EQ PEOPLE OF THE YEAR

EQ

THE PROJECT RECORDING & SOUND MAGAZINE

SPECIAL AES ISSUE

NEW PRODUCT EXTRAVAGANZA

CRAIG ANDERTON'S AES HOT PICKS

OCT 1993

EQ LIVE!

Roger Nichols Mixes Monitors

Backstage at Lollapalooza

EQ REVIEWS

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ENSONIQ ASR-10 Sampler

MICRO TECHNOLOGY UNLIMITED MicroSound

SAMSON MPL 2242

BAG END ELF-1

Atlantic Wavelengths

By Tom Dowd

05

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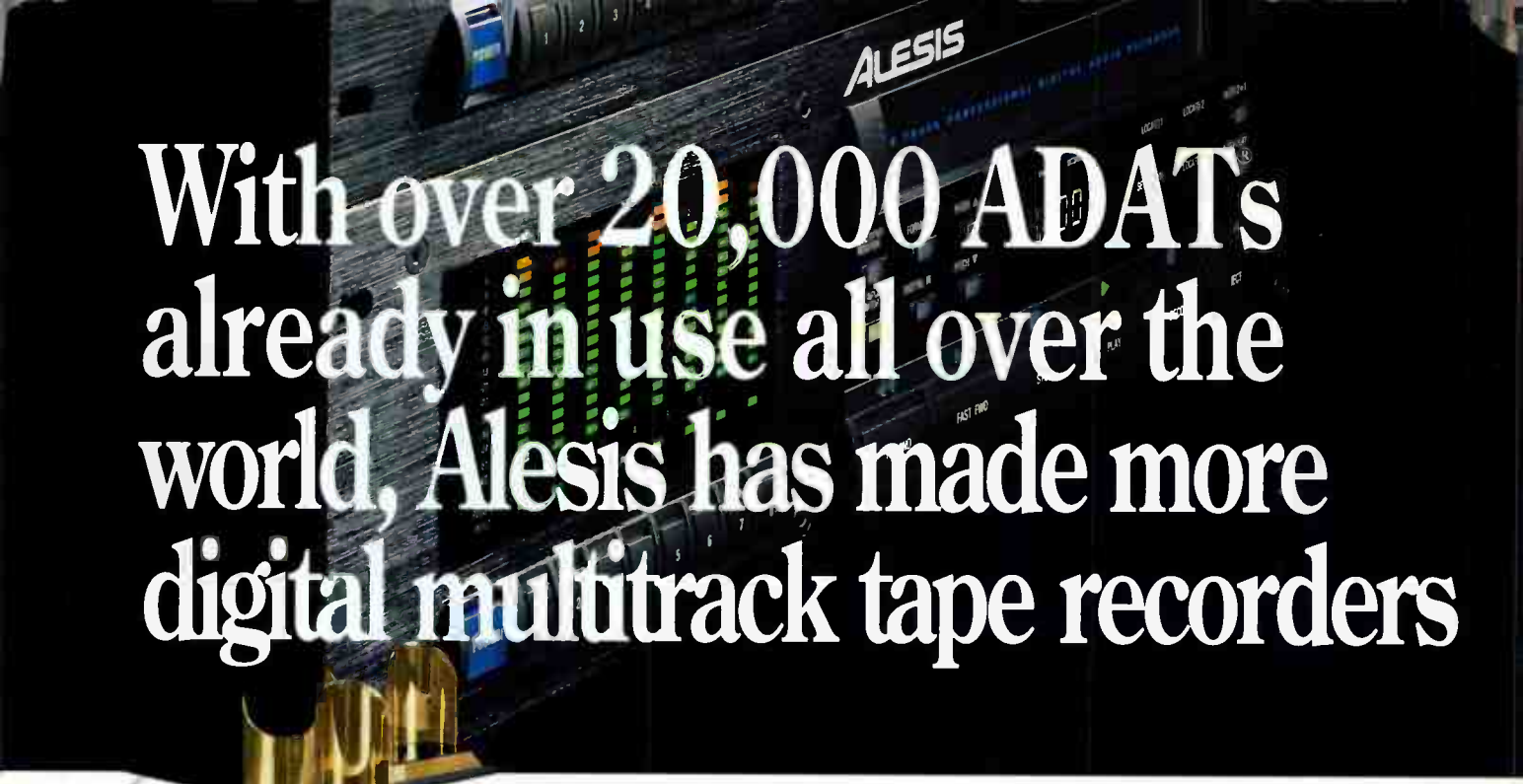
World Radio History

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.

The Alesis AI-1™ ADAT to AES/EBU and S/PDIF Digital Interface with sample rate converter lets you transfer audio digitally to or from the ADAT system and external units such as DATs, CDs, and other digital recording formats.

The Alesis AI-2™ Multi-Purpose Audio/Video Synchronization Interface by TimeLine (the leader in synchronization products) connects ADAT to the world of video, film and multi-media production using SMPTE, 9 pin and TimeLine Lynx control protocols.

Focus on Compatibility™

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.

The adat Group™

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.

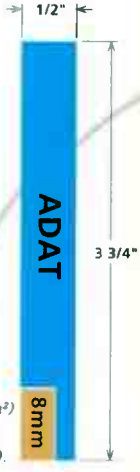
An ADAT's helical scan: ADAT tracks are safely separated into 8 discrete data blocks. (Both vertical dimensions enlarged for clarity)

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.

