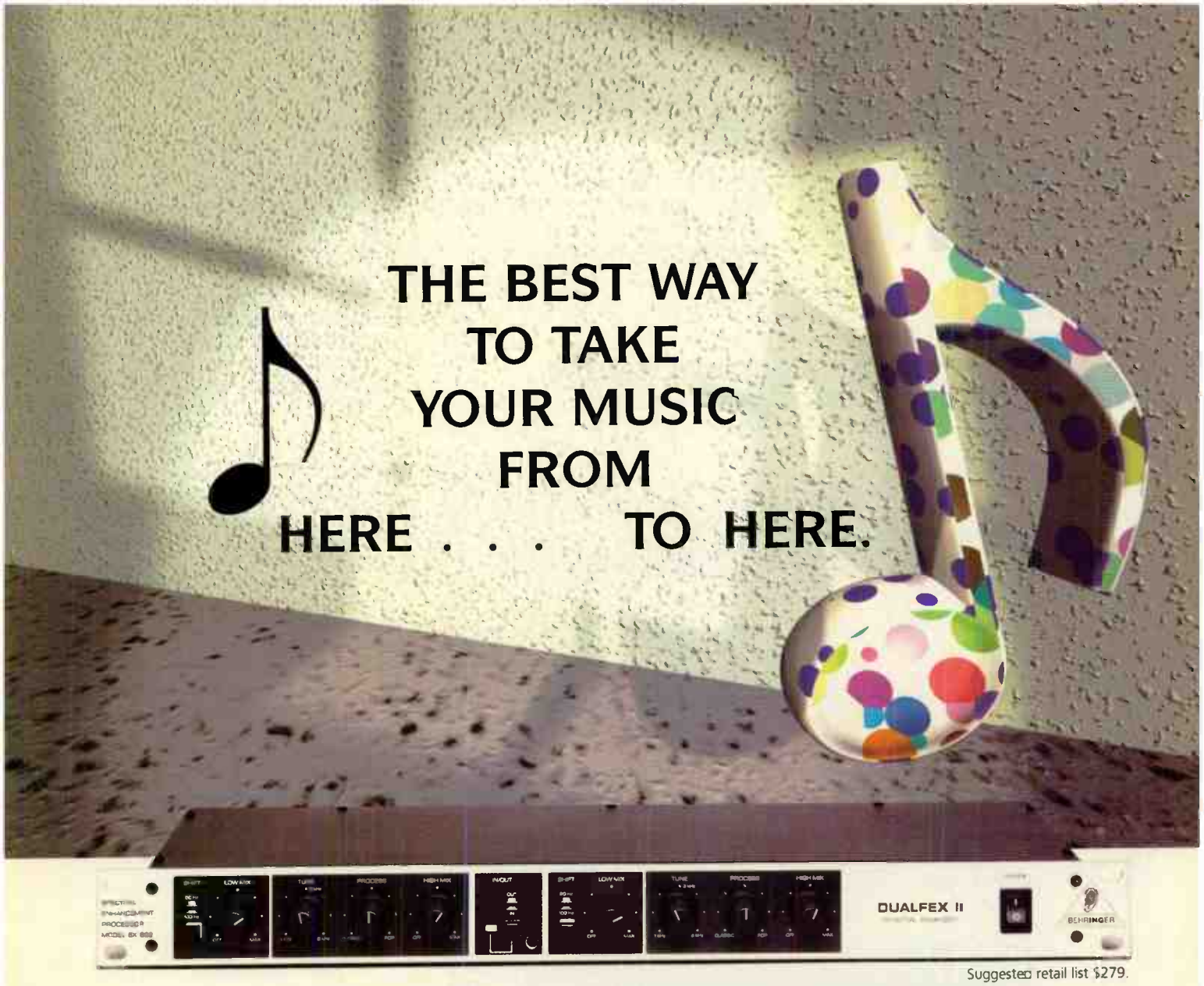

Suggested retail list $279.

Introducing the new DUALFEX II from Behringer.

Have you noticed a difference between your recordings and the sound of CDs and tapes from your favorite artists? You can't fix it with EQ. And adding more parts to the mix just makes everything sound muddier.

With the new DUALFEX II, all your parts stand out bright and clear, up front in the mix. Once you hear how it makes your music jump, you won't be able to live without it.

You've heard about exciters and enhancers. The DUALFEX is both — and more. Its unique Variable Sound Processor lets you manually adjust the processing from "enhance" to "excite," and get every sound in between.

And, unlike other units, the Dualfex's tunable high pass filter allows you to tailor the high end while a separate frequency switchable Bass Processor lets you fatten up the bottom.

Best of all, you get the musical, satisfying level of sonic performance and noise-free sound enhancement you've come to expect from Behringer.

DUALFEX II. The best way to go if you want to take your music to a better place.

THE PERFECT EAR. BEHRINGER

For more information about Behringer Signal Processing, please call 1-516-932-3810 or write to Samson Technologies Corp., P.O. Box 9068, Hicksville, NY 11802-9068.

Behringer is exclusively distributed in the U.S. by Samson Technologies Corp.

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CIRCLE 09 ON FREE INFO CARD

World Radio History

meter bridge. Where can these stands be purchased?

Chris Wood
Ashland, OR

A Tip Toes are one of the products of McCormack Audio Corporation, a manufacturer of high-end hi-fi preamps, amps, and several accessory-type products. Formerly known as "Mod Squad," McCormack is located at 542 North Highway 101, Leucadia, CA. Tel: 619-436-7666. When you call them, mention *EQ* and they'll send you a complete product brochure and a list of local retailers who carry Tip Toes.

Hector G. La Torre
Executive Director
EQ

GETTING REALISTIC

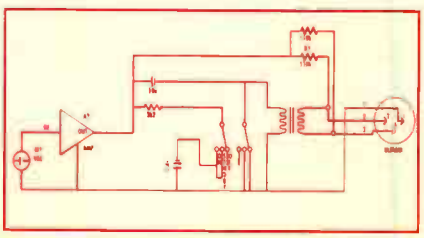
Q *I own two Realistic PZM mics (cat. no. 33-1090) that appear to be clones of the Crown version, but have minor drawbacks. For example: lower output than the Crown; battery powered by one 1.5V AA or two Eveready A544 (6V each), which must be removed when mics aren't in use; and 1/4-inch plug on end. I realize the 1/4-inch plug problem is easily solved with an adaptor, but can this mic be modified to accept 48V phantom power?*

James A. Griffin
Jackson, MS

A Yes, and pretty easily. The problem of lower output could be due to a number of things, none of which are easily addressed via user modification. Four things must be done to power the mic with phantom power:

1. Optional output transformer must be used.
2. An XLR or other balanced capable connector must be used.
3. The high side of the transformer goes to the plus (pin 2); the low side goes to the minus (pin 3); and the shield must be carried through to either the sleeve, ground, or shield (pin 1).
4. Two 110 Kohm resistors must be tied from the plus and minus connections of the input side of the transformer to the junction of the 10µf Cap and the 2k2 resistor. (See diagram below.)

Greg Hanks
New York Technical Support, Ltd.
Chappaqua, New York



This is where your questions get answered. Send your query with your name and address to:
EQ Editorial Offices,
939 Port Washington Blvd.,
Port Washington, NY 11050
Fax: 516-767-1745
America Online: MPANDA

Power Mixer

Large mixing consoles can come in mighty handy when the situation calls for lots of microphones and several different mixes. But what about those applications when the needs are much more basic? Introducing the MM-6 PowerCard from ASHLY. Just plug this input option into any of ASHLY's new amplifiers and you've got all the power the job requires without the extra complication and cost of a separate mixer.

The MM-6 has separate controls for each line level channel, allowing for the connection of two stereo sources or four monaural ones. Phantom power is provided for condenser microphones, and there are even patch points on each channel for the connection of an equalizer or any other signal processing device. Combine all this flexibility with any of ASHLY's latest amplifier models, and you have a *truly powerful* powered mixer! Sometimes the best solutions come in small packages.

Ashly Audio Inc., 100 Fernwood Ave, Rochester, NY 14621
Toll Free (800) 828-6308, Telephone (716) 544-5191 , FAX (716) 266-4589

ASHLY

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Gain

MD 511/512

MD 515/516

MD 518

MD 527

MD 530

BF 1051

Gain. Get more than what you pay for. With a ProForce microphone, you get Sennheiser's award-winning sonic superiority, and gain that reaches incredible levels before feedback. Plus, a unique combination of new high tech materials that ensures rock-solid durability.

Laser-age manufacturing techniques keep the cost of ProForce mics low. But their sound and ruggedness are uncompromised Sennheiser. Grab a ProForce mic... and gain complete control of your performance.

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CIRCLE 77 ON FREE INFO CARD
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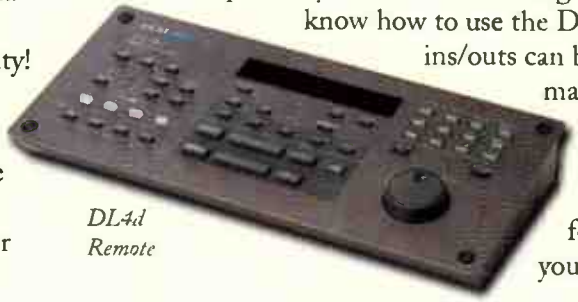
Ten Reasons Why You Should Cho

1. TAPELESS EDITING The DR4*d* can simultaneously record 4 tracks directly to standard SCSI-compatible hard disks, not tape. Tape recorders which use a cassette format (VHS, 8mm, etc.) have a huge problem: without at least two machines, you can't edit. But even a single DR4*d* allows random access editing that tape recorders just can't offer. Move, Copy, Insert, Copy + Insert, Move + Insert, Erase, and Delete with ease. Edit with complete confidence, because if you try an edit but change your mind, the Undo function will instantly restore the previous arrangement. It's a breeze to copy any part of a track and paste it anywhere on any track, even with a specified number of repeats. Or perhaps use the Insert commands to instantly slide track data in time against other tracks. This editing power encourages experimentation, and thus, your creativity! Imagine it. Do it.

2. NO WAITING Another problem with tape is the time required to physically move from one point on the tape to another. Concentrating on your music is what's important, not waiting for tape to shuttle back and forth. Never again waste such precious time: the DR4*d* allows you to instantly move to 108 different locations. Set up repeat sections, jam along with your tracks, then drop into record to capture it all while it's still immediate, fresh.

3. JOG/SHUTTLE Another cool DR4*d* advantage is the ability to offer scrubbing of audio, like "reel-rocking"on analog decks - only with much better quality. Our Jog/Shuttle wheel lets you scrub through the audio at various speeds, forwards or backwards. So finding precise editing points is only as complicated as using your ears.

4. FAMILIAR OPERATION One concept we *did* want to carry over from tape recorders is the user interface. Friendly, tape machine-style controls make the DR4*d* by far the easiest hard disk recorder to use. With dedicated buttons for Play, Stop, Rewind, Fast Forward, and so on, what could be simpler? If you've used an analog deck, then you know how to use the DR4*d*. Punch-ins/outs can be performed manually or automatically from the front panel, or via footswitch. Like you'd expect.



DL4d Remote

5. EXPANDABILITY Up to four DR4*d*s can be chained together to create a 16-track system, simply by plugging an optional cable between units! And the optional DL4*d* Remote makes it a snap to

World Radio History

ose the DR4*d* Hard Disk Recorder

control all of them. An optional, factory-installed 200 MB internal hard disk offers 32 track minutes of recording right out of the box. The DR4*d* can handle up to seven hard disks and supports seamless overflow recording across multiple disks. With enough disk storage space, you can actually record on all four tracks for an incredible 24 hours!

6. EXCELLENT CONNECTIONS The balanced TRS 1/4" Input and Output jacks easily switchable between -10 and +4 dBu levels, simplify interfacing with any type of console. The DR4*d*'s pair of digital I/O ports allow communication with other digital devices in the form of both XLR and RCA connectors (AES/EBU or Type II selectable), as well as provide DAT backup. And then there's the supplied SCSI port for access to external hard disk drives. Just plug and play!

7. YOU'VE GOT OPTIONS And affordable ones, at that. For digital access to all four channels simultaneously, the IB110D provides the two additional AES/EBU ports. For SMPTE timecode applications (slave or master), the IB112T is installed in seconds. The IB113M interface gives you MIDI In, Out, and Thru, and the IB111S is a second SCSI port which will allow connection to computers for visual waveform editing and magneto optical drives for data backup.

8. DEDICATED DESIGN The DR4*d* is a dedicated digital audio product rather than an add-in board for a computer. It's a tool designed for a single purpose: to record and edit audio precisely, effortlessly, and affordably. We think you'll agree that it succeeds on all counts beautifully.

9. SOUND QUALITY The DR4*d* contains Akai's own advanced digital technology, including super-clean 18-bit 64x oversampling A/Ds and advanced single-bit 8x oversampling D/A convertors with 18-bit resolution. Industry standard sample rates include 48, 44.1, and 32kHz. In short, the quality is superb and with a full 96dB dynamic range, you can rest assured of always sounding your best.

10. $1995.00 Simply put, the DR4*d* is the best value in digital recording today. For the first time, the nucleus of a professional quality 4-track hard disk recording system can be yours for only $1995.00! Just add internal or external hard disks, and you're ready to use our latest masterpiece for creating your next masterpiece.

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Specifications subject to change without notice
Consult your Akai dealer for information on compatible hard drives

DR4d

AKAI DIGITAL

CIRCLE 01 ON FREE INFO CARD

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The 3rd Annual EQ BLUE RIBBON AWARDS

The first AES held at New York City's Javits Center turned out to be the largest ever with 352 exhibitors showing their wares to more than 17,000 attendees. Our editors and contributors tirelessly walked the 185,000 square feet of show floor to bring you the best in show — our Third Annual EQ Blue Ribbon Awards.

THE BLAST FROM THE PAST AWARD
TO AKG VINTAGE TL MICROPHONE

AKG has introduced the Vintage TL. This transformerless dual large diaphragm multipattern mic combines the sonic characteristics of the 1950s C12 capsule with advanced electronics from the C414 Series that exceed all digital recording requirements. So you now can have the best of both worlds — vintage warmth with digital sonics. For complete details, contact AKG, 1525 Alvarado St., San Leandro, CA 94577. Tel: 510-351-3500. Circle EQ free lit. #101.

THE MORE THAN JUST AUDIO AWARD
TO DIGIDESIGN'S POSTVIEW

Digidesign's PostView brings digital video capabilities and VTR machine control to its popular Pro Tools audio editing system. PostView allows Pro Tools to import an accurate, instant, and random access digital "PostView Movie," and play it back from within the Pro Tools session. This allows for accurate laying of Foley, music, dialog, and special effects tracks, as well as accurate editing. The PostView movie is displayed either on the same monitor screen as the Pro Tools audio session or, with the appropriate hardware, on a separate monitor screen. The Movie is captured to a hard disk from a video source by an appropriate third-party video capture board and video capture software. By enhancing the QuickTime clock reference (which has less than frame-accurate resolution), PostView ensures frame-accurate synchronization between the audio and video once the PostView Movie is imported into Pro Tools. For complete details, contact Digidesign, 1360 Willow Rd., Menlo Park, CA 94025. Tel: 415-688-0600. Circle EQ free lit. #102

THE SIZE DOES MATTER AWARD
TO AMEK'S BIG MIXING CONSOLE

The Big by Langley console is manufactured by Amek and is available as either a 28- or 44-input chassis. Monitoring is in-line and there are eight stereo returns. All consoles are equipped with "Amek Supertrue" fader and switch automation. Also standard is a Recall system enabling all pot and switch positions from a mix to be stored in the computer for subsequent Recall and manual reset. For more information, contact Amek US Operations, 10815 Burbank Blvd., North Hollywood, CA, 91601. Tel: 818-508-9788. Circle EQ free lit. #103.

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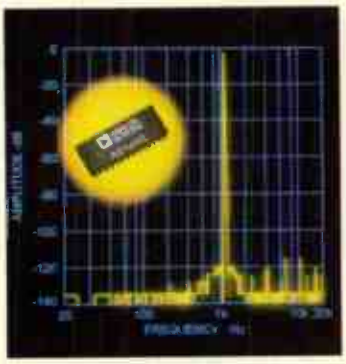
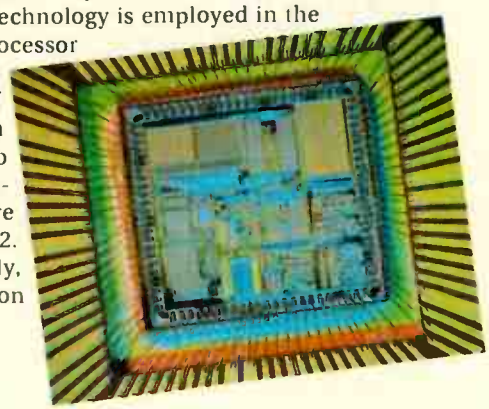


THE WHOLE IS JUST A SUM OF ITS PARTS AWARD

TO ANALOG DEVICES' AD1890/1, DIGITECH'S S-DISC, AND MOTOROLA'S DSP56000 CHIPS

Analog Devices' AD1890 and 1891 SamplePort stereo asynchronous sample-rate converters (pictured at left) are the industry's first such ICs designed to solve sample rate and digital data interconnect problems in professional, computer communications, and consumer audio applications. The ICs are fixed-function, DSP-based chips that convert a digital input sample stream — at an arbitrarily clocked or dynamic changing sample rate — to a user-set output sample rate. Input and output clock frequency is automatically sensed with no user programming required. DigiTech's fourth generation S-DISC technology is employed in the company's TSR-24 digital reverb and multieffects processor and allows you to program an unlimited number of effects algorithms by stacking effects modules in any chosen order, even using a module more than once if desired. Motorola's DSP56000 series of 24-bit digital signal processors (shown on the lower right) are designed to provide high-quality effects in various digital audio applications including multimedia computers, sound effects, electronic instruments, film production, and consumer and automotive audio products. For more information, contact Analog Devices, One Technology Way, Norwood, MA 02062. Tel: 617-329-4700. Circle EQ free lit. #104. DigiTech, 8760 So. Sandy Parkway, Sandy, UT 84070. Tel: 801-566-8800. Circle EQ free lit. #105. Motorola, 6501 Wm. Cannon Drive W., OE314. Austin, TX 78735. Circle EQ free lit. #129.