World Radio History

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

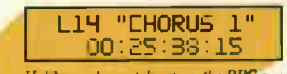
ADAT, when combined with the BRC™ Master Remote Control, is a complete digital recording and digital editing system with features that no other recorder, analog or digital, can match. The BRC is a full-function autolocator and MIDI/SMPTE time code chase-lock synchronizer. Plus, it controls digital copying 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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PROJECT RECORDING
& SOUND TECHNIQUES
VOLUME 4, ISSUE 5
OCTOBER 1993

FEATURES

SOUNDQUAKE HITS NY: SPECIAL AES SECTION

The walls of the Javits Center are still shaking from the year's premier audio event. Find out what went down when the audio show of shows took on the city that never sleeps. Includes Craig Anderton's take on the show, AES Product Views, EQ People of the Year, and our picks for the TEC Awards 42

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World Radio History

On the cover: Tom Dowd by Deborah Gray Mitchell; Javits Boom Box by J.R. Rost

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EQ

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HEAR ME ROAR...

As a professional woman in the recording/music industry, I have totally had it with your magazine! Consistently, month after month I cannot read *EQ* without being bombarded with sexist comments. I've experienced more sexism in your magazine than any other magazine of its type, not to mention any studio control room. There are women in your readership despite the fact that your articles don't reflect it, and there is no reason why one should have to be subjected to offensive comments while attempting to acquire information relevant to audio recording or products. Why don't you have any women producers or engineers (or women period) such as Susan Rogers, Angela Piva, or Sylvia Massey as contributing editors? For many people, *EQ* is their only contact with the recording industry and you're not painting a very realistic nor encouraging picture for women (or men for that matter) in terms of what is accepted or expected behavior. Keep your comments to yourself and stick to the point, which should be audio recording, live sound, and audio products. You're welcome to jump into the '90s anytime now.

Jennifer Monnar
Engineer, Right Track Recording
New York, NY

...HEAR US OINK

Letters like this one make you think. They make you seriously look into your soul and wonder if, in fact, there is some truth to the claim that you are inadvertantly more sexist than you ever would have believed. It is the kind of introspection that the entire audio industry might well explore in an effort to open up the recording field (a male bastion if there ever was one) to creative, technical women.

I called Jennifer to find out more about her beef. I found out specifically that she was upset that we categorized the owner/operators of our "Rooms with a Vu" with the terms "Main Men" — too gender specific; she's right and we're wrong and (as you'll see in this issue) it's been changed. She felt that the reference to "Girls, Girls, Girls" as the primary draw of Duran Duran was demeaning (sorry, but it's a fact — teenage girls are girls and they are Duran Duran's primary fans); and that our columnists occasionally lapse into sexist banter (maybe we've been too lenient in our editing or maybe not; we ask for your opinions and encourage some debate about this point in this space).

Finally, she remarked that we don't have women cover stories nor do we have women writers. Again, a very valid point. We're open to suggestions for our cover stories, but just because a subject is a woman does not necessarily mean she warrants a cover. As for writers — we beg, plead and openly welcome any woman with solid technical chops to write us a story query. Unabashedly, we will give it a priority read.

Are we not pigs? This is a much bigger question. And thanks to Jennifer we will be more careful in the future. How-to information is not gender specific. The recording studio is not the male domain. It can't be, shouldn't be, won't be. Thanks for keeping us honest.

We feel so strongly about this fact that (even before Jennifer's letter) we were the sole industry sponsor of Technet's Women in Audio survey, which is scheduled to be presented at the AES.

In short, we're doing something about sexism in audio. Are you?

Martin Porter
Executive Editor

TO THE POINT

Re: Rudy Van Gelder's interview [July/August '93]

Finally, it's about time — the legend has spoken.

L. Jerrald Mottz
Fairfield, CA

CORRECTION

In the Micro-Phile section of the July/August '93 issue of *EQ*, we incorrectly identified the Neumann U47 microphone as being externally phantom powered. It is not phantom powered. EQ

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.

World Radio History

1500 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

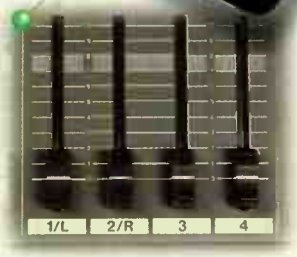
If you don't have dedicated inputs and outputs for your 8-track deck, where do you plug it in? Without this basic recording configuration you'll be repatching day and night and you won't be able to record on 8 tracks at once. With these inputs, tape monitoring is as simple as pressing a switch. Also, 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.

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.

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EQ&A

CONSOLE QUERY

Q *I am interested in purchasing a small (4- or 8-channel), portable stereo mixer. Since it will be used for field recording, it needs to be battery and, hopefully, AC powered. I will be using the mixer with a portable DAT, so I'm not interested in an all-in-one mixer/recorder. Any suggestions?*

Chas Zureki
Dearborn, MI

A Well Chas, you're in luck. A number of small stereo mixers will run on battery power; however, you didn't say what type of recording you would be doing with this mixer in the field. For instance, recording sound effects "on location" can be very demanding; productions occasionally require very soft sounds (e.g., distant bird calls) to be greatly amplified, exposing the noise floor of even the quietest preamp, and, conversely, other sounds (e.g., large machinery, explosions, and thunder) can test the headroom of both the microphone and the preamp. These extremes make selecting a mixer for this application much more difficult.

Battery-powered mixers have traditionally been the tool of the location sound recordist for film and broadcast productions. These applications required robust mixers with fully balanced inputs and outputs, as well as very good dynamic range. Mixers designed for these applications typically range from three to ten inputs, and, due to their rugged construction, they can be considerably more expensive than a project studio mixer with the same features. Reliability is very important when the tape is rolling on a "once in a lifetime" sound event.

Portable mixers add two important factors to all the usual ones we consider when buying a mixer. First, how portable is it? Size, weight, fragility, connector positions, handles, etc., must be considered. Second, how well does it perform on battery power; how long do the batteries last; how easy are they to change; and how does the mixer sound on marginal batteries? If the unit requires bulky batteries, carrying multiple spares will become tiresome and if they are expensive, owning enough of them to always have a charged set on-hand will be costly.

If cost is a major consideration, then the AC- or DC-power capability of the Soundcraft Spirit Folio mixer range might suit your needs. These stereo mixers offer mono and stereo line inputs and phantom-powered mic inputs — all with 3-band EQ and two auxiliary sends. Soundcraft also makes the more expensive LM1 mixer specifically for location sound recording, as do many of the manufacturers in the film sound industry, such as Stellavox, Sennheiser, Seeport, and Sonofax. Sennheiser even makes a location mixer, the WM-1, that combines wireless mic receivers into a portable mixer for the ultimate in portability (no mic cables to wrap up afterwards).

Wade McGregor
Contributing Editor
EQ

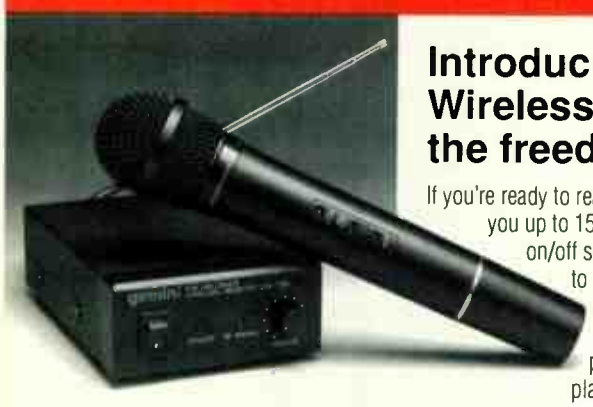
TRAVELIN' MAN

Q *I travel a lot during the course of my job and carry along many different electronic devices. The biggest problem is knowing which converters to bring, both electrical and mechanical. Is there any reference book that lists types of electricity used in various countries?*

Daniel Lundquist
Milwaukee, WI

A The U.S. Chamber of Commerce prints a handbook titled *Electric Current Abroad*, which lists line voltage and frequencies, types of connectors used (with diagrams), phase, number of system wires, and a glossary of terms. For credit card orders, call 202-783-3238, or send $3 to

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



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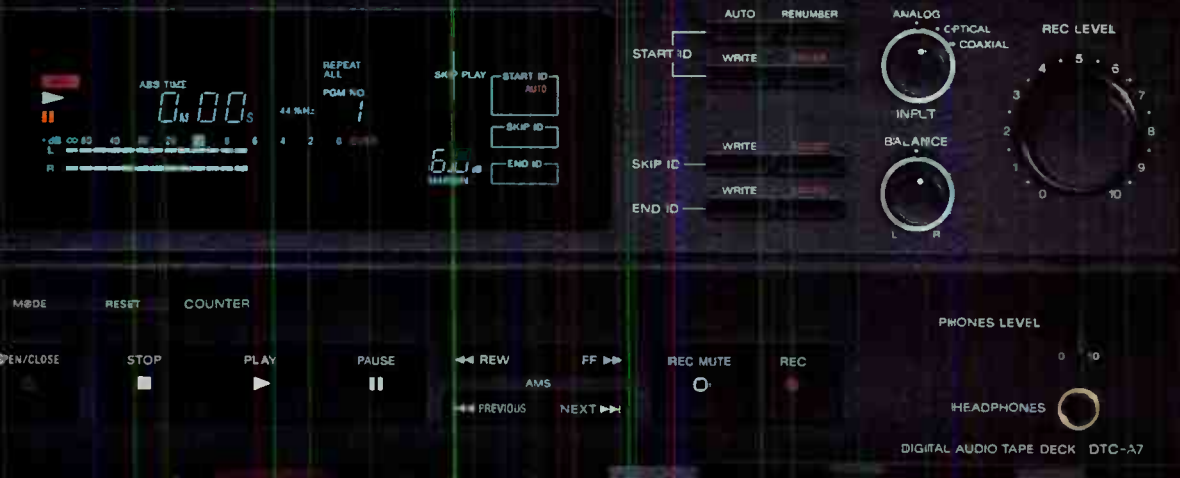

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Craig Anderton
West Coast Editor
EQ

GUIDANCE COUNSELORS

Q *I am a high school senior interested in pursuing an education and career in the music industry, perhaps as a recording engineer for an indie label. Should I get a 4-year electrical engineering degree and specialize in music later? Is there an alternative path?*

Phil Ohme
Royersford, PA

A Out of all the types of questions this magazine receives, none is more difficult to answer than this one. There are no specific paths to take into the music industry; in fact, several paths can lead you to the same end. The first thing, however, is to decide which segment of the industry you really want to be in. Think about what interests you the most. Most record labels no longer maintain a staff of "in-house" engineers and producers, opting instead to maintain close relationships with independents. Therefore, I wouldn't look in that direction.

There are two great sources of information: your local library and your local recording studio(s). Check the library for books on jobs in the music business; read everything. If your local library is small, head out to the nearest big city. Look through your phone book and find recording studios. Call them and ask if you can drop by on off hours. Check into local and regional live sound companies and record labels, call them and go see them.

While at the library, read industry magazines and check reference books on colleges and universities with curricula specializing in recording and music. Many of these schools will offer courses in varied music fields, giving you time to decide what really interests you while you learn. If you do find out that recording engineering is your thing, find a school that also offers technical maintenance programs. It will always be to your advantage to be able to read a schematic diagram and understand proper signal flow. (A full-blown electrical engineering program would help if you decided to design audio equipment, of course.) While you're at it, a couple of basic music courses wouldn't hurt.

Incidentally, visit any schools you plan to attend. Make sure that the schools have good music/recording studios on campus. Check that the professors have experience in the field and that the college provides several field trips to studios, mastering plants, concerts, and so on, during the year. Also, be certain the college programs include bringing in outside professionals a few times a year. Universities have a tendency to provide a safe, closed atmosphere, and hearing the word from professionals working in the field helps to give you the complete picture. Don't go anywhere where "life" experience isn't part of the scholastic package.

EQ readers are invited to write in and provide Mr. Ohme with additional information.