THE TWO COOL AWARD

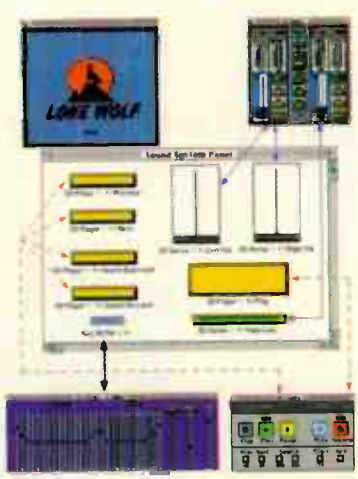
TO THE FOSTEX FOUNDATION 2000 AND RD-8 DIGITAL 8-TRACK ADAT-COMPATIBLE RECORDER

Fostex gets the nod for far-thinking technology and for taking its cues from American technology. The result is the Foundation 2000 (pictured), a six-rack-space enclosure for audio recording, mixing, and editing. Each Foundation 2000 has 16 channels summed to eight output tracks or dual-stereo mix outputs. One edit controller (a removable front panel) will support one to six systems, up to 96 channels. Data is stored on the Removable Project Environment (RPE), a standard Foundation 2000 feature. The RPE is a 3 1/2-inch removable 540 MB SCSI hard drive that stores up to 90 minutes of mono audio. The removable feature eliminates upload and download time in the production process. As many as six external SCSI devices can be added for additional storage capacity. Foundation is based on a 16/24-bit scalable architecture. It comes with 18-bit data converter resolution and is open to future 20-bit digital performance. Fostex also deserves credit for furthering the affordable digital multitrack revolution. Its ADAT-licensed 8-track is used for multitrack recording, sound file library storage and retrieval, and for synchronized playback and production. It comes in a sturdy, rackmountable casing and it sports a familiar user interface; the same as that of an analog multitrack recorder, minimizing the user's learning curve. For further information, contact Fostex, 15431 Blackburn Ave., Norwalk, CA 90650. Tel: 310-921-1112. Circle EQ Free Lit. #107.

THE WE'RE ALL CONNECTED AWARD

TO THE AES SC-10 COMMITTEE AND MEDIALINK LICENSEES

We consider it the most significant development since MIDI. The AES SC-10 Committee made history by paving the way to a sound system computer control protocal. Don't be surprised if this move impacts the pro audio and consumer electronics industries for many years to come. Meanwhile, Lone Wolf's MediaLink received the nod of innumerable licensees. It is a format-independent network communications protocol that allows for the connection of electronic devices into a fault-tolerant network. MediaLink was designed specifically for real-time transmission of streaming multimedia data — such as audio and video, as well as control and monitoring signals. All data formats can be carried on a single cable through a single port. A high-speed channel for transferring control configuration and performance data between devices that are MediaLink-compatible is easily created. For more info, contact Lone Wolf, 1509 Aviation Blvd., Redondo Beach, CA 90278. Tel: 310-379-2036. Circle EQ free lit. #108



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3rd Annual EQ BLUE RIBBONS

THE RACK IN THE BOX AWARD
TO PEAVEY'S MEDIAMATION

Peavey's MediaMation is an entire sound system, except for power amps and transducers, on a PC platform. The MediaMation operating software provides a visual interface for the Peavey MediaMatrix digital signal processing card mounted within the PC. Each MediaMatrix DSP card utilizes five Motorola 56000 processors and the number of cards used is only limited by the number of available card slots in the user's PC. Individual signal processors can be called up from the Windows menu and placed on the user's screen as though the designer were drawing a block diagram of the audio system. Once the audio chain is determined, the user then "wires up" the devices using a mouse, thus enabling all interconnections to be accomplished with a simple "point and click." For further information, contact Peavey Electronics, 711 A Street, Meridian, MS 39302. Tel: 601-483-5365. Circle EQ free lit. #109.

THE ALL MY LIFE'S A CIRCLE AWARD
TO RSP TECHNOLOGIES' CIRCLE SOUND SYSTEM

RSP Technologies' Circle Sound system is a cost-effective surround format that dramatically enhances music productions while adding more realism to video sound productions. The Circle Sound format is designed for recording in surround and also allows playback of any audio format, including any existing surround format. Circle Sound is an analog design intended to be used with at least four separate full-range speakers placed around the listener and driven from equal power sources. The complete system is comprised of three components: the Circle Sound Encoder, the Circle Sound Decoder, and the Circle Sound Controller that contains a four-joystick remote. The Circle Sound Decoder is the key element in the system. It detects ambient information present in the input signal to produce multidimensional effects. The advanced steering logic in these circuits use this detected information to place sounds at specific locations around the listener. For more information, contact RSP Technologies, 2870 Technology Drive, Rochester Hills, MI 48309. Tel: 313-853-3055. Circle EQ free lit. #110.

You've got a stereo signal. Why in the @#*!? would you want to combine and process it in mono when you could process the whole thing in stereo with the exceptional effects processor you see right here.

The remarkable Yamaha SPX990. Which, unlike other processors in its price range, offers two discrete inputs from beginning to end.

Here's the other big reason why you're going to want this beauty.

It sounds a lot better.

Where other processors offer you standard 16-bit A/D and D/A converters, the SPX990 boasts 20-bit A/D and D/A conversion. And internal 28-bit processing to deliver much greater dynamic range than most any effects processor you care to name.

So you'll have no trouble patching things up, the SPX990 takes either XLR or TRS phone jack connectors.

And as you might expect from the company that brought you the legendary SPX90, the first affordable digital effect processor, everything about the new Yamaha SPX990 has been designed to silence other effect processors in its price range.

For starters, we've enhanced our algorithms to produce

THERE'S NOTHING WRONG WITH YOUR LAST

World Radio History

THE DID YOU CATCH THAT DEMO? AWARD

TO THE TWO-VOICED GUY AT AT&T'S BOOTH

All right, we know that the man from Tuva is not a new product, but everybody at the show was talking about AT&T's demo, where this man and a young Tuvan boy each sang two notes at the same time. And while it looked a bit uncomfortable, no one could deny the uniqueness of the sounds being sung — a deep croaking sound combined with a high-pitched whistle. The live show going on at demo room 3DO5 made more than a few attendees wonder, "How does he do that?" Others were thankful that Paul Simon never ventured in for a demo.

Photo by Bill Loewy/Friends of Tuva

THE WHOLE SPECTRUM AWARD

TO THE SPECTRAL SYNTHESIS AUDIOPRISMA

Spectral Synthesis' new AudioPrisma is a digital audio workstation that features 96 tracks, 12-channel real-time mixing with dedicated multiband parametric EQ on each channel, 24-bit DSP, and MIDI, SMPTE, MTC, and SCSI support all on a single board for a suggested list price of $3995. The Prisma operates within Windows to provide the sophisticated mixing, patching, editing, and signal processing functions required by professional environments. The Prisma will chase code, it supports CMX auto-conforming, and it permits recording on high-capacity removable media. For more information, contact Spectral Synthesis at 19501 144th Ave, NE, Ste. 1000A, Woodinville, WA 98702. Tel: 206-487-2931. Circle EQ free lit. #112.

far more natural sounding reverbs than you probably thought was possible.

But there's more to it than that.

The SPX990 features 39 different types of Reverbs, Delays, Echoes, Modulations, Pitch Changes and Sampling – plus variations on each – for a total of 80 all new effects. And if that's not enough, you can simultaneously add EQ and/or compression on top of any of these effects.

The SPX990 also features 100 internal memory locations to store your own variations.

Store up to 100 of your favorite effects programs on one of these cards and you can take them with you to every session.

And you can say goodbye to all the button pushing. The data entry wheel on the SPX990 lets you enter your data on the fly. Looks like we're running out of room. So here's the big finish.

Every so often, something comes along that makes people in the recording industry sit up and take a good hard listen to the way they're doing things. This is one of those times.

Stop by your nearest Yamaha dealer and check out the SPX990 today. For more information, call 1-800-937-7171 Ext. 310.

Your next mix will thank you for it.

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CIRCLE 65 ON FREE INFO CARD

World Radio History

3rd Annual EQ BLUE RIBBONS

THE BUILT TO LAST AWARD
TO TANNOY'S MARK II PBM MONITORS

Tannoy has added the PBM Mark II Series to its award-winning line of nearfield monitors. Refinements in the PBM Mark II Series, which includes the PBM 8, PBM 6.5, and the PBM 5, include injection-molded cone materials, rather than the vacuum-molded technique that has been the past standard. These polyolefin low-frequency cones are also mica-impregnated for high resolution and enhanced endurance to avoid speaker fatigue. The Mark II Series also features high-grade minimalist crossover topology, and the speaker elements are suspended with a single roll of nitril rubber. These enhancements result in an additional half-octave low-frequency extension and smoother, more articulate midrange and high frequencies. There are three models in the line ranging from $295 to $695 per pair. For more info, contact TGI/Tannoy, 300 Gage Ave., Kitchener, Ontario, Canada N2M 2C8. Tel: 519-745-1158. Circle EQ free lit. #113.

THE NEW & IMPROVED AWARD
TO THE ENSONIQ ASR-10 O.S. VERSION 2.0

Ensoniq's ASR-10 Advanced Sampling Recorder adds two tracks of digital audio recording to hard disk or RAM memory. You can add up to two tracks of live audio performance to MIDI sequenced tracks for full production in a single product. The new O.S. Version 2.0 features Digital Audio Tracks that can be recorded to either DiskTracks (SCSI hard drive) or to RAMTracks (internal memory). The floppy disk-based software will be available free to all ASR-10 owners and will be the standard operating system shipped with all ASR-10 samplers. Audio Tracks work like additional sequencer tracks, recording incoming audio instead of MIDI data. They can be recorded in conjunction with individual sequences or as part of a complete song consisting of multiple sequences linked together. The ASR-10's locate mechanism allows you to instantly move to any section of music and resume playback of both MIDI and audio data. Tracks can be recorded at 44.1 kHz or 29.76 kHz sampling rates in mono or stereo with punch in/out recording and auditioning of all recording and editing. For further information, contact Ensoniq, 155 Great Valley Parkway, P.O. Box 3035, Malvern, PA 19355-0735. Tel: 800-553-5151. Circle EQ free lit. #114.

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BETA Bio

ROGER LINDSAY, *SOUND ENGINEER*

HOMETOWN:
Liverpool, England

CLIENTS:
Sade, Mark Cohn, Basia, B.B. King, David Gilmour, Frank Sinatra, Frank Zappa, Joe Jackson, et al.

ON GETTING STARTED:
"As a keen young roadie in Liverpool in 1967, my family thought I would do it until I was 21, then 'get a haircut and a proper job.' Thanks to my wife's patience, some talented artists and a little luck, the former is infrequent and the latter has evolved into a long and enjoyable career."

ON BETA MICROPHONES:
"Sade's voice is unique — very subtle, very difficult to capture. When the Beta 58 came out a few years ago, it established a new industry standard. We're currently using the new Beta 87 Wireless. Its response is amazing — studio quality in live performance."

OTHER SHURE FAVORITES:
SM98A ("Great for drums."), SM91A ("Outstanding for kick drums and piano."), VP88 Stereo ("I use it for cymbals and percussion racks, and it's great for house tapes."), Beta 57 ("Superb for snare, bongos and congas.").

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Call 1-800-25-SHURE.

BETA Bio

SHURE BETA

CIRCLE 52 ON FREE INFO CARD
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3rd Annual EQ BLUE RIBBONS

THE BEST OF BOTH WORLDS AWARD

TO THE YAMAHA SPX990 SIGNAL PROCESSOR

Yamaha has introduced one of the first signal processors built with 20-bit A/D and D/A conversion. The SPX990 simultaneous multieffects processor can produce smooth, natural sound with extremely low noise. Electronically balanced inputs and outputs with XLR and TRS phone jack connectors are included, making for a wide range of compatibility, while tempo-based delay time programming is available. For more information, contact: Yamaha, P.O. Box 6600, Buena Park, CA. 90622. Tel: 714-522-9011. Circle EQ free lit. #115.

THE ALTERED STATES AWARD

TO E-MU SYSTEMS MORPHEUS Z-PLANE SYNTHESIZER

E-mu's Morpheus Z-Plane synthesizer is a rack-mount synth that features 14-pole digital Z-plane filters capable of modeling virtually any resonant characteristic. The Morpheus Z-Plane features 32-voice polyphony, 16-channel multitimbral operation, and an 8 MB sound complement that is internally expandable to 16 MB. For more information, contact: E-mu, 1600 Green Hills Road, Scotts Valley, CA 95067. Tel: 408-438-1921. Circle EQ free lit. #116.

IF SILENCE IS GOLDEN, THIS CO

The D&R Orion. From its Hi-Def™ EQs to its fully modular design, from its custom-welded RFI-killing steel frame to its incredibly flexible floating subgroups, the handcrafted Orion is every bit a D&R.

World Radio History

THE WHAT A CONCEPT AWARD
TO THE OTARI CONCEPT I

The new Otari Concept I features fully programmable master status switching, fader level and mute automation on both signal paths per module, all balanced inputs and outputs, Concept Image Recall system replayed against SMPTE/MIDI, and control of external MIDI devices. The solo system features AFL, PFL, and Solo-In-Place independently selectable for each path with Interlocked, Additive, and Temporary solo modes. For the whole story, contact Otari, 378 Vintage Park Drive, Foster City, CA 94404. Tel: 415-341-5900. Circle EQ free lit. #117.

THE GIVE A LITTLE BIT AWARD
TO THE APOGEE UV22 SUPER CD ENCODER

Apogee has finally placed the finishing touches on its UV22 super CD encoder. Apogee's UV22 does its job without sonic compromise and without adding a sound of its own. You can hear clean audio up to 30 dB down in the noise floor of the 16-bit CD. In addition, the UV22 process has 24-bit data handling capability and can encode information from beyond the 20-bit level into standard 16-bit formats. Other features include comprehensive input and output formats and a noise floor that is constant, irrespective of input signal. For more information, contact: Apogee Electronics, 3435 Ocean Park Blvd. #211, Santa Monica, CA 90405. Tel: 310-314-1700. Circle EQ free lit. #118.

HONORABLE MENTIONS

Tactile Technologies M4000 Console: The M4000 is a fully-automated, digitally-controlled analog mixing system that can be applied to studio applications, remote uses and stage mixing. Twenty-one functions are fully automated and it's (get this) project studio affordable. To find out more, contact: Tactile Technology at 310-802-1500. Circle EQ free lit. #130...**Soundcraft DC 2000 Console:** The DC 2000 is an in-line recording console that features fader automation, digital control, much more — for under $25,000. Available in both 24- and 32-input versions, the DC 2000 includes 4 band EQ, stereo foldback returns, and digital overbridge. For more information, call: 818-893-8411. Circle EQ free lit. #131...**Lexicon NuVerb Digital Effects Processor:** The Lexicon NuVerb showcases a plug-in card for Apple's NuBus. In addition to offering 20-bit audio processing with AES/EBU digital input and output capacity, there are currently 11 development partners that are making NuVerb compatible with their products. For more information, contact Lexicon at 617-891-6790. Circle free lit. #132 ..**KRK Model 6000 Nearfield Monitors:** KRK's Model 6000 monitors are the most affordable models to date, offering a high-quality construction plus 75 watts of high-power handling and a portable configuration. They also feature low distortion and a sensitivity rating of 89 db. For more information, contact: KRK at 714-841-1600. Circle EQ free lit. #133...**Crown SmartAmp Amplifier:** Designed to ensure maximum protections against sound system disasters, SmartAmp informs you about vital amplifier functions. Other features include a smooth output limiter, power supply gate, and backwards compatibility, allowing any premium Crown amp to be upgraded to a SmartAmp. For more info, contact Crown at 219-234-7017. Circle EQ free lit. #134.

NSOLE SHOULD COST 7486% MORE

Next time you audition a console, from anyone at any price, ask to hear a test for which we're well-known. It goes like this: We select 'mic' across the board, and assign every channel to the mix bus. We crank up the studio monitor amp, all the way. We push up all the channel and master faders, all the way. We turn the console's monitor level up. All the way. Next, we invite each customer to place his or her ear right next to one of the monitor's tweeters.

Gingerly, they listen, to not much at all.

Then, we bring the monitor pot down from what would be a speaker-destroying level to a merely deafening level. Before ears are plugged and music blasts forth, we invite one last, close listen, to confirm the remarkable: Even with everything assigned and cranked up, a D&R console remains effectively — and astonishingly — silent.

Of course, a D&R is much more than the quietest analog board you can buy. So we equip each handcrafted D&R with dozens of unique, high-sonic-performance features. And we back each board with our renowned factory-direct technical support.

How much is all of this worth? Well, if silence is golden, then every D&R is worth its weight in gold.

In which case, until we raise its price about 75 times, the D&R console pictured at left is one truly impressive investment opportunity.

D&R

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D&R handcrafts consoles for recording, live sound, theatre, post-production and broadcast, for world-class to project facilities. "Weight in gold" comparisons based upon 11/93 market prices.

CIRCLE 15 ON FREE INFO CARD

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Photo by Rick Diamond

GEORGIA ON HIS MIND: Chief engineer Mathew Still at Bobby Brown's Atlanta project studio.

LIFE'S A PEACH

Atlanta

"Not to be pigeonholed into any one category, Atlanta has encouraged musicians of all types to come here to lay down tracks."

Nashville may have country and Seattle may have grunge, but Atlanta, GA is undoubtedly this season's project studio haven. Engineers, producers, and artists are migrating to Atlanta en masse, building their own places and producing the hippest and most profitable ideas in the music industry today. Just a sampling of some of the artists that have recorded there — Arrested Development, Black Crowes, Kris Kross — and one can see why Atlanta, in the words of its effusive Mayor, "is well on its way to becoming the third-largest entertainment center in the U.S."

Widely recognized as a weather-friendly, down-home attraction, Atlanta is loved for what it is as much as for what it is not — namely New York or Los Angeles. "It's not quite the rat race down here yet," says Nate Smith, president of Bobby Brown's Triple B label. "The vibe is better, and it's more relaxed." John Rogers, manager of Dallas Austin's D.A.R.P. Studios agrees, stating the town's personality as the main attraction for a wide array of creative entrepreneurs. "People don't seem to be quite as greedy here," he observes, "but the competition's growing, mainly in rock and roll."

While rock and alternative music may indeed be penetrating Atlanta's entertainment base, there's no questioning the city's formidable roots in R&B and rap. Some of the stars and starmakers who have recently arrived to set up camp in Atlanta include Bobby Brown, Keith Sweat, Dallas Austin, and Jermaine DuPree, the producing mastermind behind Kriss Kross. But, for all the influence these studio owners have had in recreating Atlanta in the image of Motown, the individuals most responsible for getting the Atlanta scene off the ground in the first place are, without a doubt, L.A. Reid and Babyface.

Since arriving here in 1989, the Reid/Babyface union has delivered a relentless barrage of smash hits by superstars such as Boys II Men, TLC, Toni Braxton, and Keith Sweat. By hinging their bets on an Atlanta-based production company, comprised of their own Studio LaCoco and LaFace label, the pair effectively paved the way for future artists who needed financing for their own production companies built on Georgian turf. In that respect, credit is due to another legend in his own right, Clive Davis, founder and head of Arista Records, who gave L.A. Reid and Babyface his seal of approval early on. The duo has since split, leaving L.A. Reid at the helm in Atlanta.