Hector G. La Torre
Executive Director
EQ

DESPERATELY SEEKING PAIA

Q *I need a source for circuit diagrams for an 8x2x4 mixing console, as well as for other outboard gear. I only know of Paia as a source, but don't have an address for them.*

Bill Loughery
Hollywood, CA

A Here's the info: Paia Electronics, 3200 Teakwood Lane, Edmond, OK 73013. Tel: 405-340-6300. Fax: 405-340-6378. If any readers and manufacturers out there in *EQ*-Land can provide additional information on circuit diagram sources, please write us.

Craig Anderton
West Coast Editor
EQ

This is where your questions get answered. Send your query with your name and address to:
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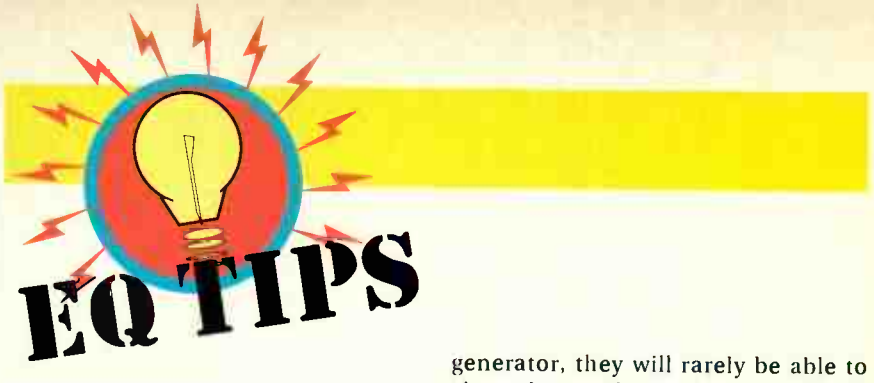

EDITED BY DAVE BRODY

Inexpensive digital multitrack recording is, from all indications, a wonderful thing. With, according to Alesis, 20,000 ADATs in the field and any major dark and dirty secrets would certainly have reared their unwholesome heads by now. Having said that, there are some tidbits they don't tell you about in the manuals for these devices:

THE ANGLE OF DANGLE

More than a few folks have noticed that some ADATs dislike being asked to work at certain angles. Oh, they'll be fine in your average slope-front fixed rack, but if you mount your new ADAT(s) in your old roll-around swing rack it (they) may say "no thank-you" to angles too far from level. To further confuse the issue, this problem may not show up until the end of the tape when the unequal size of the tape pack within the shell combines with the irresistible force of gravity to make your tape sag away from the helical head.

PICKING THE LOCK-UP

There seems to be some confusion on the part of many users, dealers, and even manufacturers' "help-line" answerers about the powers and abilities of the new generation of video-style multitrack digital recorders to lock their transports to the outside world. Let's say you want to dump your newly recorded tracks to a larger format so that you can continue working, or that you want to be able to transfer tracks developed in your project studio to a "mothership-based" master reel (24/48-track analog or digital, 32-track digital, etc.). If you read your manual (or call your dealer) you may get the impression that it's a simple matter of patching timecode from the big machine into the new "Huge Remote Controller" they're about to sell you. It ain't necessarily so.

While ADATs, TASCAM DA-88's, and the like may be able to lock to a crystal-controlled external timecode generator, they will rarely be able to chase the wanderings of a tape transport with code striped on a track. You will likely need to make your personal digital multitrack machine the "master" and use an external synchronizer (Lynx, Q-lock, Zeta-Three, etc.) in "Code-Only Master" mode to get the big multi (as a "slave") to chase lock. And because you are now in the realm of real-time transport slewing, you may begin to hear some intonation and phasing problems.

POLISHED TO PERFECTION

It's ironic — and sweet — that some ancient analog tricks can be dusted off for application in the digital world. Some of the old master recording engineers would run their tapes through the machine once at play speed before recording on them; not in "Record," but just letting the heads buff the surface and allowing the guides to "form" the edges. This is not a bad idea for digital tapes. [ADAT makes you do a run-through anyway to format the tape.] In fact, the rotating heads of most current digital formats will do an outstanding job of polishing the particulate.

THAT DATA DAT

If you plan to mix something important to DAT, you might want to consider mixing to DATA DAT — those somewhat more expensive DATs intended for use in computer DAT drives. They are, by and large, the very same as regular audio DATs except that they've been end-to-end tested for an acceptably lower error rate. And, because they've been run through a helical head wrap and then rewound, the recording surface is polished and the tape pack is nicely set-up for recording. EQ

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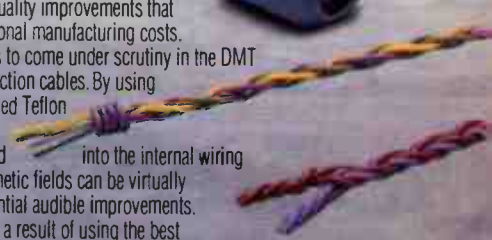
Differential Material Technology (DMT™) is the study of Different materials and their relative behavior when in intimate contact. The starting point of any high grade professional monitoring system is properly engineered drivers that naturally work well together. With this established, the crossover can be designed purely for the function of filtering between high and low frequency drivers rather than the complex function of addressing limitations of the drivers themselves. Through the use of computer circuit analysis software, this would seem a simple task... But in the real world, not only do components not behave as their mathematical models predict, but components inter-react with the powerful magnetic and acoustic fields present within a loudspeaker system. Understanding and measuring these effects is extremely difficult, and rather than ignoring these previously unexplored aspects of crossover design, Tannoy's DMT research team has spent a great deal of time investigating the interactions of each element within the speaker system's design... Particularly through extensive listening tests.

Tannoy considered the new Dual Concentric driver as a complete system to both generate the signal and control the wavefront. The low frequency cone is designed and injection molded to work with the new Tulip HF waveguide so that the driver system shows no discontinuities of the response or wavefront at the critical crossover area. Research into component behavior and empirical tests showed that when a capacitor is encapsulated in vibration absorbing material, its noise performance noticeably changes, dramatically improving both the sonic texture and dynamics of the loudspeaker system; and so the DMT capacitor was born. Every aspect of Tannoy custom capacitor's, from the type of film employed to the high purity copper used for termination leads, has been optimized for sonic performance. Tests have also shown that reducing the effect on inductor coils of the immense internal vibrations experienced within a loudspeaker cabinet, can improve overall system bass and midrange resolution. Consequently, within the DMT II crossover, Tannoy used coils vacuum impregnated with a resin selected to reduce vibration.

With the mechanical aspects of the DMT crossover design largely resolved, Tannoy engineers addressed the problems of interaction with magnetic fields within the system. Air cored inductors radiate a significant measurable magnetic field which can affect nearby components and the inductors are themselves affected by the driver's magnetic radiation. It was found that creating a split crossover, with the inductor mounted on the cabinet's cross-brace away from the other crossover components and driver magnets, produced sound quality improvements that more than justify the additional manufacturing costs.

The final components to come under scrutiny in the DMT system were internal connection cables. By using custom manufactured braided Teflon Kimber Kable, unwanted signals ordinarily induced into the internal wiring from within static and magnetic fields can be virtually eliminated, yielding substantial audible improvements.



The DMT II system is a result of using the best analytical tools, test equipment and computer analysis available, together with intuitive design ideas thoroughly tested by an extensive program of listening tests.

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World Radio History

IDOL HANDS

Mark Younger-Smith & Robin Hancock

"It started out with us developing the songs and doing preproduction at Billy's project studio, but it blossomed into much more."

Back in the '80s, rebel yeller Billy Idol was crying "more, more, more." Today, the rocker is still crying "more, more, more," but he's doing it with "less, less, less." For his latest release, entitled *Cyberpunk*, Idol, guitarist and co-writer Mark Younger-Smith, and producer Robin Hancock moved the action into Idol's project studio where an Akai 12-track, an Apple Macintosh IIfx, and some outboard gear helped them complete the album in only ten months.

"It all started with Billy turning me on to the book *Neuromancer* by William Gibson," said Younger-Smith. "Billy and I started writing songs with the cyberpunk theme in mind. We realized that with the band we weren't getting the effect that we wanted, so we went into Billy's and my project studios and started messing with the songs."

Idol's studio is in a large room, but the equipment is holed up in an area that is 12 feet square. There he keeps the gear mentioned above plus a Pacific Coast Technology 660 MB drive, a Pinnacle optical drive, and a RasterOps screen. Also on hand are various 2-track recorders and a number of keyboards — an Akai S1100 among the faves.

Younger-Smith's studio is simpler than Idol's. It consists of an Akai S900 sampler, a Peavey DPM3, an Alesis sequencer, and an Akai 12-track identical to Idol's. "My studio is more of a writing studio," says Younger-Smith, "although occasionally we record things there that are so good that we use them in the commercial studio."

After Idol and Younger-Smith had developed enough of the songs, they searched for an engineer/programmer to take them to the next level. They found their engineer/programmer in Robin Hancock — and also got the benefits of his yet-untapped producing skills, as *Cyberpunk* was his first opportunity to produce an album. "It started out with us developing the songs and doing preproduction at Billy's project studio," says Hancock, "but it kind of blossomed and developed into much more. The relatively few tools we had were enough — they gave us enough ideas, and in some ways I think that it's a great discipline to limit yourself; if things work without EQs and effects, you're not kidding yourself — they're good."

But despite the theme and the way in which it was recorded, *Cyberpunk* is not a "computer" album. The drums were played by a real drummer and then corrected and looped using the computer. The keyboards were played live and then sequenced so that they could be altered in the computer, which was running Opcode's StudioVision and Galaxy and Digidesign's Pro Tools softwares. They were able to monitor their progress through the Akai 12-track.

Although the project studios were where the songs were first put down on tape, a commercial studio also played a big part in production. "After we did much of the work," states Younger-Smith, "we went to American Studios where we dumped the sequences onto the keyboards and recorded them properly onto a digital 48-track. Some of the things that we recorded on the Pro Tools were dubbed D to D, but so many of the keyboards were running on sequencers that they hadn't been recorded yet.

"Some stuff came directly from the project studio. Quite a bit of the vocals and guitar parts that were used on the actual album. On one song, 'Tomorrow's People,' we used all the vocals we recorded on the Akai. We had purposely distorted the vocals, and it had this sound that we really loved and we didn't want to change it."

These recording techniques not only helped capture the spirit of the cyberpunk theme, but they also let Billy complete the album in a short period of time. Quite a feat considering his previous album, *Charmed Life*, took three years to finish. Although the new producer, in addition to the new technology had a hand in that as well.

"We bypassed a few steps by getting Robin," adds Younger-Smith. "Robin used to be an engineer. This is the first album he produced, and by having him take more control over the engineering aspect as well as production we saved a lot of time and effort trying to translate our ideas between two different people."

"Besides that," states Hancock jokingly, "I don't party as much as the boys."

The trio is continuing to use this time-saving technique, so expect more releases from the rebel rocker soon.

—Tony Savona

CYBERPUNKS: Mark Younger-Smith, Robin Hancock, and Billy Idol.

World Radio History

THE *EQ* 5-MINUTE INTERVIEW: GRAHAM LANGLEY

CONSOLE KINGS: Rupert Neve and Graham Langley

Graham Langley is the co-founder of AMEK and the designer of the company's new BIG console. We asked him to share his views on the new console as well as his views on the recording industry in general.

EQ: What approach do you take for every console you design?

Langley: It is first necessary to identify a market area that is open for a new console design. This can be to replace an older model of our own or of a competitor, or to establish a new market for ourselves. Newer console designs can offer much better value for money and facilities than a few years ago, mainly by employing computer systems to provide automation or signal processing.