Not content to be pigeonholed into any one category, Atlanta has encouraged musicians of all types to come here to lay down tracks. For example, one potential R & B bastion, Bobby Brown's Bosstown Studios, has expanded into an eclectic facility with a variety of clients. "From the beginning, it has been a priority of Bobby's that Bosstown be much more than a project studio," says studio manager Jon Marett. "The result has been a client base ranging from Arrested Development to Elton John to R.E.M."

While project studios have played a large role in shaping Atlanta's newest image as an entertainment powerhouse, the city does have its share of commercial activity as well. Facilities such as Audio Production Center, Southern Tracks, Crawford Post, and 2560 Studio, for instance, have also seen

World Radio History

their business grow as the excitement surrounding Atlanta builds. "One of the reasons this town is growing is because it's very cost-effective," enthuses Sal Nappo, owner of Audio Production Center, "and now that the Olympics are coming here in '96, everybody anticipates gangbusters business."

These days everyone's talking about the latest production hot shot to hit town — Brendan O'Brien, an A-list producer/engineer who made his name working for rafter-shakers like Pearl Jam, Red Hot Chili Peppers, and Stone Temple Pilots has hooked up with Atlanta's Southern Tracks operation. Many speculate that O'Brien's arrival in town will add another element to the ever-expanding Atlanta empire, one which speaks for the enormous rock/grunge constituency. "While Nashville's been getting a lot of session musicians, we've been seeing a lot of self-contained rock bands coming our way," says Mike Clark, owner of Southern Tracks.

Strong possibility. With hip-hop on one front and hard-rock on the other, Atlanta is now poised to become that which every rock and roll city craves to be — Hollywood (and dare we now add Nashville?) without the hype; New York without the noise. But underneath all the project studio heads' calls for "friendly competition" and "communal creativity" exists the inevitable specter of big business. And as the industry begins to tighten its focus on the town, a new question arises: How will Atlanta sing under the stress of being called the latest American jukebox hero? —*Jonathan Varman*

SMOOTH SAILING

Danny Kortchmar

"Basically I'm in favor of recording in other places, but the reality of that doesn't always come through."

The working title for Billy Joel's latest release, now called *River of Dreams*, was *The Shelter Island Sessions*. The name came from a project studio Joel had built at the Island Boatyard, located (as one might guess) at Shelter Island, New York.

The problem with naming it after his boatyard studio was that by the time all was said and done, only one of the songs from the studio made it onto the album ("The River of Dreams"). The rest of the songs were recorded at the Hit Factory in New York City.

Why the change of heart? The main reason was that this was Joel's first collaboration with producer Danny Kortchmar. "Billy had recorded six or seven tracks out on Shelter Island," explains Kortchmar, "and he gave me a tape of what he had done and I had a lot to say about it. I explained to him that these opinions were very subjective, but he wanted to try working with me, which means doing it my way."

Photo by Niko Bolas

DREAM TEAM: Danny Kortchmar (right) and Niko Bolas

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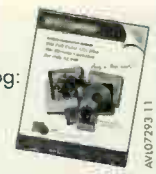

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Kortchmar's way meant moving Joel from the project studio and bringing in engineer Niko Bolas and the musicians he wanted, as Joel was recording on the island with his touring band. "Basically I'm in favor of recording in other places," Kortchmar continues, "but the reality of that doesn't always come through. He was in a boatyard — communication was hard. The room was not that great of a room. I felt he needed to be in a recording studio."

Apparently Kortchmar's decision was a good one — the album has been hovering around the top of *Billboard*'s charts since its release. Of course, location alone does not make a hit record, and Kortchmar's got a few more tricks up his sleeve:

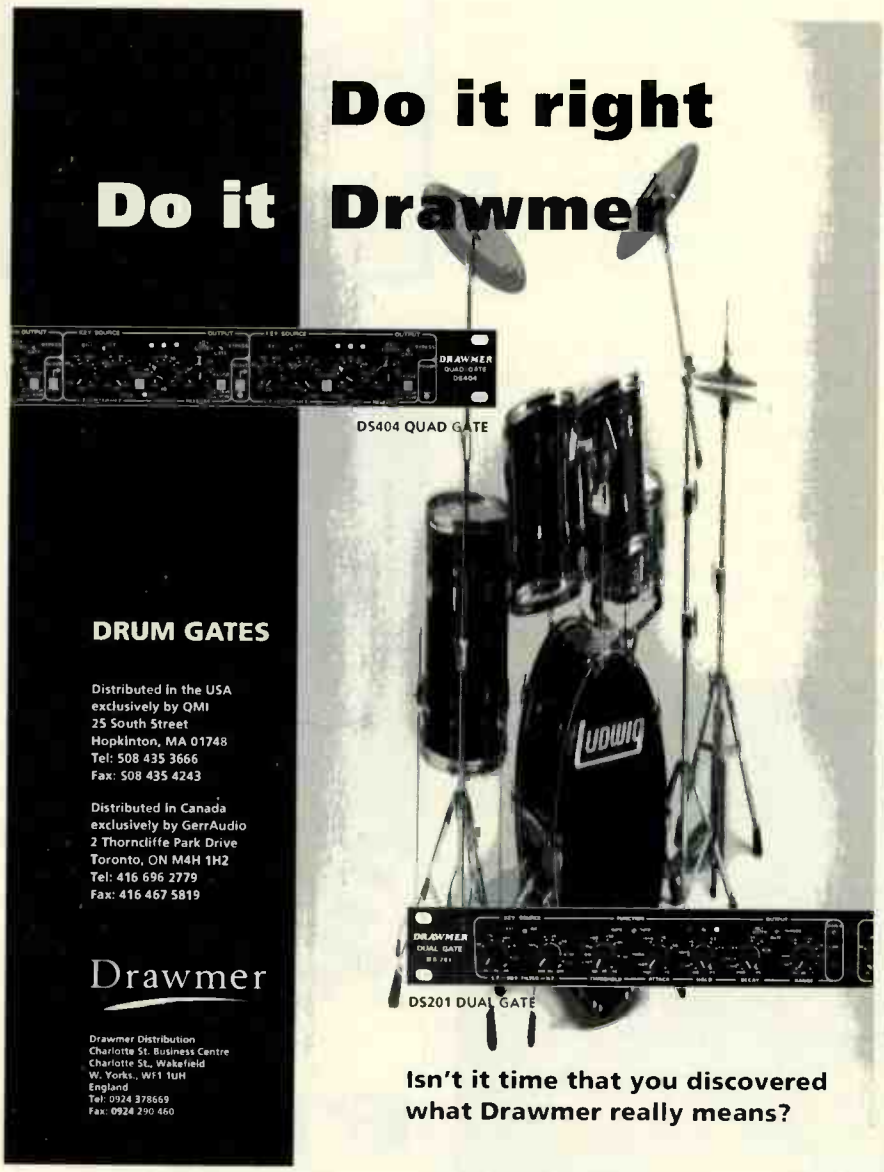
"Niko and I both believe in tubes and we like to work with older gear," he says. "We record from the mics in the studio right into Niko's mic pres and into one of my favorite pieces of digital gear — a Sony 48-track digital recorder.

"It's hard to say which is better — analog or digital," says Kortchmar. "It's the source that's got to sound great. It's got to be a great guitar into a great amp in a great room. By the time it gets to digital, it's already done.

"I prefer digital because of its speed. I like the sound of analog, but the recording process takes too damn long. In analog, if you want 48 tracks, you have to bounce and mix and most of the time you're listening to a lousy slave. You only hear the record once in the beginning and once in the end. I like hearing what I put on tape the way that it's going to be. Generally, we mix to 15 ips 1/4-inch and that brings back a lot of warmth."

Niko and Kortchmar use very few effects, notably an old EMT that Niko owns. Kortchmar adds, "Niko and I like the idea of a really good song played by a rocking band that means it. That's an effect in and of itself."

In addition to his producing duties, Kortchmar also played guitar on nearly every track on *River of Dreams*. He's currently finishing an album by Andrew Strong (of Commitments fame) and is currently producing Curtis Stigers' first album. —*Tony Savona*



CIRCLE 32 ON FREE INFO CARD

SAVING A SYNCING SHIP

Mike Thorne

"The thing that drove all of us who were interested in reviving the company was so that we could continue to have the use of this technology."

Mike Thorne loves Synclaviers. So much so that he bought (saved?) the company. He is part of a group that is engaged in the revival of the Synclavier Company — something that is making a lot of Synclavier owners breath a loud sigh of relief.

As Thorne explains, "The company [New England Digital] owed the bank a lot of money and they called in its loan and claimed the assets. Actually there were a number of people interested in buying the assets, all the spares and a number of systems.

"What happened was myself, Bruce Nazarian (a Synclavier owner

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Studiomaster

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Ten additional stereo inputs, 4 with EQ, allow for a variety of line inputs, effects returns etc . . . to be connected. Both RCA and 1/4 inch (pro) inputs have been provided on the 4 equalised stereo inputs, (2 with RIAA) and are switchable from the front panel allowing you to easily select between line sources at the 1/4 pro inputs and Hi Fi sources such as CD's, tape, turntables, etc . . . at the RCA inputs.

Additional features and specifications include inserts, channel mutes, input swap switching, dual 2 track tape facility, overall bus mutes for tape and stereo line inputs, PFL/ solo in place, a loudness button for the head-phone bus and more . . Dual half-rack ports add to the overall flexibility of the STAR SYSTEM allowing for the insertion of exclusive STAR SYSTEM audio processors including a stereo compressor, stereo gate, parametric EQ, digital reverb and digital delay.

The STAR SYSTEMS' comprehensive facilities and incredible audio specifications are typically found on consoles costing considerably more and make it an ideal choice for digital multi-track recording, keyboards, sound reinforcement and broadcast. Compare for yourself!

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CIRCLE 54 ON FREE INFO CARD

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The AKG C12

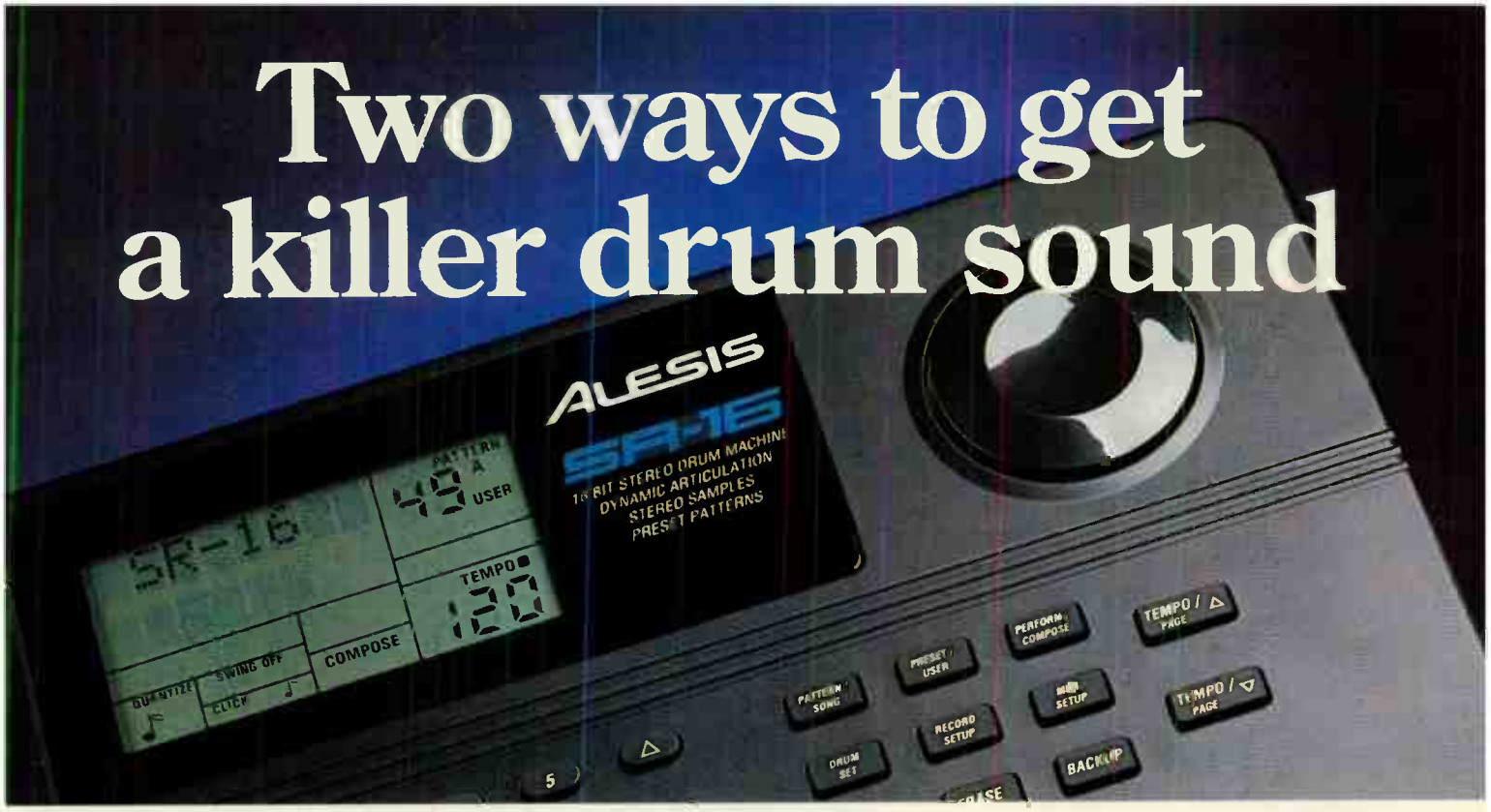
Ocean Way Recording owner Allen Sides presents one of his favorite recording tools

MICROPHONE NAME: AKG C12
TYPE OF MIC: Condenser
FROM THE COLLECTION OF: Allen Sides, Ocean Way Recording
SERIAL NUMBER: 1188
CURRENT VALUE: Around $7000
POLAR PATTERN: Cardioid with remote-controlled directional characteristics during program pick-up
FREQUENCY RANGE: 20 – 15,000 c.p.s.
FREQUENCY RESPONSE: 50 – 10,000 c.p.s. ± 2.5 dB; 30 – 15,000 c.p.s. ± 3 dB
SENSITIVITY: 1 mV/microbar (for 250 ohms)
OUTPUT IMPEDANCES: 40, 250, and 500 ohms
HISTORICAL NOTES: This particular mic was used by Lionel Ritchie on three of his albums. Mr. Sides has personally used the mic on Frank Sinatra, Ray Charles, James Ingram, Denise Williams, and Johnny Mathis. It was also one of six or so of Ocean Way's C12's used on "We Are the World."
SONIC QUALITIES: Allen Sides states: The C12 is sort of the standard overhead drum mic of choice at Ocean Way, and it's fair to say that 80 percent of all recordings done at our studios use them. They are unparalleled for background vocals and make excellent lead vocal mics provided sibilance is not a problem, as they are very bright.
USER TIPS: Sides continues: Conventional measurement techniques do not always tell us the realities of one mic sounding better than another. A new mic that shows lower distortion, lower noise, and greater SPL capacity may still sound considerably less impressive than its tube counterpart. The things that we as engineers and musicians look for — size, richness, and what we might call a musical sound — are difficult to define in purely technical terms.
FUN FACT: At the AES Convention, AKG released the Vintage TL mic, which combines the sonic characteristics of C12 capsule with contemporary electronics. EQ

Photo by Ed Colver

World Radio History

Two ways to get a killer drum sound



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ALESIS STUDIO ELECTRONICS

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Man On The Flying Tropea

STUDIO NAME: San Tropea Productions
LOCATION: Cliffside Park, NJ
KEY PEOPLE: John Tropea, owner
PROJECTS RECORDED: Tropea has four albums: *Tropea, Short Trip To Space, To Touch You Again,* and *N.Y.C. Direct.* He is currently working with bassist Will Lee on an album entitled *Tropea Live At Mikell's.* He is also producing two albums, one for Charlie Brown and one for the New York blues group 9 Below Zero.
CREDITS: Tropea has played on Eric Clapton's *Journeyman;* Paul Simon's *Still Crazy* and *Best of Simon;* and many other projects including composing, arranging, and producing jingles for Sunday Productions.
CONSOLE: Amek Matchless 28x24
RECORDERS: MCI JH 24 24-track; 24 tracks of Tascam DA-88; Otari MX 5050 2-track and MX 5050 4-track; Sony DAT 55ES; Tascam cassette 122 MK 2; Fostex 2-track center channel
MICROPHONES: AKG C414 [2]; Audio-Technica 4051 [2]; Neumann 87 [2]
MONITORS: Yamaha NS10; B&W Studio Monitors; JBL 3340S; Visonik David's 6000 (powered by Dynaco amp/stereo 400)
SYNTHS & SEQUENCERS: Akai MPC sequencer and drum machine and S900; Korg M3R, M1, and 01W; Proteus 1 [2] and Proteus 2; Roland JV 880, D550, TX7, TX 817, and GR1 guitar synth
COMPUTERS & SOFTWARE: Apple Macintosh Classic; MOTU Performer
OUTBOARD GEAR: Yamaha REV 5, REV 7, and SPX 90; Roland SRV; Alesis MicroVerb; dbx 165A and 166; Korg A3; LXP 1; Zoom 9030
EQUIPMENT NOTES: Tropea states: I think my Amek is an outstanding board. Though it is an older board, it has a great warm sound and is easy to get around. I like the Tascam DA-88's because their format is simple and easy to use. As for my synths, I'd say my favorites are the JV 880, the Proteus 1 and 2, and the 01W. They're flexible and sound great together.
STUDIO NOTES: Tropea continues: My studio is flexible. I can take all types of preproduction on different formats, bump it up to 24-track, and transfer synth tracks with SMPTE timecode. From there it can stay or go anywhere else to be finished. **EQ**

Guitarist/producer/composer/recording artist John Tropea gets on the right track (24 of 'em) with Tascam's DA-88

Photo by Peter Monroe

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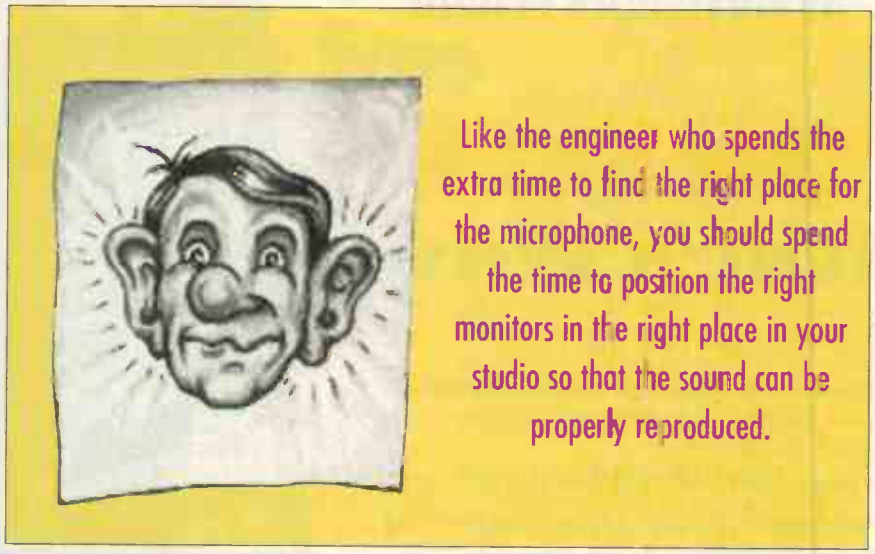

a correct stereo balance. Concentrate on the placement of lead vocals, kick drum, and bass lines from several sources. Most of the time these elements are in the center of a mix. If they are consistently not in the center, correct any problems with outputs, pans, and/or balances, then move on.

UP & DOWN

While listening to a stereo mix that you are very familiar with, lower your head to just above the faders. Slowly raise your head until you are sitting erect. Hear any changes in phase, frequency response, or stereo image as you raise your head? Small amounts of change may be acceptable, but if you hear lots of changes you have got a problem. The shift could be caused by anomalies in the driver surfaces of your monitors, acoustical coupling between your monitors and whatever they are mounted on, or by the reflection of audio from nearby surfaces.

If the monitors are pointed down at the sweet spot, some of the sound is probably reflecting off of the console surface before it reaches your ears. That forest of knobs acts just like a giant unpredictable comb filter. There is no way to compensate for the sort of phase cancellation and addition caused by console reflectance. Your only hope is to mount your monitors so that they are aimed more directly at your ears, making sure that there are no other reflective surfaces, like walls or equipment racks, that will indirectly bounce sound into the sweet spot.

SIDE TO SIDE

Now move from side to side through the sweet spot. Try this in mono first to determine how large your mono sweet spot is. Listen again for any changes in phase and frequency response. Now switch back to stereo and make the same side-to-side check. Listen for differences in EQ, phase shift, and stereo image. You may find it helpful to make a few grease pencil marks on the console to indicate the the side boundaries of your sweet spot.

BACK TO FRONT

Finally, move your head from back to front, starting at a point about a foot behind to a foot past the spot where you normally sit while mixing. Again check for any changes in equalization, phase, or stereo image. EQ shifts, especially in the low frequencies, may be the result of angled ceilings, floor risers, or angled walls that change the cross-sectional area of the control room. Changes in phase or to the stereo image may be the result of reflections from nearby surfaces into the sweet spot. If you can't move the problem, try to treat it as best as you can.

It's also a good idea to check for any differences between the sound in the sweet spot and in the position you normally find yourself in when making EQ adjustments. If you're standing up, bent over the left end of the board working on kick and snare EQ, you could be making those adjustments without benefit of being in the sweet spot.

ROOM EXCITATION

Checking for room resonance is more

World Radio History

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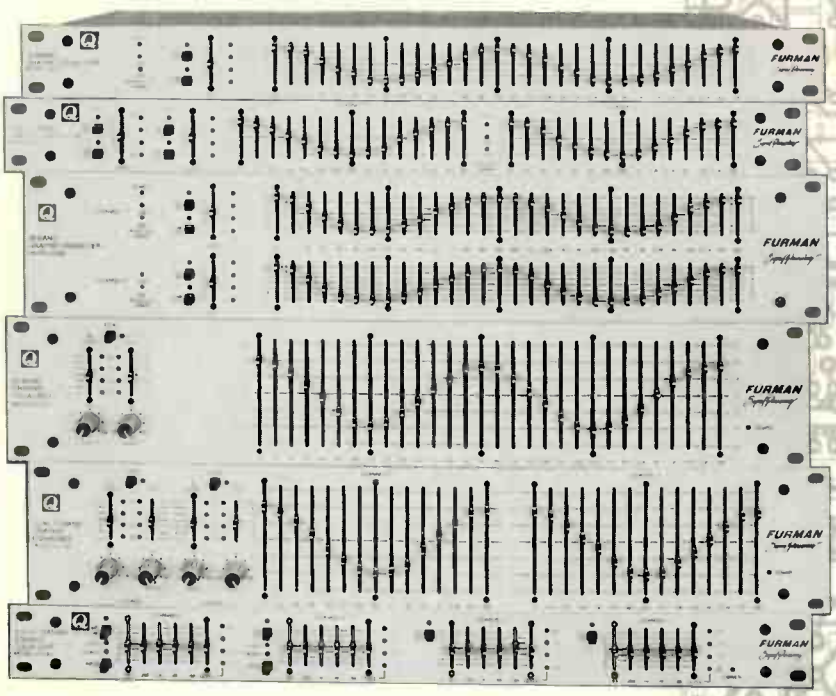

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difficult because there are more variables at play. Resonance is a complex function of frequency and level.

Let's say you suspect your control room is resonant at 500 Hz. In order to deal with the problem you really need to know how loud the monitors have to be before the room becomes resonant. There might not be enough energy at lower listening levels to excite the room to resonance. As you crank up the monitors you may reach a resonance peak that will remain constant, increase or peak, and then decrease. Listening to your mixes at low, average, and slightly higher levels on at least two sets of monitors will give you a more complete perspective. You also have to account for the nonlinearities of the human ear. As the volume of sound decreases, our sensitivity to frequencies above and below 3 kHz decreases. I also use the "walk-around-the-room" and the "step-out-in-the-hall-with-the-door-open" methods of monitoring to simulate less than optimum monitoring conditions.

IN THE END

The result of all of this fidgeting is that, by removing or reducing the number of variables in your monitoring environment, you have paved the way for more precise mixes. This means you spend less time mixing and agonizing over why something doesn't sound quite right. It's also an indication that, if you continue to get queasy feelings in your gut while mixing, you should change pizza delivery services. EQ

Ty Ford is a 20-year veteran of the radio and audio industries. He currently runs his own production company, is a regular contributor for several trade magazines, and gives seminars and guest lectures at conventions and universities. His studio also serves as a beta test site for audio equipment manufacturers and related research. His new book Advanced Audio Production Techniques, *from Focal Press, is full of the kind of useful information found in this article. To get your copy, call 1-800 366-2665 and have your Visa or Mastercard handy.*

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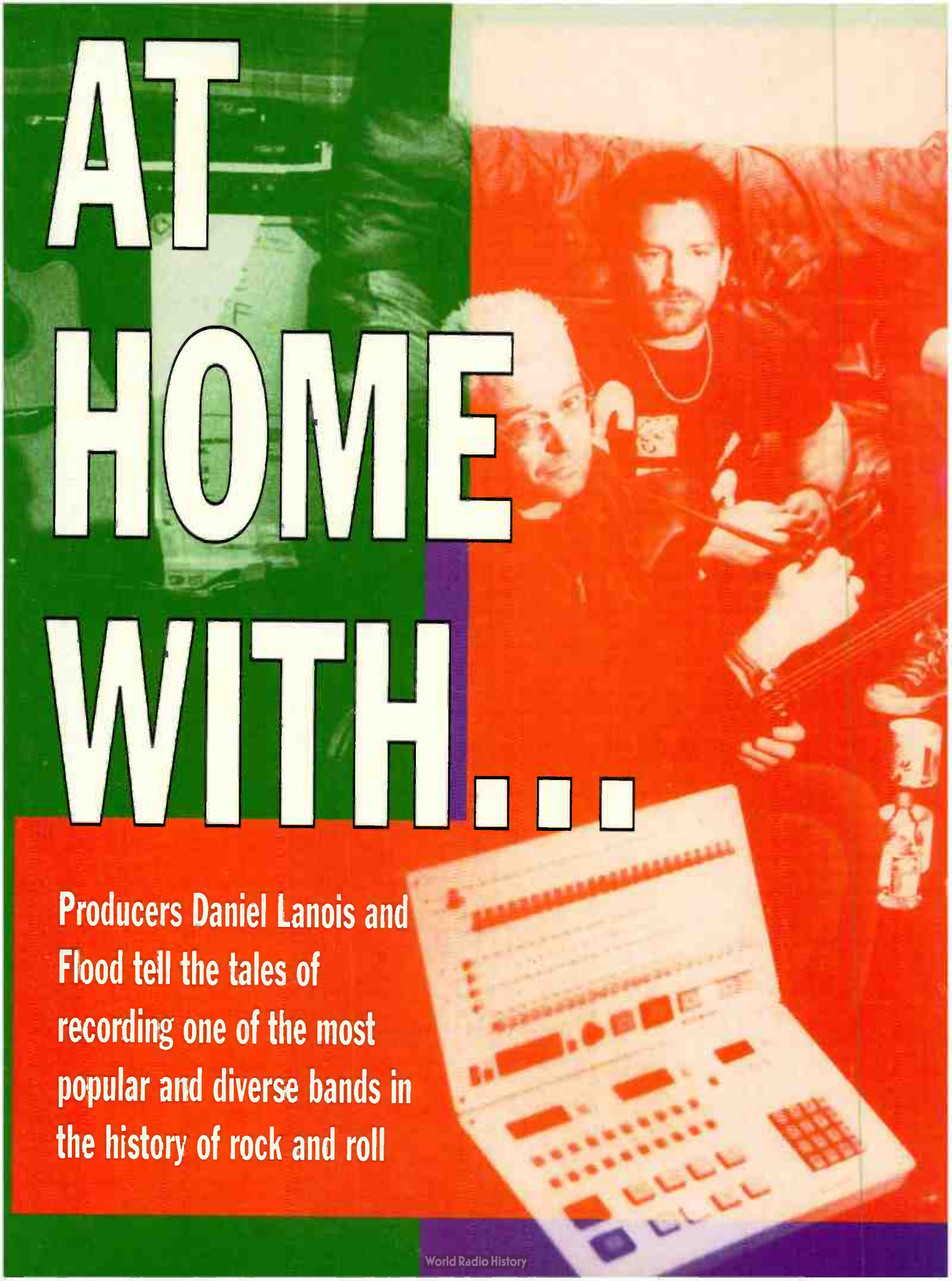

Producers Daniel Lanois and Flood tell the tales of recording one of the most popular and diverse bands in the history of rock and roll

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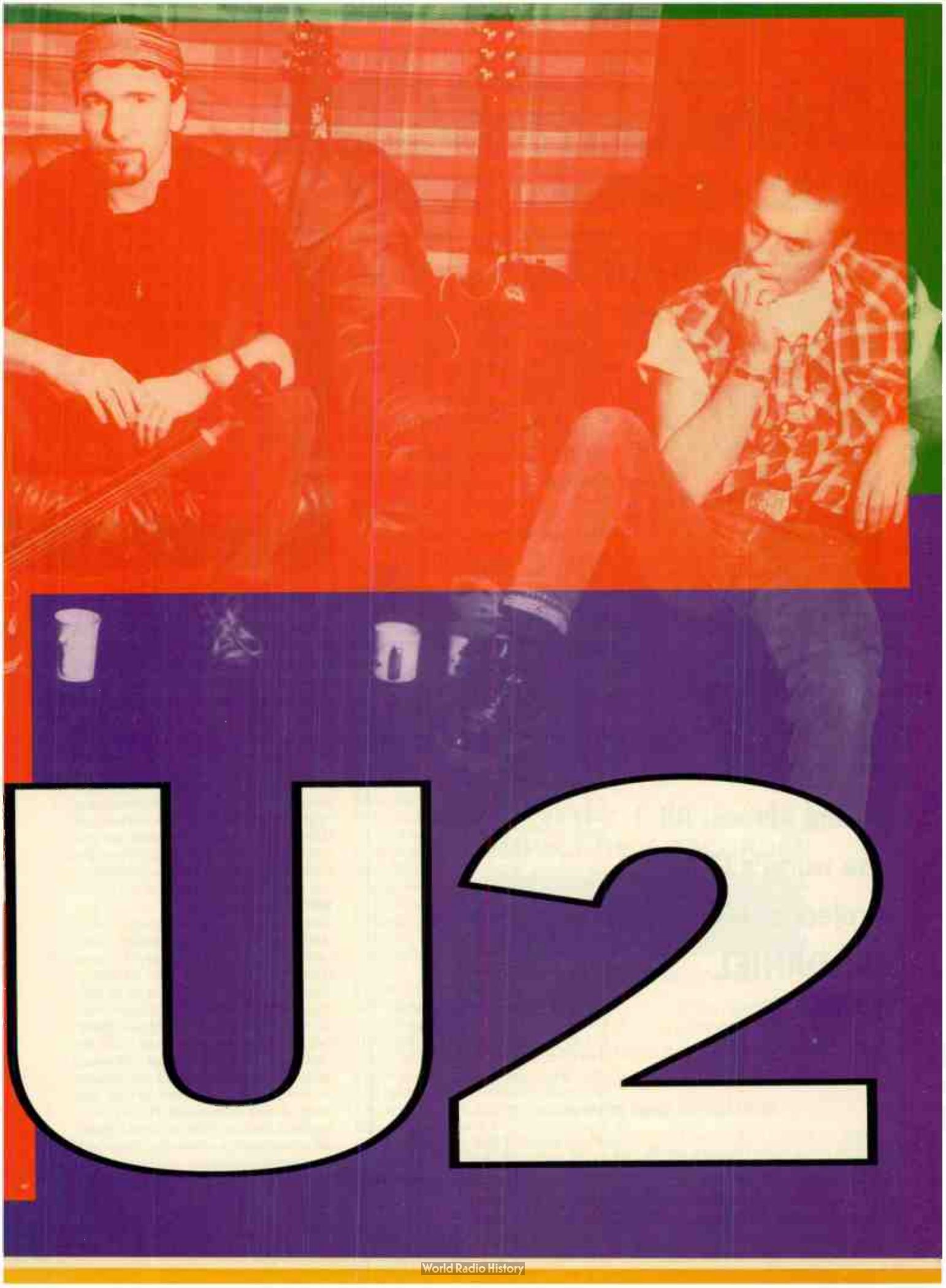

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AES AT A GLANCE

BRAND	MODEL	TYPE	DESCRIPTION	PRICE	TEL	LIT #
CARVER	PST 24	Auto reverse dubbing deck	Dual auto-reverse mechanisms; high-speed dubbing; Dolby B/C NR; REC mute	$560	206-775-1202	169
CELESTION	Studio 1	Compact monitor	8Ω; 1" titanium tweeter; felted fiber drivers; improved crossover; 50 watts	$210	508-429-6706	170
	Studio 3 Series 2	Pro monitor	5" driver; 75 watts; 62Hz-20kHz frequency response; 1" titanium tweeter	$300		
CREATION TECH.	RADAR	Tapeless multitrack	8 expandable tracks; 32-char LCD; 16-bit, 64x oversampling A/D conv.; MIDI	$8500+	604-980-6850	171
CRESCENT	Mod Factory	Eventide H3000 upgrade	"Modular" digital effects processing for the H3000; includes adjustable delays, duckers, envelopes, pitch shifters	NA	201-746-9417	172
CREST AUDIO	9001	Power amplifier	3000W/ch. into 2 ohms; 20 Hz–20 kHz freq. response; takes up 3 rack spaces	$4200	201-909-8700	173
	7301	Power amplifier	NexSys compatible; 940W low at 4 ohms, 240w high	$2190		
	LM St. Monitor	Console	40 x 8, 32 x 8 & 24 x 4 versions; ideal for in-ear monitoring; 8 stereo mixes; 4 mono mixes	$20,460 (32x8 stereo)		
	Gamble UltraMod	Retrofit for Gamble EX-56	Up to 68 inputs; up to 12 line input faders act as effect returns; each module accepts an unbalanced signal	$500/ch.		
CROWN	MacroReference	Power amp	Performs within digital tolerances; 760W per ch. into 8 ohms; greater than 120 dB S/N ratio	$3850	219-294-8000	174
	PB-1 & PB-2	Touring power amp	205W & 320W per ch. into 8 ohms, respectively; ODEP circuits; parallel mono & bridged mono operation	$869, PB-1; $1099, PB-2		
CSIRO AUSTRALIA	A4D2	Development system	Operates standard AT platform; A4 processor provides dual 2048 FIR filter & multipurpose time domain processor	$995	612-372-4331	175
CUBICON	"D"	Enclosure material	Multi-ply mold of fiberboard made from recycled paper; 3/8"-1" thicknesses	NA	314-567-0667	176
CUTTING EDGE	Yellowtec Vip 1	Voice processor	Limiter, compressor, expander, de-esser; 3-band parametric EQ; jog wheel; LCD	$1800	216-241-3343	177
DAN DUGAN	Model D	Auto mixing controller	8-ch. rackmount unit patches into console; balanced ins; reduces feedback; eliminates cueing errors; up to 96 mics	$5450	415-821-9776	178
D&R USA	Vision Series	Console	Extended bandwidth (10 Hz-100 kHz); user defined configurations; 4-band fully sweepable EQ and mic preamps; 12 to 100 in configurations	$4000 and up	409-588-3411	179
DB TECHNOLOGIES	Model 3000	Sample-rate data converter	Format & sample rate conversion; acoustic bit correction; reference meter bridge; headphone monitoring	$2995	206-842-8972	180
DBX	1024	Buffer amplifier	Matches XLR ins directly to the XLR outs, bypassing low level ins; extra set of -110 dBV buffered outs	$239	510-351-3500	181
	760X	Microphone preamp	2 ch., transformerless design; 60 dB of sonic transparent audio; polarity reverse & phantom power switches; clip LED	$349		
	274	Quad expander gate	4 ch. of user-selectable expansion or gating in any combination; patented VCA & RMS detection circuitry	$449		
	296	Spectral enhancer	2 ch.; cleans up & details instruments, vocals & mixed program material; HF Detail circuitry; DynActive circuitry	$349		
	266	Compressor/gate	AutoDynamic attack & release; new gate timing algorithms; separate precision LED displays; stereo or dual mono	$299		
DDA	microFILE	VCA fader automation	8-ch. motherboards that link to under-console-mounted proprietary computer via ribbon cables	NA	616-695-4750	182
DELTRON DGS	700 Series	Multipole connectors	Chuck & screw-collar cable grips; squeeze-clip; plastic color coding	NA	800-292-2834	183
DEMETER	VTCL-2	Compressor/limiter	All-tube design; stereo; variable attack & decay; high quality VU meters; 40 dB of compression & limiting	$1995	818-986-7103	184
DENON	DN-2700 F	Double CD player	16-bit stereo digital sampling nearly 6 seconds in length; seamless loop function; multi-range pitch control; jog wheel	$2300	201-575-7810	185
	DN-770R	Bi-directional twin out deck	Play 2 cassettes at the same time; pitch cont. defeated during rec.; auto standby	$650		
DIC DIGITAL	CD-R	Recordable CD	18-, 63-, & 74-min times; Orange Book standard in jewel box with 4pg insert	$25-$40	800-DAT-1-DIC	186
	AR-4000	DAT drive cleaner	Dry, non-abrasive tape in DAT-type enclosure	NA		
	HQ Series	High quality professional DAT	MicroFinity metal particle DAT tape; "jam free" shell design; "demo" length (10-min)	NA		
DIGIDESIGN	MasterList CD	CD mastering program	For Mac-based hard disk recording & editing systems; create masters on CD recorders, DAT recorders, or 8mm SCSI tape	$995	415-688-0600	187
	Session 8	Mac version	8-ch. direct-to-disk digital recording; sequencer-style digital audio editing & computer controlled input patching	$3995		
	Miles	Advanced pro control surface	Motorized faders; touchscreen; "soft" rotary knobs; transport control; autolocate controls; controls Pro Tools sessions	under $7000		
	ADAT Interface	ADAT interface	Allows ADAT users to edit their multichannel tape-based sessions; offers Digidesign customers archiving option	$995		
DIGITAL AUDIO	EdDitor Plus™	Sound Editor	Displays the soundfile being played while the new track is being recorded; displays both stereo tracks on the screen	$349	612-473-7626	188
DIGITAL DESIGNS	DD181	Monitor	8" unit; shielded; bi-wired; tweeter/woofer controls; 38Hz-26kHz freq.	$1099/1169	405-946-4500	189
	VSP	Control center	Utilizes a crystal oscillator device to reclock digital audio signals; reclocks any incoming frequency to 44.1 kHz	$1495		