EQ: What is the design philosophy behind the BIG console?

Langley: The basic philosophy was to design a good-sounding console with a host of features that *really are* useful and with automation compatibility with our higher-priced products. All this at a very competitive price.

EQ: Do you see people bringing their work from project studios to commercial? Or do you see entire projects being completed in the home studio?

Langley: Both. We are seeing BIG consoles going into all sorts of applications where people have previously never had any recall facilities. This has led to entire projects being carried out on the consoles. However, since the automation is compatible with Mozart, Hendrix, and Einstein, the console is being supplied into studios that already have one of these other consoles so that they can transfer work from one console to another. It is inevitable that work is transferred from project to commercial studios.

EQ: What is your working relationship with Rupert Neve?

Langley: Rupert and I work together, as well as individually, on projects. Our engineering methods are complementary in that we both strive for the same goal — sonic perfection!

When we are working together I tend to concentrate more on the system engineering while Rupert tries to obtain better performance from the analog signal path. It will be a long time before digital technology can match the audio performance of the latest circuits used in the 9098 console.

EQ: In addition to the BIG console, you have also recently released the 9098 console for high-end users. What is your view of the recording marketplace?

Langley: Digital consoles offer certain advantages over analog consoles, but they simply can't match the audio performance. The current high-end consoles have been around for some time now and there is a market for a new analog console. There are many studios that need to replace their consoles but there has been no new product available. The 9098 is a comprehensive yet straightforward console with amazing audio performance, as you would expect from Rupert Neve, the designer. The demand for Rupert's "old" designs clearly shows that there is a hunger for his approach to audio. EQ

CIRCLE 16 ON FREE INFO CARD

World Radio History

Photo by J. Donhowe

JACK ENDINO did grunge while it was still dirty.

GRUNGE DAYS

Jack Endino

"Something happened to the distortion box in the mid-'80s that made pure white noise desirable."

The first time Jack Endino saw that word — grunge — he was reading a 1971 issue of *Rolling Stone* and rock critic Lester Bangs used it to convey the sounds he heard emanating from a Ground Hogs record. Little did Endino know that this sighting would be inextricably linked with his future, and the future of rock as we know it.

As the early producer/engineer for bands such as Nirvana, Soundgarden, and Green River (early Pearl Jam), Endino has more than just served as the point-man for a variety of phenomenal careers centered around grunge — he's become the forbearer of a phenomenon.

During the mid-'80s, dozens of Seattle's hunger-artists went to a studio called Perspective Recording to bang out their aggressions while Endino mixed and engineered their angst to a slow-burn. For a few hundred bucks, bands could visit Endino in the small 8-track studio and lay down their dreams on a four-song demo. Of course, all this happened before MTV caught wind of it.

"First off, there were no A&R executives around, and secondly, there was no money," states Endino, harking back to the good old days. "Almost all the bands in Seattle and on Sub Pop knew that no one was making any cash off this and, in order to keep the price down, they came to our studio."

Perspective also lured the original incarnations of Pearl Jam, à la Mudhoney and Green River, as well as three local boys from a nearby logging town who would one day rule MTV. Endino elaborates: "These guys from Aberdeen came in looking like the farthest thing from a successful rock band. They didn't even have a name. But after they played, I was so blown away that I insisted on keeping a tape, which I later sent to Sub Pop. The record company suggested the name Nirvana."

After they were signed, Nirvana came back into Endino's lair and recorded *Bleach* [Sub Pop] for $600. "We just blasted through it in two days, using seven tracks. Everything was tight, live, and completed in one take. You can't always get a band like that."

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.

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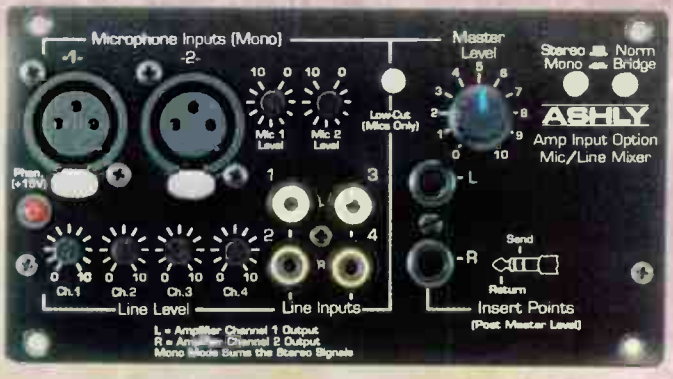

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As Endino puts it, the grunge sound wasn't solely derived from '70s supergroups. Grunge came from Fender amplifiers and Big Muff distortion boxes. "Something happened to the distortion box in the mid-'80s that made pure white noise desirable," says Endino, "but while that was great for live shows, it made my job that much harder. Sometimes these guys would use two boxes at the same time, playing the whole song on a Rat, and then kicking in the Big Muff for the solo. People were turning their boxes up to 12, where they used to put it up to five."

While distortion boxes and amps are essential for any upstart grunge act, Endino reveals that the secret to recording a good grunge tune is in the speed. "When you record at 15 ips, you may lose some high-end clarity, but you get a warm, bottom-heavy sound that's associated with records from the '60s and early '70s. If you listen to the way *Zeppelin IV* [Atlantic '71] sounds when compared to *Physical Graffiti* [Swan Song '75], you'll find that there's something about the guitars on the earlier record that's better. The earlier record was, in fact, recorded at 15 ips on a 16-track, while the later one is at 30 ips and was probably done on a 24-track. I don't know why, but for some reason, a really badly distorted guitar just sounds bad at 30 ips, but ends up sounding warm at 15.

"That's why punkers always complain that major label records never sound as good as the indies. They're used to hearing the warm stuff, not all that space cluttering up the high end. Look at Nirvana; they looked at their first album, *Bleach*, and then *Nevermind* and they said they wanted their new stuff to sound more like the former. That's not to say an expensive record produced at the high end is bad. You just have to work at it to make it sound genuinely heavy."