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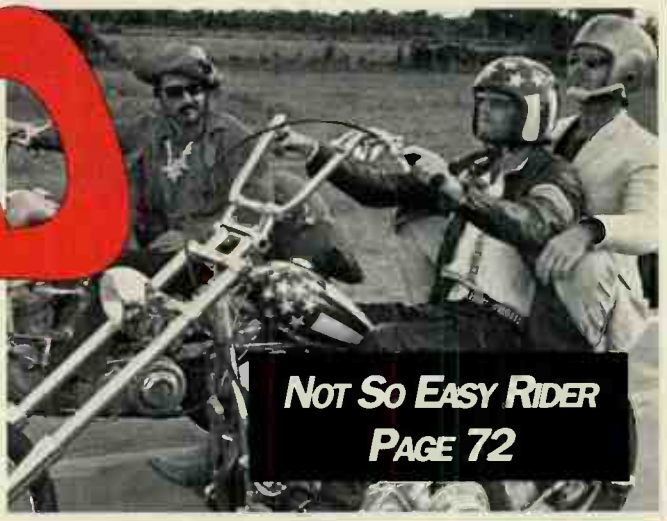

NOT SO EASY RIDER
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LIVE SOUND FOR THE GIGGING MUSICIAN

CHICK COREA GOES MINIMAL ON TOUR

INSIDE: ROAD TEST: STEWART PA-1800 POWER AMPLIFIER

World Radio History

IN A BAND VAN

TRAVELING LIGHT

CHICK COREA IS WORKING WITH LESS THAN HIS TYPICAL RACK ON HIS PAINT THE WORLD TOUR, BUT STILL GETS ALL THE BENEFITS OF A BIG RIG

BY DAVID FRANGIONI AND BOB RICE

■IN CONTRAST TO past Elektric Band tours, the basis of Chick's current touring setup is simplicity, and a return to "the way things used to was." Before the tour, we (see "Cast of Characters") sat down with Chick and went through each song deciding which synths were absolutely needed. We would even reprogram sounds from one synth module to another if it meant not having to take the original (synth). Please keep in mind that Chick's live setup interfaces seamlessly with his home studio (Studio 5's, ADAT, etc.), allowing for very little downtime between the two settings.

The touring system consists of a grand piano miked with two AKG 414's and a Barcus-Berry Planner Wave System. The piano has been modified by Brian Alexander of Key One to allow Chick to play while standing up. The piano is lifted onto large black pylons. A pedal lyre extension has been fitted to the pylons to enable Chick to stand normally in front of the piano and play.

Down stage of the piano, directly next to it, is a modified Fender Rhodes piano with the Gilbransen Crystal MIDI System. The Rhodes audio is processed through a Tube Works Blue Tube instrument preamp. This allows Chick to recreate the crunchy overdriven sound he used to get from all those horrible rental Twin Reverbs he had to play during the '70s. On top of the Rhodes is a Yamaha SY99. Resting (not so) comfortably on top of the SY99 is the previously mentioned Blue Tube as well as the remote

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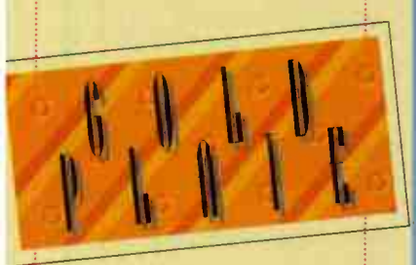
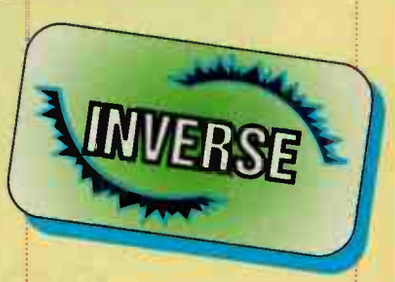
Alex

SO MUCH SOUND. SO LITTLE MONEY.





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microprocessor-controlled devices, once you figure out the unit you probably won't have to look at the manual again.

The only problem I experienced was a lockup; after switching to a program, the switches and controls froze. Powering off and on again didn't help to solve the problem, but reinitializing returned everything to normal.

OPINIONS

The SRV-330 sounds great. There's a lively, silky quality that's subjectively a little less "conservative" than the Lexicon units I've played with. And unlike budget reverbs, there's a great deal more definition in the sound. There's virtually no periodic "fluttering" (except of course with low density values), the tail fades out gracefully instead of sputters, and the reverb is airy enough so that it doesn't compete with the primary sounds but unobtrusively fills in the cracks and spaces. I also appreciate the easy editing — lots of the fun with digital reverb is creating rooms that don't exist in nature.

Strangely, though, very little of all this cool stuff has anything to do with the 3D algorithms. Most of the time I wouldn't have known a 3D effect was being used if I hadn't seen it in the algorithm name. I tried shifting my position and that of the speakers to find a "sweet spot," but to no avail. If the SRV-330 sounded so-so and I was counting on the 3D effects to make it palatable, there would be a problem. Fortunately, the SRV-330's basic algorithms sound wonderful anyway, so one has the luxury of regarding 3D as a bonus, not the unit's raison d'etre.

To my ears, the difference between 3D and non-3D algorithms seemed comparable to the difference between, say, 14-bit and 16-bit digital audio, not color and b&w TV. Part of this is because the 3D effects are exploited to some degree in all the algorithms, so the biggest differences are due to any changes you make in the editable parameters. I suppose the 3D angle is a good marketing hook that helps differentiate the SRV-330 from competing devices; just don't expect any revelations. (Note that you don't have to worry about mono compatibility with the 3D algorithms. Independent stereo processing means that the left and right channels contain mostly different information that can collapse into mono with very few "holes.")

Granted there are a lot of good reverbs these days, and the standards keep getting higher. But one thing's for sure: If you can afford it, the SRV-330 gives you a clean sonic signature, is easy to program, includes the breadth to offer some truly whacked-out sounds for the adventurous, and wraps a cozy and airy ambient blanket around whatever you feed into it. If that isn't what a good reverb is all about, I don't know what is.

—Craig Anderton

Although the SRV-330 isn't a multieffects device, the possible variations on the basic reverb make the SRV-330 much more flexible than you might initially expect.

World Radio History

Studio Software Report

Deus ex Macintosh? Part 2

Alchemy has vanished. Has the Mac fallen from its pedestal in the digital audio pantheon?

By Tim Tully

LAST ISSUE we began an overview of the Macintosh software that's available for recording, playing and editing sampled sound. We started by covering the programs that are optimized as audio recorders—digital versions of tape decks. Part 2 of this series will cover the rest of that field, then look at some hybrid programs and finally go to the traditional sample editor—all geared to answer the question: when it comes to digital audio, does the Mac still make it?

TimeBandit

Steinberg-Jones's *TimeBandit* ($499) is a relatively new program and one of the most focused applications in any venue. TimeBandit is designed to do just two things to a digital audio file: it can make a sound up to 25% longer or shorter without changing its pitch; and conversely it can change a sound's pitch by as much as sixteen semitones up or down without altering its duration.

These functions can be invaluable in a production environment where a singer or musician is out of tune on a short passage, or in post production, where a scene needs a cue to be just a little longer or shorter than was planned. The application can be a boon to people designing sounds for sample-playing MIDI instruments as well. For situations where you might *want* the distortion that results from excessive time- or pitch-shifting, TimeBandit has an Effects mode that allows you to exceed its normal limits. In these cases, the algorithms that the program uses to maintain a sound's "natural" qualities are disabled, allowing you to actually get the boominess or munchkinization effects of shifting a pitch down or up.

TimeBandit makes no bones about its single-mindedness; it will not show you a waveform (since you can't edit it anyway), but only a session window containing small icons representing various sound files. (Figure 1) You can import or create any number of files in a session window, play them and of course process them to create a new stretched or shifted file.

In line with its straightforward functions, TimeBandit is easy to use. The session window has but four controls: buttons that load a file, play the sound and activate the time stretch and pitch shift dialog boxes.

The Time Stretch dialog (Figure 2) displays the original file's length and number of samples. A vertical slider lets you set the factor by which you want to stretch or shrink the sound, and a pair of boxes tell you what the

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Editorial

By Tim Tully

The deadline, as is its wont, was roaring down on me like a fast freight coming down the back of the continental divide. It was big. It was fast. And nothing on earth could stop it.

Like Dudley Dooright's Nell, lashed cruelly to the track by Snidely Whiplash, I had only one option. Keep a calm and exquisite control over mind and emotions. And keep. The panic. Down. (Never gone. Just controlled. Like a cheap effects box held barely in check by a brick wall noise gate: always bubbling, rumbling at the fringes of awareness.)

Untie one knot at a time—not too fast, and not too slow—making sure every motion loosens another hitch, and not a second is wasted thinking (chug-a, chug-a, chug-a, chug-a) about the consequences of not getting it all done in time (chug-a, chug-a), about the sheer impossibility of slipping so many knots in so short a span.

It was a constant and continual act of the will: work as fast as hell, but maintain the calm center. All those rigorous years of training in a Zen monastery were paying off (actually, just reading *Siddhartha* once in college. But, hey.) Keep a cool, rational detachment, and just think clearly about the next keystroke, the next sentence, the next idea. Order my thoughts and not even the fact that having six different articles open in the word processor, TimeBandit running in the background along with the graphics program to edit screen shots and now asking the phone dialer program to call Peavey has made the computer freeze up colder than I'm gonna be if I haven't saved everything and real recently, too FROZEN??? NO YOU CAN'T LOCK UP ON ME NO DON'T DO THAT NO NO NO-O-O (chug-a, chug-a chug-a)

It did. I hadn't.

All those days and years doing this; all the times I've preached to myself and anyone else who's asked: "Save whenever you've done more work than you want to do over again," and I'd spent the whole afternoon keeping so many balls in the air that the one marked "Save" disappeared like a stolen voice on a cheap synth.

The point, if any, is that our industry, and the rest of the world, is going software. (surprise.) One company spokesman at the AES convention told us we were about to see a computer-based system that would make "all that hardware out there obsolete." Fifteen minutes later, the grizzled New York studio veterans and wisecracking trade journalists in the room were passing around grudging compliments.

The models on which we base our work are still being changed profoundly by the personal computer. Those of us who neglect (or forget) to get in line with the new, computer-based models...chug-a, chug-a, chug-a, chug.

EQ ■ December 1993
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resultant file's specs will be: number of samples, tempo, and length, in seconds and SMPTE Time Code. You can also type numbers directly into the destination boxes to specify the results you want. For tempo-oriented changes, you can either type in a tempo or, if you don't know the tempo, type in both the file's length in bars and its time signature. This allows the program to calculate the tempo of the original, and provides you with a figure you can use as a basis for determining any tempo change you may want to make.

The final control here is a slider that lets you set a mix of "sound accuracy" and "rhythm accuracy." The exact nature of this slider's effect is not too clear in the documentation, but apparently, selecting more "rhythm accuracy" will make the program look for spikes—i.e., drum hits—and keep them equidistant. Moving the slider closer to "sound accuracy" causes the program to spend more of its brainpower preserving the tonal qualities of the sound.

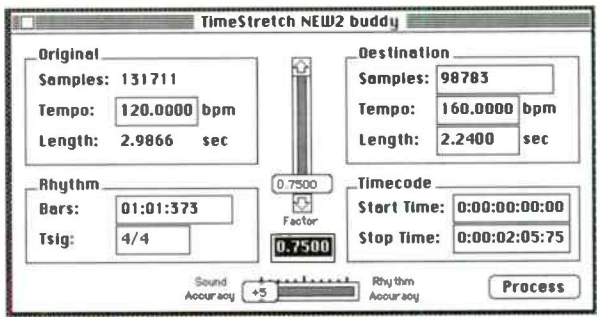


Fig. 2: The Time Stretch dialog box gives you a lot of information about a sound file and the results of stretching it.

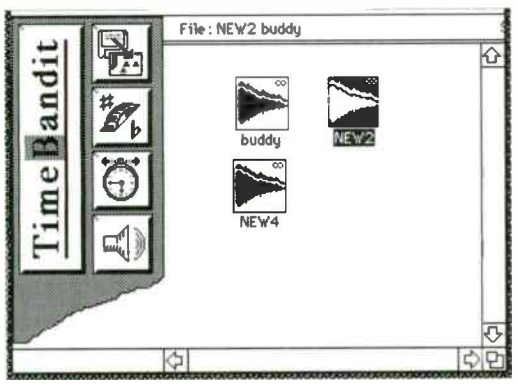
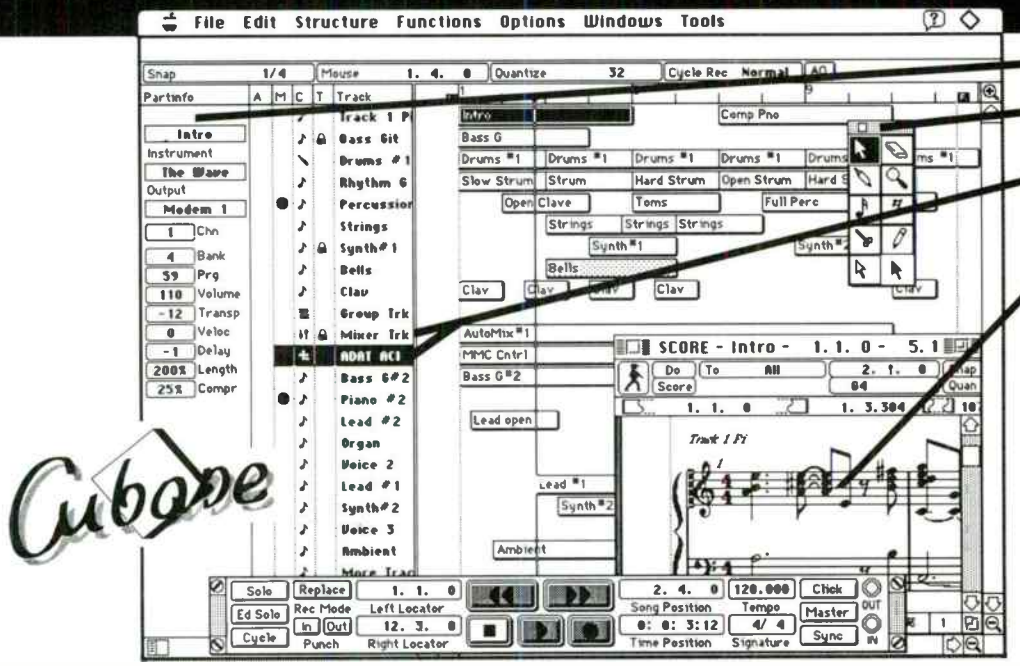


Fig. 1: A TimeBandit Session window can hold almost any number of sound files.

To change a sound's pitch, TimeBandit presents you with another dialog box in which you click on the keys of a piano keyboard graphic or type in a number of semitones and cents. (Figure 3) If a sample has a basic pitch—i.e., if it's a sample of a single note—you can have the application deduce that pitch to help orient your subsequent processing. You can also make multiple pitch shifts at once and mix their results with the volume slider to create chords from a single tone. Pitch Shift has a rhythm accuracy/sound accuracy slider and an effects mode that work in much the same way as their analogs in the Time Stretch function.

TimeBandit uses the same method of copy protection as does Steinberg's

"Cubase is just so damn fast, it has become real difficult to work with any other sequencer..." CRAIG ANDERTON



The Track Inspector - Immediate access to the most frequently used parameters. *Direct Access.*

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Cubase: you must connect a small plastic box—a "dongle"—to the Mac's ADB (keyboard) bus, or the application will not run. Some people find the dongle a great inconvenience, but this method does let you move the application around freely on your disk or even run disk optimization programs without tedious de- and re-installing. Both the TimeBandit and Cubase keys have been installed on my Mac for a while and I don't even notice they're there.

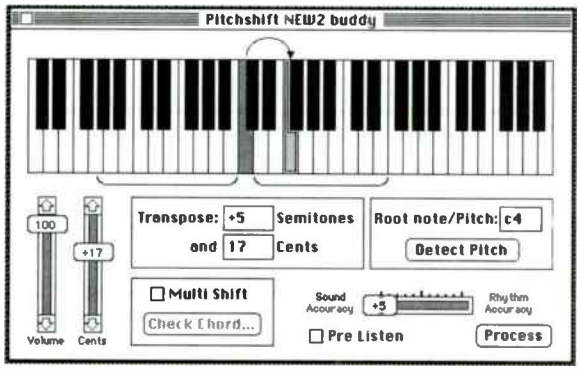

Fig. 3: The Pitch Change dialog lets you designate changes in semitones and cents.

While TimeBandit is something of a one-trick pony, it is very easy to use overall, and yields predictable and respectable results.

Hybrids

A second group of applications adds another dimension to the world of Mac digital audio. This genre combines the audio functions with those of the MIDI sequencer.

The first successful MIDI/digital audio amalgam was Opcode Systems' Studio Vision. Now in version 1.5, Studio Vision combines all the features of Opcode's flagship professional sequencer, Vision, with the capability of playing back four discrete synchronized channels of audio on nearly all the Digidesign DSP cards and can contain many more "virtual" tracks. (Figure 4)

In addition to combining MIDI and audio recording in one application, Studio Vision offers extensive non-destructive editing of the audio that lets you play any segment of an audio track in any order, control its dynamics, panning and volume and edit it in any number of ways, all without altering the actual sound file.

Studio Vision's audio editing rivals that of Pro Tools in its intuitive graphical nature, and is not far behind in features either. You can drag across a section of audio to select it, cut, copy and paste it, or drag it to a new location that you can line up by eye or by precise numerical readouts.

While Studio Vision was the first, others have come along since, and as it happened with sequencers, these applications too have melded a good deal of their predecessor's audio features and functions with their own sequencers.

In addition to the Digidesign hardware, Digital Performer, from Mark of the Unicorn, works with MOTU's own Digital Waveboard and the Yamaha CBX-D5 external audio unit. Digital Performer can play back four and record an unlimited number of audio tracks, offers a audio event list editor and all the MIDI power of its popular sequencer, Performer.

Similarly, Steinberg-Jones' entry, Cubase Audio for the Mac offers a parallel set of features framed by the idiosyncratic model of its sequencer, Cubase. Cubase Audio uses iconic tools to cut, paste and otherwise manipulate audio as well as MIDI events, subdivides tracks into parts for an extra layer of control over editing, and supports all the Digidesign hardware.

The differentiations among these three sophisticated programs are subtle yet important. In the end, a good deal of the differences come down to one's personal taste for one particular set of operations and interface metaphors over another. The audio features of all three are powerful, sophisticated and about equal.

Sample Editors

The final group of Mac audio applications are specifically designed for the creation and modification of sound samples intended to be used by a MIDI sampler. They work with sounds loaded into the Mac's RAM, rather than with files on hard disk. As such, they are faster, but are limited as to the size of the files they can load. This is the ground that had been covered so well by Alchemy. Let's see what's there now.

Infinity

Jupiter Systems' new *Infinity* is every bit as focused as *TimeBandit*, but with a different target. Infinity is designed exclu-

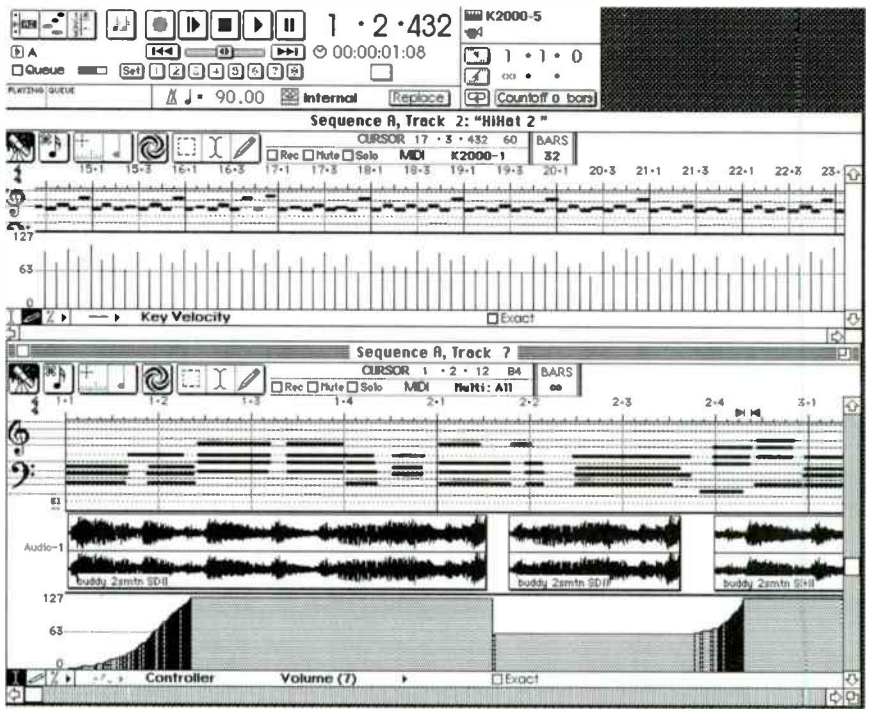

Fig. 4: Opcode's StudioVision combines MIDI sequencing with digital audio recording, editing and playback.

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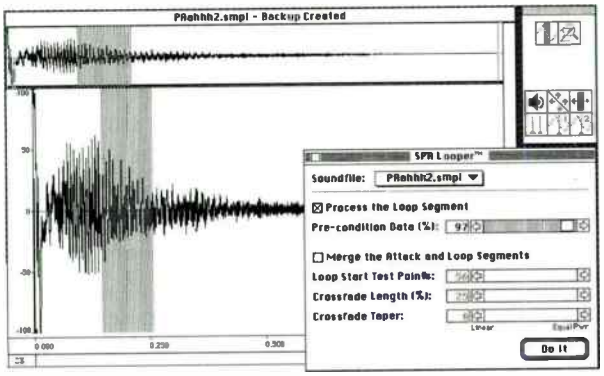

Fig. 5: Infinity's sophisticated looping algorithms give you a lot of control options.

sively to create seamless, bumpless loops in sounds intended for samplers and sample-playback synths.

Infinity was designed by people who had previously developed software for geophysical research. They've managed to translate their skills well, and Infinity brings a new set of tools to the sampler user. Infinity applies digital signal processing technologies to the looping process that serve to automate it, reduce the enormous trial and error traditionally associated with it, and significantly improve the quality of the resultant loops.

Of these technologies, Infinity's smart auto-scan is the only familiar one of its four looping methods—and the only one easily explainable. The feature improves tremendously upon the traditional auto-scan functions. In addition to simply finding zero crossings, Infinity's auto-scan also compares the amplitude and phase of the major harmonics at potential loop points to create a loop that is much less noticeable.

The first of Infinity's more novel loop tools is the freeze looper. It works exceptionally well on decaying timbres like guitars or pianos by analyzing and then perfectly "freezing" the timbre of a sound over a number of cycles, creating an absolutely seamless loop that sounds just the way you always thought your loops should, but only rarely did. Two other looping algorithms—the Rotated Sums Looper and the Spectral Phase Randomization Looper (I'm not making this up) work wonders with non-periodic waveforms like chorus and orchestra, and complex sounds, like those of string sections choirs and others, whose tone color must be preserved exactly. (Figure 5).

Despite the tendency of Infinity's terminology towards Amos 'n' Andy scamspeak, the software most undoubtedly works. It creates loops like nobody's business, and its designers had the sense to emulate some of the best elements of Infinity's spiritual forefather, Alchemy. Infinity doesn't have Alchemy's range of features and functions, but it's not entirely limited either. The edit menu (Figure 6) offers a good handful of edit commands, including such basics as cut, copy, paste and mix, as well as others that normalize a sample, accurately change gain and let you control loop points. Moreover, the application is terrifically navigable—its interface nearly always lets you do just what you want with a notable absence of search and struggle.

Naturally, Infinity uses the Digidesign DSP cards for playback, but

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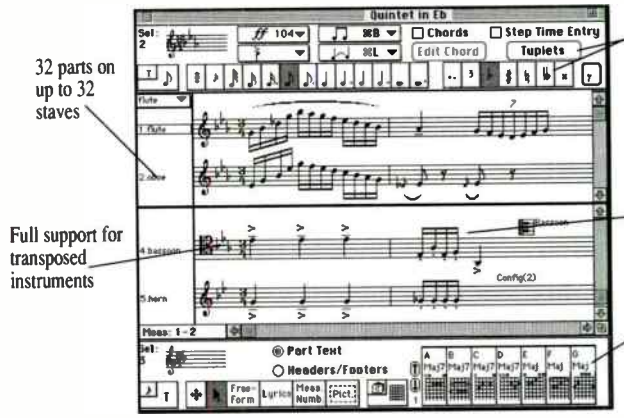

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it also has a special relationship with SampleCell via the Mac System's Apple Events. Choosing SampleCell as a playback device in Infinity will automatically launch the SampleCell editor, and not only let you use a SampleCell card for playback, but automatically update the card with any changes you make in Infinity.

Infinity is a unique and powerful tool that has redefined what sample loops are all about. As such, it's a must for serious sound designers.

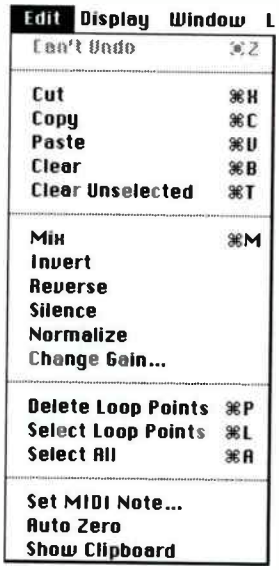

Fig. 6: Editing functions available in Infinity's Edit menu.

Turbosynth SC

Turbosynth SC for the Macintosh ($349) is a new version of the sample-editing/sound design program from Digidesign. While the original Turbosynth was able to load samples from, and save them to many different brands and models of sampler, the SC version works only with Digidesign's sampler-on-a-NuBus-card, SampleCell. That is, it will load and save sounds in the same Sound Designer II or AIFF formats that SampleCell uses.

Digidesign has effected this redirection as part of its overall plan to design a recording studio that will fit entirely into a single Macintosh. This desktop studio will be built using the company's random access digitizers, signal processors and TDM signal routers, and SampleCell will be the sampler in that studio. What Turbosynth brings to the party is a front end for SampleCell that (together with any of the Digidesign DSP cards) turns the sample-playback card into a full-featured sampler with many, many ways to modify, sculpt and creatively warp the samples it plays.

Turbosynth and SampleCell are intimately entwined via Apple Events—the Macintosh System 7 feature that allows various programs to communicate. So if you run Turbosynth and the SampleCell Editor at the same time, saving a Turbosynth patch will automatically load it into SampleCell as a new instrument, which you can play from your MIDI keyboard, just as you would with any other sampler. Turbosynth will then update the sound in SampleCell any time you change it and save it. This may sound like a Rube Goldberg way to do things, but in fact it works quite smoothly and reliably, and offers a hell of a lot of power.

So just what does Turbosynth do? The application is modeled along the lines of early synthesizers on which you built up a sound by connecting various electronic modules with patch cords. Turbosynth does the same thing, but entirely with software. You patch together samples and/or digitally-generated oscillator waveforms and route them through software algorithms and DSP chips to create filters, envelope generators, LFOs and the like that eventually generate a sample you can play with SampleCell.

Turbosynth gives you a main window into which you bring all the elements of a patch, and where you can open various sub-windows that show you details of individual processes (Figure 7). There's a 21-icon palette containing tools with which you add sound source modules to a patch, insert controller modules such as LFOs, envelope generators for amplitude and filtering, resonance generators, time stretchers and compressors, pitch shifters, delays and more, then route everything through a mixer with a patch cord tool. All this is accomplished with standard mouse moves, and is pretty intuitive, especially considering the depth of processing you can achieve.

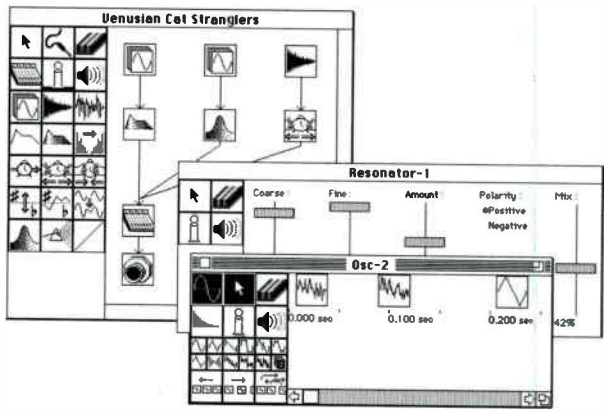

Fig. 7: Turbosynth's main window contains sound sources and their controllers, each of which with its own sub-window.

In addition to the kinds of controllers familiar to synthesists, Turbosynth serves up some weird stuff. This includes the Waveshaper, which alters a sound using a transfer function to change the instantaneous level of a sample following a wave you select; the Spectral Inverter which radically alters the partials of a sample to produce very strange effects; and the Diffuser, which provides the basis for creating your own reverbs.

Turbosynth can let you make subtle modifications to a sample or convolute it monstrously. It is an excellent front end for SampleCell and makes programming the Digidesign sampler more effective and in some ways easier than ever before.

Finale

People who create music, design sound and produce audio on a Macintosh are ill served by the disappearance of Alchemy. While older versions are still around and functioning, it's only a matter of time until some part of a new system or hardware design is incompatible with existing versions. Alchemy was an exceptional application that gave people unprecedented power over sampled sound, and was as responsible as any single device for the development of the sound design industry.

The future is not entirely bleak however. Programs like Infinity and Turbosynth do things Alchemy never could, and many gaps are being filled by other applications, new and old. In the meantime, things change. Audio editors for Windows will not remain under-implemented toys forever, and indeed, Apple's Power PC—expected to arrive in March of next year—is in many ways the harbinger of the demise of the Mac itself.

But for the present, whether it's sample editing, hard disk recording or specialized sound design, the Macintosh still takes the prize for elegance and power in digital audio. ■

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The Next Generation

LATEST PRODUCTS

Signal processors and MIDI instruments upgrade their operating systems with ROM.

ADAT Computer Interface ($399)

The ADAT Computer Interface (ACI) is a MIDI Machine Control device that enables a user of any of Steinberg's Cubase MIDI sequencers to control the Alesis ADAT eight-track digital tape recorder from within Cubase. The available functions include stop, play, fast forward, rewind, record, arming a track, punching in and out and others. The interface will effectively add eight tracks of synchronized digital audio tape to any Cubase system. Steinberg-Jones has announced a shipping date of July, 1993.

Steinberg-Jones
818.993.4091

ROM upgrades for ART gear (n/a)

Applied Research and Technology (ART) is offering upgrades for its entire family of signal processors. The new EPROM chips will upgrade an SGX 2000 to an SGX 2000 Express; an SGX T2 to an SGX Nitro; and the Nightbass, DRX 2100 and Alpha 2.0 to the new Studio Editions of those units. The upgrades will add many new features including greater memory, over 400 new factory presets, enhanced reverb algorithms, regenerated delay time increase, and expanded tuner algorithms.

ART
716.436.2720

K2000 Orchestral Sample ROMs ($395; daughter board $125)

Young-Chang/Kurzweil has announced new ROM chips for the entire K2000 series of instruments. The new chips provide users eight additional megabytes of samples recorded, looped and processed to the exacting quality standards for which Kurzweil is famous. The Orchestral ROMs include 100 new programs and 50 new setups, and come with two floppy disks that hold 300 additional programs that use the new samples, as well as several new sequences and a General MIDI disk designed for use with the Orchestral ROM.

Young Chang-Kurzweil
617.890.2929

Multi Media Pro Database ($89.95)

The Multi Media Pro Database for the IBM PC (DOS) is an easy-to-use, low-cost filing solution specifically designed for videos, books and audio. Pull-down menus and an extensible help system, as well as simple commands, let you add, edit, delete, recall, search, order and query records. Originally written for use at a TV station, the database is particularly designed to organize movies, tapes and other media-type elements.

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Cubase Audio for the Falcon030 ($999)

Steinberg-Jones is shipping their MIDI sequencer/hard disk recording software for Atari's new Falcon030 computer. Cubase Audio offers professional MIDI sequencing, eight tracks of hard disk recording, Time Stretch and other digital effects, and standard notation printing. The program employs the same interface as Cubase for the Mac, PC and Atari ST, and gives the user standard Cubase tools, such as the scissors and glue used to cut, copy and paste audio or MIDI data. The eight audio channels can be assigned to play back audio from disk, to act as a drum sample player and to do RAM-based playback. Integrated DSP lets the user create such digital effects as reverb, delay and equalization, and Falcon Audio incorporates all the features of Cubase Score, including mix automation, score layout and printing and more.

Steinberg-Jones
818.993.4091

SP-Remote ($149)

SP-remote for the Macintosh is a software front end for the Peavey SP that lets the user edit the processing parameters of the instrument (though not the waveforms themselves). It puts graphic control over all the instruments parameters on the Mac screen and adds some global editing features not found in the SP itself. An automake feature automatically creates new presets from pitched or non-pitched sounds and determines the multisample split points to ease programming. SP-Remote will also convert Akai S1000 and S1100 programs to SP preset data. It requires a Mac Plus, system 6.05 or higher and a MIDI interface.

Distributed by Peavey
601.484.4287

ADAT Interface (price n/a)

Digidesign announced an interface device that will integrate either of its digital audio workstations—Pro Tools for the Mac or Session 8 for the PC—with the ADAT, the eight-track digital audio tape deck from Alesis. Using the ADAT's onboard optical interface, the rack-mount device will be able to transfer eight channels of digital audio simultaneously from a Digidesign system to the ADAT and back. It can link the two systems to give the user up to sixteen tracks of synchronized digital audio, or it can be used to enormously enhance the editability of material recorded on the ADAT. Any section of any ADAT track can be transferred to the Pro Tools or Session 8, edited there with the speed, accuracy and convenience of visual editing on a random access system, then laid back to the ADAT with down-to-the-sample accuracy. The interface will also allow the Digidesign user to archive material to ADAT tape, providing a copy that can be played on any of the large installed base of ADAT machines.

Digidesign
415.688.0600

Musicshop added to Opcode's Music Bundle ($299.95)

Opcode has replaced the Book of MIDI HyperCard stack with Musicshop in its music bundle, the Easy Music Starter Kit. Musicshop is a software notation program that can record up to sixteen tracks of MIDI information and allow the user to edit it as standard notation or in a piano roll-type graphic. Musicshop lets the user edit individual notes and MIDI controllers and provides an arrangement window for assembling a large piece of music out of many smaller segments. In addition to Musicshop, the bundle includes PG music's Band-in-a-box, the MIDI accompaniment software, and a MIDI Translator II Macintosh MIDI interface.

Opcode Systems
415.856.3333

ILLUSTRATIONS BY LINDA BLECK

World Radio History

Version Updates

LATEST SOFTWARE AND FIRMWARE VERSIONS

Minimize time-consuming system crashes! Banish annoying bugs! Take advantage of all the R&D developers put into your equipment!

You can't get the most out of your studio gear without the latest software. SSR's Version Update list tries to include all the application and operating system ROM software you might find in a studio, the most current version of each one, and why and how to get ahold of it. Not every entry is as complete as we'd like, but we attempt to give you the most salient information available.

Manufacturers can have their products listed in the Version Update List by sending information to: Studio Software Report, PO Box 8607, Emeryville, CA 94662-8607. Preferred media (in descending order) for submissions to the list are: 1. Text files on Macintosh or PC 3.5" floppies, 2. Fax (510.450.0301), 3. Print on paper. You can also send E-mail on PAN to SSR. Include the name of the product, whether the software is a computer application or internal to a piece of hardware, the latest version, release date of that version, cost to owners of the previous version, system requirements, the new version's important fixes and features and the name and issue of any recent magazine reviews you want people to read.