So whatever became of the original recording he did with Nirvana? "They eventually released it on an album called *Insecticide*, six years later," replies Endino. "But having it released in 1993 was both *good* and *bad* for me — good because I got a production credit on a Nirvana album; bad because people will hear this crappy recording and think: 'Oh, so that's what Jack Endino does.' Actually, it was the fastest recording I ever made." — *Jonathan Varman*

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CIRCLE 74 ON FREE INFO CARD

World Radio History

Cooking With Frank

STUDIO NAME/LOCATION: Utility Muffin Research Kitchen, Los Angeles, CA.
HEAD HONCHOS: Frank Zappa (owner); Spence Chrislu (engineer); Dave Dondorf (maintenance)
PRODUCTION CREDITS: Frank Zappa's *You Are What You Is; Them Or Us; Jazz From Hell; Ahead Of Their Time; The Yellow Shark; Civilization: Phaze III; The Rage And The Fury — The Music of Edgard Varese*, and many more
CONSOLE: Neve VR-60 w/Flying Faders and Recall
RECORDERS: Sony PCM 3324 [2], PCM 1610, and PCM 1630; Sonic Solutions digital editing system with 5 GB hard drive; Sony DAE1100 digital editor; Studer A-80; Panasonic SV-3700 DAT [2]
MONITORS: Custom JBLs powered by Bryston 4B amps through White EQ through Audio Art crossovers; 6-channel monitoring system with Yamaha NS-10s powered by BGW-750 amps and Kinergetics SW-100 subwoofers; nearfield system with Lost Chord Acoustic Aztecs powered by Bryston 3B amps
SAMPLERS: Largest Synclavier system in the world including 450 MB of RAM, 96 polyvoices, 5.4 GB hard drive, 4.8 GB direct-to-disc recording, and 2 GB optical drive
MICS: Many classic mics including Neumann U47, U67, U87, and KM54; AKG C24 and C12A; Crown PZM
OUTBOARD GEAR: Lexicon 224 [2]; Live chambers [2]; Quantec Room Simulator; Zoom guitar and reverb processors; Aphex Dominators and Expressors
PRODUCTION NOTES: Says Spence Chrislu: The studio is about ten to 15 years old. It was originally built in time for Frank's recording of *You Are What You Is* and it has evolved through a wide array of Frank Zappa projects. Right now we're in the midst of mixing a new album FZ produced featuring the works of Edgard Varese called *The Rage And The Fury*.

As far as the aesthetics go, UMRK has a great-sounding room with a hardwood floor, plaster walls, and a 25-foot ceiling. The environment gives the studio its own distinct sound. This is a facility where experimentation is encouraged, and if someone gets an idea, we can immediately stop to try it out. We have the technology to do so, and the creativity to make it happen. EQ