PRODUCT	V.	R.D.	$	REQ.	FIXES/FEATURES	REVIEWS
BALLADE (DOS/WDWS) Dynaware 415.349.5700	2.51/ 1.01	11/91/ 8/93	$35/ n/c	386 PC/Clone/ Windows 3.1	10-Track seq'r, CM64 Ed/lib, Prnt Scores/ 16-Trk Seq'r, Print Score, GS/GM spprt	PC MAG 3/92
BALLADE (MAC) Dynaware	1.1	8/93	n/c	Mac Classic <	16-Trck Seq'r, Print Score, GS/GM spprt	EM 3/92
BEYOND 2.0 Dr. T's Music Software 617.455.1454	2.1			Mac II		KYBD 1/92
CADENZA FOR WINDOWS Big Noise Software 904.730.0754	2.04	5/93	$10 or n/c <60 days from purchase		Staff edit & print, bank select, swing quant, multitrack record	EM 6/92; HSR 8/92
CADENZA FOR DOS Big Noise Software 904.730.0754	2.5i	5/93	$10 or n/c <60 days from purchase		Small fixes	EM 5/90
CAKEWALK PRO/WINDOWS Twelve Tone Systems 800.234.1171	2.0	9/93	n/c	PC/clone, Windows 3.0+, MIDI interface	16 staves Scoring, Other	KYBD 10/92
CAKEWALK FOR DOS Twelve Tone Systems	4.01	1/91				KYBD 2/90
CAKEWALK PRO FOR DOS Twelve Tone Systems	4.0	1/91				
CAKEWALK ALIVE FOR DOS Twelve Tone Systems 800.234.1171	4.01	1/91				
CLICKTRACKS Scores Unlimited 212.242.1275	2.6	1/93	$99<v 2.x no manual <v 1.x $89 new manl	Mac Plus	29.97 non-drop, 32-bit clean, core Apple Events, check marks next to "made" hits	HSR 7/92
CONCERTWARE PRO Great Wave Software 408.438.1990	6.0	7/93	$339.95	Mac Plus < Sys 6 <, 1MB RAM	Mac real time transcription; 32 staves, symbols, auto beaming	
CUBASE LITE ATARI **CUBASE ATARI**	1.0 3.0.2	9/93 9/93		Atari ST < Atari ST <		
CUBASE LITE MAC **CUBASE 2.5 MAC** **CUBASE SCORE MAC** **CUBASE AUDIO MAC**	1.0 2.5 1.0 1.2	9/93 9/93 9/93 9/93		Mac Plus< Mac Plus/Classic; 2MB RAM;sys 6.07 Mac Classic; 2MB RAM;sys 6.07 Mac IIci ; 5MB RAM;sys 6.07;audio card		

V. = Version #. A version number preceded by a "<" indicates the cost to owners of that version or earlier; version numbers preceded by a ">" indicates the cost to owners of that version or later. >prev means "from the previous version." Upgrades from earlier versions may cost more. **R.D.** = Release date. **$** = Cost of update to registered owners. **REQ.** = Min. hardware and software required. **FIXES/FEATURES** = What's cool about this version. **REVIEWS** = Recent magazine reviews. Abbreviations: n/c= no charge; Kybd= Keyboard; EM= Electronic Musician; CMJ= Computer Music Journal; HSR=Home & Studio Recording.

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PRODUCT	V.	R.D.	$	REQ.	FIXES/FEATURES	REVIEWS
CUBASE LITE WINDOWS **CUBASE WINDOWS GS** **CUBASE WINDOWS 2.5** **CUBASE SCORE WINDOWS** Steinberg-Jones 818.993.4091	1.0 1.2 1.0 1.0			386 < Wim 3.1 386 < Wim 3.1 386 < Wim 3.1 386 SX/25MHz<; 4MB RAM;Wim 3.1		
CUE Opcode Systems	3.01	12/90	>3.0 n/c, <3.0 $50	Mac Plus		
DECK 2.0 OSC 415.252.0460	2.0	7/93	n/c	Mac II, Quadra	16-bit, 4-track hard disk recording, non-destruc've editing, unlimited virtual tracks, waveform editing	
DIGISYSTEM INIT Digidesign	2.4	5/93	n/c	Mac IIs and Quadras		
DIGITAL PERFORMER Mark of the Unicorn 617.576.2760	1.4	7/93	n/c	Mac II, 5M RAM Digital Waveboard or Digidesign card	All Performer 4.2 features plus improved continuous sync	KYBD 6/93
DIGITAL WAVEBOARD Mark of the Unicorn 617.576.2760	1.0	4/92	$1495 new	Mac II, 5M RAM, hard disk, A/D D/A converter	Hard Disk recording	
EDIT ONE Opcode Systems 415.369.8131	1.0	9/93		Mac Plus <	Editor/Librarian for single instruments	
ENCORE MAC/WINDOWS Passport Designs 415.726.0280	3.0	8/93	$99 >prev	Mac Plus/PC Windows 3.1	New tools & palettes; EPS files; editing features	KYBD 6/90
EPS 16+ (ROM) Ensoniq 215.647.3930	1.3	7/92		EPS 16+	Intelligent backup & restore, SCSI improvements	KYBD 2/91
GALAXY Opcode Systems 415.369.8131	1.2.2	1/93	$15 or n/c	Mac Plus; OMS		
GALAXY PLUS EDITORS Opcode Systems	1.2.2	1/93	$99	Mac Plus; OMS	Set#2 Editors: K2000, E-mu Procussion, Alesis D4, Roland U-220	KYBD 4/92
INFINITY Jupiter Systems 800.446.2356	1.0.6	5/93	$495 list	Mac, System 7, 4MB RAM	Sample-looping program. Proprietary looping algorithms loop any sound	EQ 8/93
JAZZ IMPROVISATION SOFTWARE MiBAC Music Software 507.645.5851	1.5.8	5/92		Mac, multitimbral MIDI Synth	Improved transmit routines, drum note sustain, improved printing, 12 styles, tempo and countoff control, humanize rhythm	MacWorld 11/90, EM 9/90, KYBD 10/90, Downbeat 10/90
KCS Dr. T's Music Software 617.455.1454	3.5	10/91		Amiga		KYBD 10/86, 2/87
KCS LEVEL II Dr. T's Music Software		3/89		Mac		
KCS OMEGA Dr. T's Music Software	4.0			Atari		
MACPROTEUS FRONT PANEL Digidesign	1.02	12/92		Mac II, IIx, IIcx, IIsi, IIci or IIfx		
MASTER TRACKS PRO 5 Passport Designs 415.726.0280	5.2	5/93	>prev: $99	Mac Plus	Auto mixer, SMPTE insert, enhanced Step Editor, transpose map, velocity editor	
MASTER TRACKS PRO FOR WINDOWS Passport Designs	4.6	1/92	>prev: $99	IBM AT, PS2/clone, MPC, Windows 3.0, DOS 3.1Microsoft	Issues commands to Start, Stop MCIplayer to play WAV. Audio in Windows	
MASTERLIST Digidesign	2.3	12/92				
MASTERSCORE II Steinberg-Jones 818.993.4091	2.0	1/93	$89	Atari ST/Mega	Score Printing, bugs	

VERSIONS *continued on page 98-10*

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PRODUCT	V.	R.D.	$	REQ.	FIXES/FEATURES	REVIEWS
MAX Opcode Systems 415.369.8131	2.5	7/93		MAC II	Flexible MIDI Programming	KYBD 4/91
MIDISCOPE Kurzweil Music Systems 213.926.3200	1.5		n/c	Mac	MIDI data analysis	
MIDIMIXR 7s CNSLE MAC/PC Mark of the Unicorn 617.576.2760	1.1.1/ 1.02	1/93 1/93	n/c n/c	Mac PC/clone	Control MIDI Mixer 7s ditto	
MIDI TIME PIECE II CNSLE Mark of the Unicorn 617.576.2760	1.03	6/93	n/c	Mac	PowerBook Compatible	KYBD 8/90
MIDI TIME PIECE II ROM Mark of the Unicorn 617.576.2760	1.0g	9/93	n/c	Mac/PC		
MIMIX Steinberg-Jones	1.06	4/92	$5,995 new	Atari ST/Mega	Mixing automation	
MOD FACTORY Creacent Engineering 201.746.9417	1.0	3/92	$250 new	Eventide H3000 Ultra-harmonizer	New H3000 functions: gain-ducked delay and reverb, envelope-controlled filter, audio-rate LFOs	
MOSAIC Mark of the Unicorn 617.576.2760 Fax: 617.576.3609	1.3	7/93	$195 for Composer owners	Mac II 2.5M RAM (Sys 6) or 3M RAM (Sys 7) hard drive, ATM	Many new features, QuickDraw printers	KYBD 2/93
MUSIC TIME MAC/PC Passport Designs 415.726.0280	1.2	5/93		IBM AT, PS2/clone, MPC, Windows 3.0, DOS 3.1Mcrsft mouse	Auto mixer, SMPTE insert, enhanced Step Editor, transpose map, velocity editor	
MUSICATOR GS/ WINDOWS THINKWARE 415.255.2091	1.0	12/92	n/c	Mac II	Various feature enhancements	
NOTATOR LOGIC **(MAC/ATARI)** Emagic 800.553.5151	19	9/93	n/c	Mac II < / Atari ST <	Many sophisticated seqeuncing features	
OFFICE MANAGER White Crow Inc. 800.424.0310	2.5	12/92	n/c	Mac II	Various feature enhancements	
OBJECT MOVER Kurzweil Music Systems 213.926.3200	2.0			Mac	K1000/1200 series librarian	
OMS Opcode Systems	1.2.1	9/93	n/c	Mac IIs, Quadras	Fixes problems with Powerbook modem port	EM 3/92
PERFORMER Mark of the Unicorn 617.576.2760	4.2	7/93	n/c	Mac Plus 4M RAM hard drive	Partial solo; solo button in all edit wdws; popup menus for track switching	KYBD 8/90
POWER CORDS/PRO Howling Dog Systems 613.599.7927	1.1/ 2.0	5/93 9/93	$15, free if after 4/15/93 /$200 new	PC/clone, Windows 3.1, mouse, snd card or MIDI interface	Copy/move/delete groups of bars, smart MIDI thru, key transpose./16 melodies per bar; drag&drop edits, quant'n; import MIDI&PwrChrds parts;efx.	EM 1/93; SOS 9/93
PRO TOOLS Digidesign 415.688.0600	2.2	7/93		Mac IIs, Quadra	Built-in timecode calculator; set selection by SMPTE; SMPTE in Transport window	
PRODUCER/PRO Passport	1.1/ 1.0	5/93 8/93		Mac IIs, Quadra	Pro Video support, hardware control etc.	
Q-SHEET A/V Digidesign	2.01			Mac Plus, SE1, SE/30, IIs		
QUICKSCORE DELUXE Dr. T's Music Software 617.455.1454	1.0	7/93	$149.95 new	Windows 3.1 386 PC 2MB RAM	Windows MIDI Scoring Program; 16 staves; Suprts Windows Printers & True Type; input from MIDI Kybd.	

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PRODUCT	V.	R.D.	$	REQ.	FIXES/FEATURES	REVIEWS
SAMPLECELL EDITOR Digidesign 415.688.0600	2.0	7/93	$50	Mac IIs, Quadra, SampleCell Nubus Card	New Interface, Sys & savvy, Apple Events.	
SESSION 8 Digidesign	1.15	7/93	n/c	386 PC/Clone	Supports DATa for the PC	
SOUND ACCESS Digidesign	1.10		n/c			
SOUND DESIGNER II Digidesign	2.5	12/92	>2.xx: n/c <1.xx: $195	Mac IIs, Quadra	New time compression/expansion, pitch shifting	
SOUND DESIGNER IIPT Digidesign	2.5	12/92	$995 for Pro Tools	Mac IIs; Quadra	New time compression/expansion, pitch shifting	
SOUND EDIT PRO MacroMedia 415.442.0200	1.0	1/92	$349 new	Mac Plus, Sys. 6.0.7	Edit 16-bit audio, non-destructive editing, DSP effects	
SOUND STAGE (56K SYS) Turtle Beach Systems 717.843.6916	2.0	1/93	n/c	PC w/ Windows 3.1	Feature fixes, larger buffers	KYBD 5/91
STUDIO 3 DA Opcode Systems 415.369.8131	1.01	9/89	n/c	Studio 3 Interface		
STUDIO 5/OMS SETUP Opcode Systems	1.1.3	1/92	n/c	Studio 5 Interface	More OMS device names	
STUDIO VISION Opcode Systems 415.369.8131	1.5	10/93	>1.4 $150; $995 new	Mac II/Quadra; 32-bit add'g Digi card; 8MB RAM;18-ms hard disk	Four-channel audio w/ Audiomedia I &II, Sound Tools I & II, and 4- to 16-channel compat. w/ Pro Tools.DAE/TDM support; audio scrubbing	KYBD 1/91; EM 2/91
TIGER CUB Dr. T's Music Software 617.455.1454	1.1	10/91		Amiga		
TIGER Dr. T's Music Software	1.21	2/91		Atari		KYBD 2/90
TIMEBANDIT Steinberg-Jones 8*8.993.4091	1.0	5/93	$495 new	Mac II, LC, SE/30 and Classic I	Time Correction, Compression, Expansion, Pitch Shift and Harmonisation effects for Sound Designer II files	
TIMECODE READER (ROM) EnterTec Inc. 804.353.7133	1.1		$179	PC/Clone DOS, Windows 3.x	Captures SMPTE to Clipboard	
TRACKCHART Opcode Systems	1.03	4/92	n/c	Mac Plus	Sys 7 compat., 32 bit clean	
TURBOSYNTH SC Digidesign 415.688.0600	1.00	7/93	$29 dmstc $49 int'l	Mac Plus or better	Sound creation and editing system for samplers; Suprts Stereo; SmpleCel Edtor via Apple Evnts; AIFF; SD II; new Manl; no samplers but SmpleCell	KYBD 10/88
UNISYN Mark of the Unicorn 617.576.2760	1.00	7/93		Mac Plus or better	Universal Editor Librarian	
VISION Opcode Systems 415.369.8131	1.44	5/93	>1.3 n/c; <1.3 $29	Mac Plus		KYBD 7/89
WAVE FOR WINDOWS Turtle Beach Systems	1/93	2.0	$39	PC/clone Windows 3.1	DSP reverb, delay, pitch shift	

World Radio History

Techniques for the Digital Studio, Part 1

By Craig Anderton

Mention hard disk recording, and most people think of audio storage and editing. That's one application, but a hard disk recording system can also serve as a piece of audio test gear roughly comparable to a high-resolution, two-channel storage oscilloscope.

With a hard disk recording system you can find a synthesizer's delay in responding to MIDI messages; test equalizer frequency response; learn the real times—in milliseconds—of synthesizer envelope segments that range from "00-99;" check sequencer timing jitter and more. The measurements aren't real time, but you can record a series of measurements and analyze them at your leisure (as well as store them as computer files), which in some cases is better.

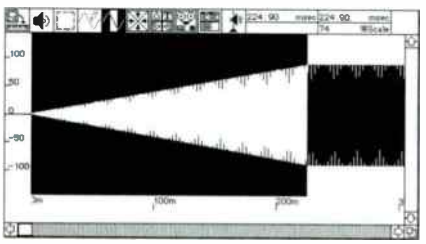

Fig. 1: DPM envelope attack time of 20.

You'll usually need to measure only a few seconds or minutes of audio to get the data, so a giant hard drive isn't as crucial as it ordinarily is. But good audio cards make for the most accurate reading.

In this installment we'll calibrate your synthesizers, samplers, and other sound generators. In part 2, we'll measure noise gate response time, frequency response, gain, and sequencer jitter.

Beating the Numbers Game

Let's remove the shroud of mystery around synthesizers that say an attack time is "03" or an LFO speed is "22." What does that mean in milliseconds? Not only can hard disk systems provide the answers, they can also give some insights into the "vintage synth" sound.

Figure 1, a screen dump from Sound Tools, shows a note played through a Peavey DPM 3 amplitude envelope set for an attack time of "20."

Highlighting the attack region gives an elapsed time readout in the box to the right of the scrub icon—in this case, about 225 ms. (With Sound Tools, the cursor must remain at the end of the region; if you move it, the elapsed time reading will follow its position.) Take several readings for different generator values, plot a graph, and you need never guess about envelope times again.

It's also instructive to look at an envelope's overall shape. "Vintage" synthesizers like the Minimoog usually have envelopes that decay exponentially after a short peak hold time (Figure 2), which gives a natural sound.

Modern digital synths tend to have linear decays. Note how a DPM 3's decay envelope drops off linearly after a 30-ms hold (Figure 3). But you can program linear rate/level envelope generators to simulate an exponential decay by setting each subsequent level at half of the previous value, and doubling the times between levels. Figure 4 shows a DPM 3 amplitude envelope set for levels 99-50-25-00 with times of 4-8-16 between these levels.

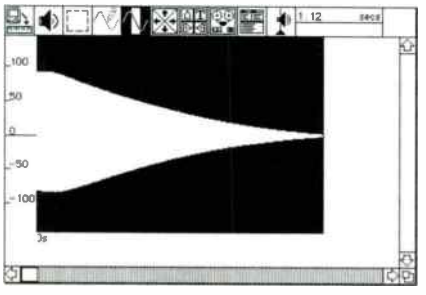

Fig. 2: Minimoog envelope decay.

Interestingly, the DPM 3 and Minimoog, both of which are considered "punchy," exhibit a very short maximum-level sustain time (30 and 40 ms respectively) before the decay kicks in. The short "full on" time may give the subjective effect of punch. (If you see "punch" buttons on synths that add this hold time, you saw it here first!)

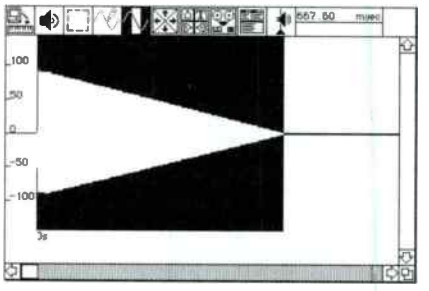

Fig. 3: Linear envelope decay.

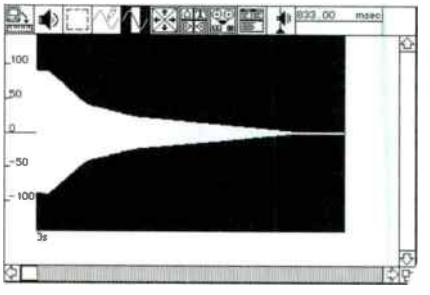

Fig. 4: Setting a rate/level envelope for exponential decay.

Punchiness involves other factors. When subjected to the scrutiny of hard disk editing, it's clear that some synthesizers don't have an instantaneous attack time, even with the attack parameter set to 0. It's easy to test a synth for this by setting the synth's attack to 0, recording

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a note into your hard disk system, then checking if there is a time difference between the onset of the note and when it reaches its maximum level. Fig. 5 shows an OB-8 synthesizer's attack time (this is a fairly old and slow synthesizer); highlighting the time difference shows the delay in milliseconds (in this case, 2.00 ms).

When testing attack times with a sampler, truncate the beginning of the sample somewhat to insure that the attack characteristic of the sample itself

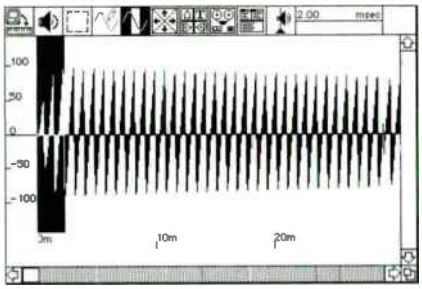

Fig. 5: OB-8 fixed attack time revealed.

doesn't influence the attack. Musically, this implies that instruments with non-zero attack times are best for strings and pads rather than percussive sounds. (Maybe this is one reason why the OB-8 was famed for its string and horn pads, two sounds that aren't dependent on quick attacks.)

"This is MIDI Central, Please Hold..."

Even the best synths don't respond instantaneously to incoming MIDI data. Some take less than a few milliseconds and exhibit a constant delay; others have significant, and sometimes varying, delays. Timing delays that vary randomly are the worst, because the variability makes it difficult to compensate for the delay by shifting sequencer tracks a few clocks. Fortunately, a hard disk recording system can help quantify these delays.

Figure 6 shows the test setup, which requires a stable source of timing pulses and MIDI events. The Alesis MMT-8 has exceptionally stable timing (I recorded the click into the hard disk system and measured the elapsed time between clicks, as well as the elapsed time between the generation of MIDI events; both were virtually constant). By feeding the MMT-8 metronome click into one

TECHNIQUES *continued on page 98-15*

NEED MORE CONTROL?

ANNOUNCING SoftMC v1.0 FOR WINDOWS

SoftMC is an easy to use programmable MIDI controller for Windows. SoftMC will allow you to control multiple MIDI devices, at discrete levels, in a complex MIDI system environment. SoftMC controls virtually any MIDI device available along with built in support for the Lexicon LXP-1 multi effects processor.

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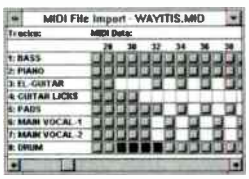
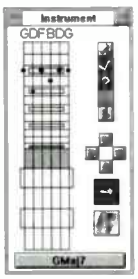


Graphic import from MIDI or Power Chords files make 'clip-music' a reality.



Record anything played on the on-screen instruments. Intrepret as melodies, drum parts, chord parts, or even chord progressions.

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upgrade from 1.1:	$ 60.00
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upgrade from 1.0:	$ 15.00
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Mr. Drumstix' Music Studio:	$ 69.95

Demo disk available

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or GO HOWLING

World Radio History

Software Directions

STUDIO SOFTWARE NEWS AND UPDATES

The studio shrinks to the size of a desktop, and maybe there's a future in modular synths.

In 1969, **Tom Oberheim** founded Oberheim Electronics, where he developed some of the most used, loved and respected instruments in the history of electronic music. He founded **Marion Systems** in 1987 to further the state of electronic music, and the company recently made an intriguing announcement.

The **MSR-2 Modular Synthesizer System** ($1495 per module) is scheduled for release to Marion Systems dealers in November. The unit is designed to meet the musician's need for an electronic instrument that combines top-quality sound, ease of use, modularity and freedom from obsolescence. The instrument will let users incorporate many different technologies into a single system with a single user interface. It's based on a 1U rack unit ("The Mainframe") that can hold two plug-in sound modules, each of which is a complete synthesizer that slides easily into and out of the rack. The first modules to be developed will be configured as eight-voice analog synthesizers featuring proprietary High Resolution Oscillators that will combine the classic analog sound with the stability of digital technology. The modules will offer warm, 2- and 4-pole filters, external audio inputs into each filter, and an extensive modulation matrix that will provide expressive, real time control. Future modules will feature wavetable synthesis, sample recording and playback, reverb and other new technologies. The user will be able to swap different modules in and out of the Mainframe to create individualized, custom sounds, and to access its 6-channel mixer, external inputs, programmable graphic EQ, two MIDI ports including MIDI processing, and easy-to-use, menu-driven interface. Experienced synth-oids will keep a eye out for this new development. **Marion Systems:** 408.688.8593.

Digidesign continues to pump up its Macintosh-based **TDM Bus** system which will serve as the foundation for a complete, all-digital studio in a box. The TDM system will give users of **Pro Tools** access to all the functions normally associated with the recording studio, but all in the digital domain, and generated by hardware and software installed in the Macintosh. Software "plug-ins" will perform such operations as EQ or noise reduction and Mac NuBus cards (such as the **Lexicon NuVerb** or Digidesign's **SampleCell**) will offer signal processing, sample playback, mixing and other functions. The system also allows the ability to route signals to and from outboard analog or digital gear already in a studio, and to control send and return levels automatically.

New TDM-compatible products include **PostView**, an integrated digital video and VTR control software for Pro Tools; **MasterList CD**, a CD mastering system for ProTools, ProMaster 20, Sound Tools II and Audiomedia II systems; and the **File Browsing Utility**, an audio file management system that provides cataloging, searching, auditioning and allowing the user to insert a file into current applications. **Digidesign:** 415.688.0600.

Mark of the Unicorn is also boarding the Digidesign TDM bus. The venerable sequencer and MIDI interface manufacturer announced that their **Digital Performer**, too, will support the **Digidesign Audio Engine**. The DAE is the system-level software that integrates and operates the TDM system. MOTU's collaboration means that their software will be able to take advantage of future enhancements to TDM. **Mark of the Unicorn:** 617.576.2760.

Peavey, not content to let Digidesign have all the fun putting the recording studio in a Mac, has announced **MediaMation**, the technology that puts a sound reinforcement system in a PC. The system is based on Peavey's **MediaMatrix** expansion card, designed around four **Motorola 56002 DSP** chips, and the MediaMation software. Since the functions of the DSP cards are configurable in software, they can function as EQs, signal processors, mixers, and "anything between the mics and the power amps," as one Peavey representative put it. The user can install as many MediaMation cards as the PC has slots, to give the system an extraordinary expandability.

The software provides a graphical user interface that lets the user click and drag icons representing the elements of a system. The screen can show an overview including unit names and signal routings and zoom in to display the controls of any of the individual units. The software can also display (and save) scanned photos or architectural-style diagrams of any venue, onto which the user can impose elements of the sound system, including speakers, mixers and other gear. These images can be saved and recalled along with the settings required at the given venue to make setup faster and surer.

The system connects to the outside world via small A-to-D/D-to-A breakout boxes that can integrate outboard analog gear into a setup.

While the system is optimized for sound reinforcement, its internal processing is done in a 24-bits format, so it could be refitted for studio use by a relatively simple redesign of its breakout boxes to also reflect 24-bit quality. **Peavey:** 601.486.1287. ■

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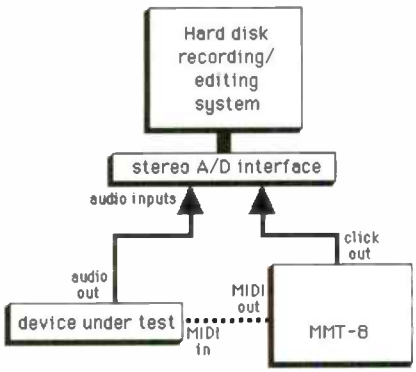

Fig. 6: Test setup for measuring synth MIDI delays.

hard disk recording channel, driving the instrument under test from the MMT-8's MIDI out, and recording a percussive sound from the instrument being tested into the other channel, compare the offset between the click and note onset to get the delay times of different synths.

Figure 7 shows the delay for an Alesis SR-16 drum machine. The highlighted area defines the region between where the click starts and where the audio starts, which is around 1.9 ms—very fast, considering that a MIDI note-on message itself takes about 1 ms.

Fig. 8 shows the delay for an OB-8. The highlighted region is about 7.50 ms, but this can vary a little for individual notes. (For what it's worth, a good synth or sampler will measure around 3-4 ms of delay, an average device around 4-6 ms, and below average, 6 ms or more.)

Once you know the delay times of your synthesizers, you can "slip" sequencer tracks to tune out variations.

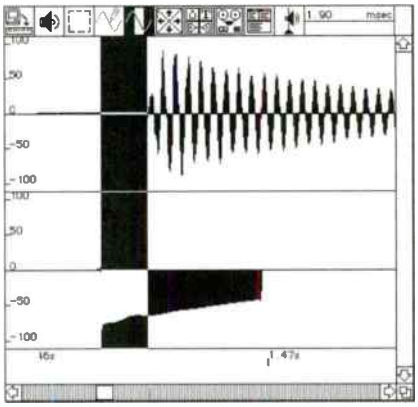

Fig. 7: SR-16 MIDI response time.

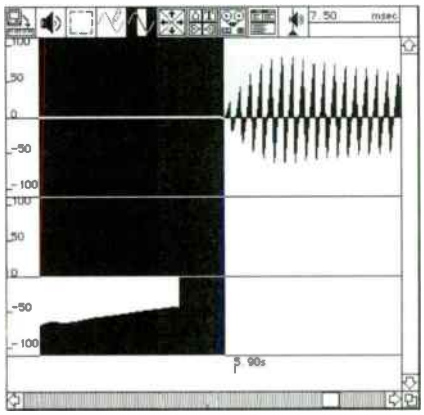

Fig. 8: DB-8 MIDI response time.

(Even if you do track-shifting to create a particular "feel," it helps to have a consistent point of departure when you start.)

Now that we have the synths figured out, it's time to find out more about the rest of your studio. See you next issue.

Craig Anderton spends most of his time traveling around the world and giving lectures on subjects related to musical electronics. He knows where the video arcades are in all major airports.

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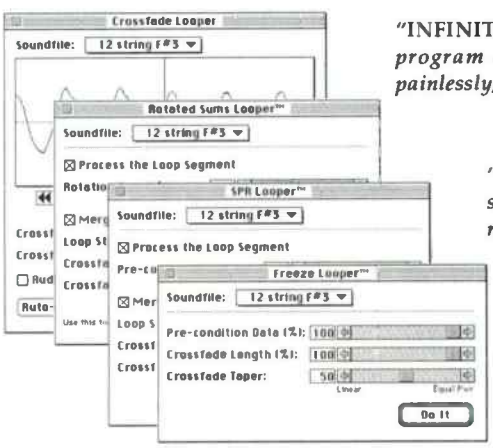

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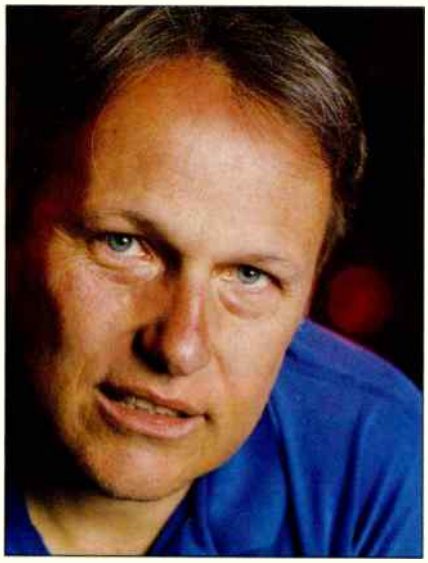
Software Explosions and More



A look at things that bug me and other computer confessions

BY ROGER NICHOLS

I think that it's time to talk about software again. Phil Burnet from River Sound just called me about the Flying Faders they have installed on their Neve console. Apparently the computer crashed just as they were getting ready to print the mix to 2-track. The computer locked up. The screen started doing funny things, the keyboard would no longer work, and the faders wouldn't move. Nice.

The Flying Fader system software is stored on the hard disk of a Hewlett-Packard "IBM PC" clone. Inside the HP box is a card that contains a stand-alone computer with its own memory, CPU, and I/O that actually does all of the automation. The "automation" board is connected to the scanning computer located under the console by a fiber-optic link. The CPU in the HP box is just there for the screen display and the hard-disk storage. When you move a fader, the scanning computer sends the movement information to the "automation" board. If you save a mix to disk, the HP asks the "automation" CPU to send over the data for the mix that you want to save. The HP's CPU then stores that data in a format that you can get to with any DOS-based computer.

The data in the memory of the "automation" board is completely isolated from the HP's memory space. If the memory and CPU crash in the HP, there is no reason to expect the data in the "automation" board's memory to be corrupt. Got it?

If the HP crashes, there is no way to reset the computer without turning it off. If you turn off the computer, you will surely lose all data in the "automation" board. I asked Neve four years ago why there wasn't a hardware reset on the HP box. They said that someone might accidentally press it and ruin a mix. It also prevents someone from pressing it on purpose to save a mix.

I picked Neve in this case because that happened to be the most recent phone call I received before sitting down to finish this column. It could just as easily have been any number of other manufacturers who rely on computer software to make their products work. That covers just about all of them.

My gripe here is that these crashes are usually caused by bugs in the software. Some combination of circumstances causes the computer to go off into never-never land. Most of the time the software vendor knew about the problem, but release schedules wouldn't allow any more time to be spent debugging. The next release of the software would be better. The product is shipped to the customers and if the customers' system crashes, the vendor acts as though he is the first person to encounter the problem.

Even big companies like Microsoft do it. DOS 6.0 will eat everything on your hard disk under certain circumstances. When IBM's version of DOS 6.0 is released, all of the known bugs will be fixed, but Microsoft didn't want to wait.

I have nothing against introducing new software that is not quite ready to go. I love to test new versions of software with new bells and whistles. I would, however, like to know what the problems are that I am likely to get myself into. I think that there should be someplace you could go to find out about potential software problems.

There are two major plusses involved in disclosing known bugs. The first is the knowledge that the end user can dive into the buggy water if he wants to, but he can stay away from problem areas if he needs to have a reliable product in order to finish a paying job. The second plus is that if the software user is aware of the bug, he could document the course of action taken before the crash, thus providing the vendor with some data that might help solve the problem.

I had a program once that would crash if you tried to save a sample that was an exact multiple of 512 samples. If you sampled a drum that lasted about five seconds and the last sample was 524,288, saving would mean crashing. After the company told me about the problem it was easy to cut the drum off one sample sooner or one sample later. It made no difference to the sound of the drum, but it sure made a big difference in my sanity at four in the morning.

There are digital EQs that roll off the bottom end even when they are bypassed. It is a software problem. There are digital EQs that mute the digital output data stream when you recall a new EQ setting from memory. Software problem. There are digital audio workstations that always pass the digital audio through the DSP and change it slightly even when you think that the DSP is bypassed. Software problem. There are digital multitrack machines that stay in record after you press stop in certain circumstances. Software problem.

continued on page 128

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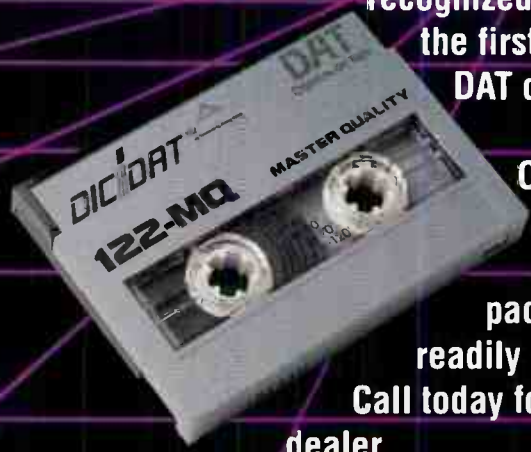

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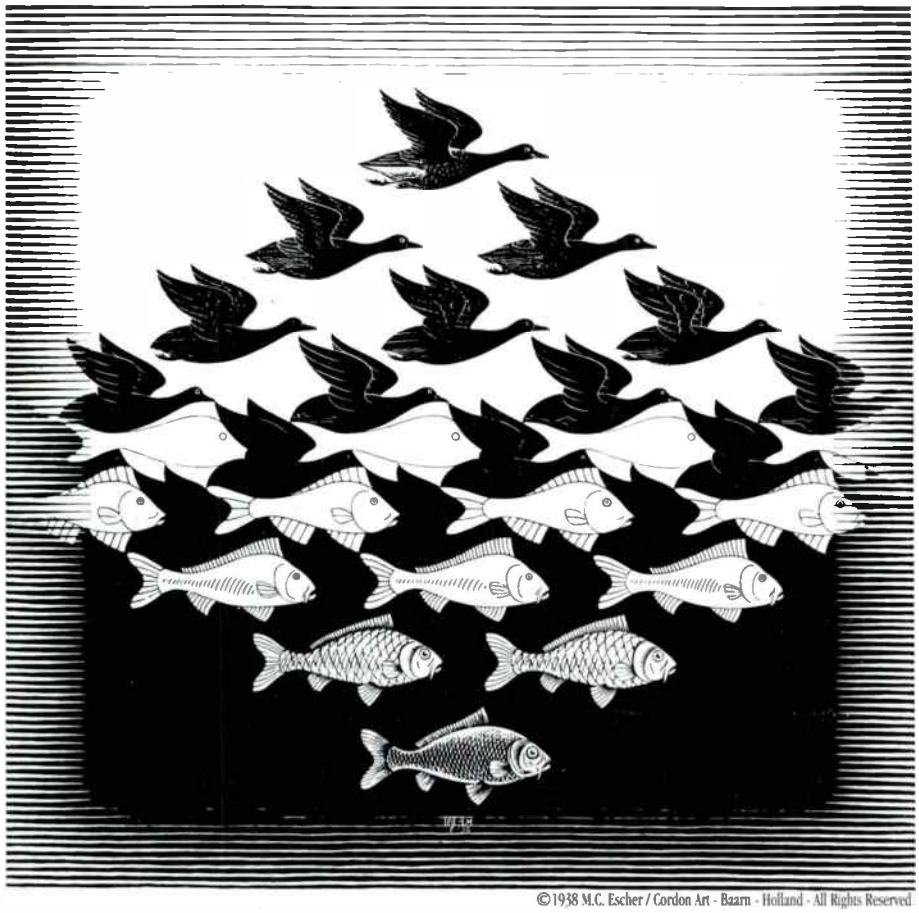
If you think only your eyes can play tricks on you...



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Study the illustration. Are the geese becoming fish, the fish becoming geese, or perhaps both? Seasoned recording engineers will agree that your eyes *and* your ears can play tricks on you. In the studio, sometimes what you think you hear isn't there. Other times, things you don't hear at all end up on tape. And the longer you spend listening, the more likely these aural illusions will occur.

The most critical listening devices in your studio are your own ears. They evaluate the sounds that are the basis of your work, your art. If your ears are deceived, your work may fall short of its full potential. You must hear everything, and often must listen for hours on end. If your studio monitors alter sound, even slightly, you won't get an accurate representation of your work and the potential for listener fatigue is greatly increased.

This is exactly why our engineers strive to produce studio monitors that deliver sound with unfailing accuracy. And, why they create components designed to work in perfect harmony with each other. In the laboratory, they work with quantifiable parameters that do have a definite impact on what you may or may not hear. *Distortion*, which effects clarity, articulation, imaging and, most importantly, listener fatigue. *Frequency Response*, which measures a loudspeaker's ability to uniformly reproduce sound. *Power Handling*, the ability of a loudspeaker system to handle the wide dynamic range typical of the digital domain. And, finally, *Dispersion*, which determines how the system's energy balance changes as your listening position moves off axis.

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