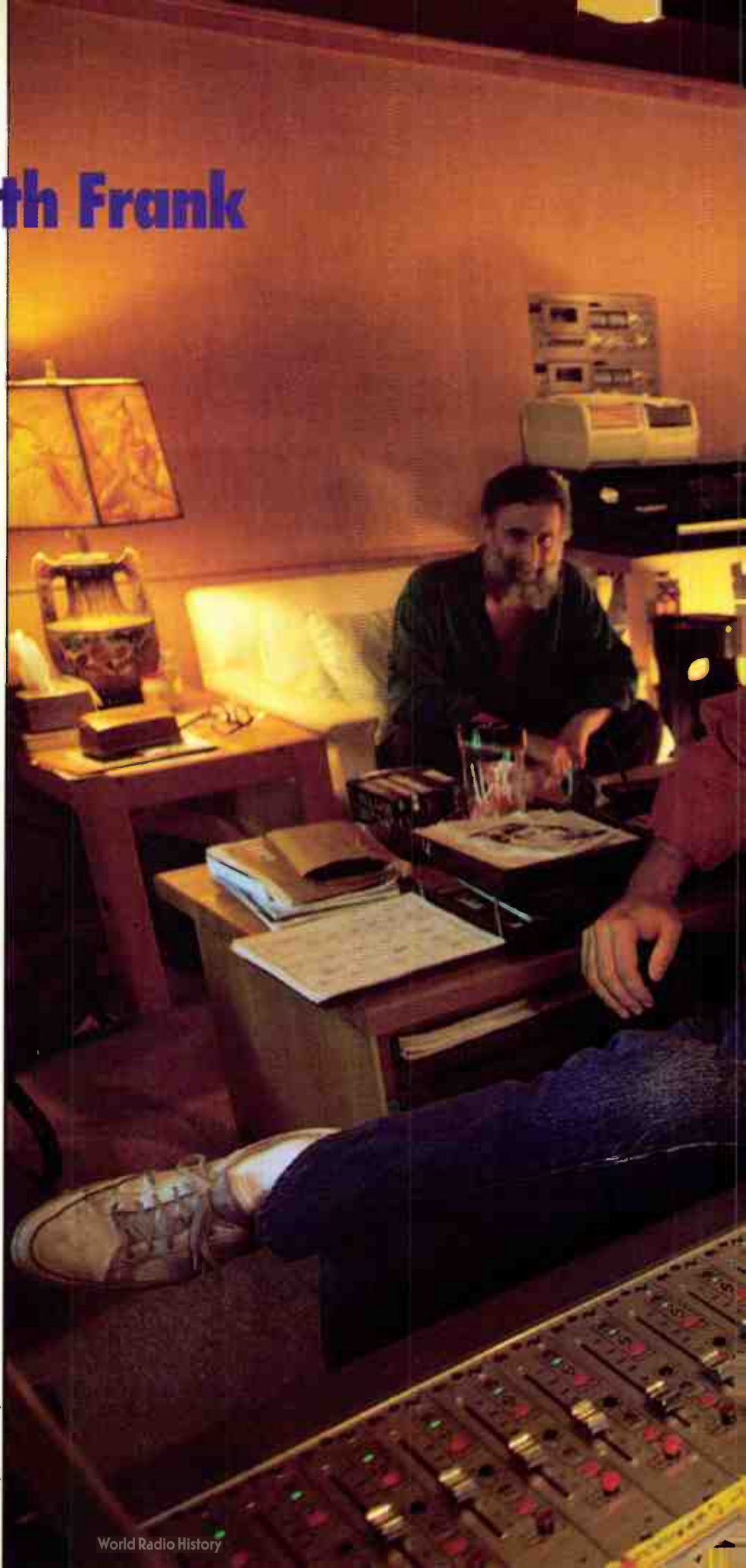

Photo by John Livzey

World Radio History

FRANK'S PLACE: Chief engineer Spence Chrislu works the board while Frank Zappa sits in his favorite listening chair.

World Radio History

The RCA 44-BX

Bruce Swedien shows off one of the prides of his extensive collection

MICROPHONE NAME: RCA 44-BX
TYPE OF MIC: Ribbon-Type Velocity
SERIAL NUMBER: 1073
YEAR RELEASED: 1956
ORIGINAL COST: Less than $200
FROM THE COLLECTION OF: Bruce Swedien
POLAR PATTERN: Bi-directional
FREQUENCY RESPONSE: 50 to 15,000 cps [cycles per second]
OUTPUT IMPEDANCE: 30, 150, or 250 ohms
PROJECTS: Swedien has used the mic on numerous projects ranging from Count Basie's recordings for Roulette Records to recent releases from Quincy Jones and Michael Jackson.
SONIC NOTES: Bruce Swedien states: The 44-BX is a unique tool. It has a tremendous amount of proximity effect. That is, the closer the sound source to the mic, the greater the low-frequency response. The proximity effect is greatest between zero and three feet. The frequency response of the mic is essentially uniform when the sound source is greater than three feet from the mic.

If you want to hear how it sounds, check out the three-part low harmonies on Michael Jackson's "Remember The Time" from his *Dangerous* LP. It's a wonderful vocal mic, although I also use it on a lot of brass because of its smooth frequency response. I used it on the trumpets for a song called "Birdland" on Quincy Jones's Grammy-winning album *Back on the Block*.

Of course there is a down side — it's very delicate. You just blow into it hard and it's done. I have mine overhauled every two years by Clarence Kane of ENAK Microphone Repair in Pittman, NJ. He did them for RCA originally, and continues to do fine work today.
USER TIPS: Swedien continues: If you have the microphone positioned vertically, its frequency response is normal. If you tilt it, however, it increases the high frequency response due to the force of gravity on the ribbon. EQ

Photo by Ed Colver

World Radio History

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World Radio History

A Chip Off The Old Clock

Every few years a product comes along that changes the way you work. It has just happened again. If your studio contains any equipment that produces digital audio signals, you need to know about a new IC chip, the AD1890 from Analog Devices.

Most engineers sooner or later experience trouble copying signals of different formats and incompatible sample rates. Larger studios face the problem of synchronizing all their digital equipment. Fully digital solutions to these problems are very expensive. This will change very soon, since manufacturers are working now to bring you products based on this new circuit.

The AD1890 is a stereo sample rate converter that costs less than $50. It comes in 20-bit professional and 16-bit consumer-grade versions, but here we will only be looking at the pro version.

WHAT IT DOES

Hook this device up to a few external components, and you have a box that does a lot of very cool things. Here's a short list:

1. It will convert any input sample rate to any output sample rate within the range of 8 kHz and 60 kHz. This means an average DAT recorder with standard SPDIF (RCA jack) connectors could make a digital copy of any signal — from the 11.025 kHz used by computer sound cards right up past 48 kHz. Just select the output frequency you need, and the input side looks up to whatever you throw at it. Converting 48 kHz consumer standard to 44.1 kHz CD standard is effortless. Until now, the price tag for this feature has been up to $10,000. You'll soon pay less than a tenth of that.

2. The AD1890 will track continually changing sample rates. Look for digital varispeed to appear on more new tape recorders. Until now, varispeed has been done mostly with analog tape decks

3. This chip will synchronize digital signals of varying sample rates. Watch for digital mixers that use one AD1890 for each input. They will mix together any signal you have, whether it be DAT, CD, DSP processor, digital editor, sound card — well, you get the idea.

4. If that's not enough, the AD1890 also dejitters any signal you put through it. In plain English, this could improve the final sound quality of your mix. It acts somewhat like a high-quality line-level isolation transformer in the analog world. If you have digital cable runs that are longer than you wish, or a piece of equipment that seems to sound different

Analog Device's new AD1890 IC chip gives you unprecedented power at a lower price

BY DAVID TORREY

World Radio History

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CIRCLE 77 ON FREE INFO CARD

World Radio History

WHY YOU SHOULD CARE ABOUT DIGITAL JITTER

No, jitter is not about too much coffee at 3 A.M. It's a problem that can cause distortion in digital audio equipment. How does it happen? Good question.

Analog-to-digital converters and their opposites, digital-to-analog converters (DACs), require a perfectly stable reference signal, called a clock, to work correctly. Both consumer SPDIF and professional AES/EBU data formats require that the clock be encoded into the same signal as the audio information. This allows one wire to carry everything needed to produce a stereo image on your speakers. When the data reaches the receiving end of the wire, the clock is separated from the audio. The DAC then uses the clock to reconstruct the original signal. In a perfect world, we're done.

But what if the wire is too long, or of the wrong type. Or the method of extracting the clock — or even the DAC itself — is sensitive to minor problems with the incoming signal. This is not just theory, it happens frequently. Many studios run audio through multiple conversions from analog to digital and back again, often through cabling that is less than perfect. Suddenly the clock is not a stable reference, it is "jittered." The DAC can no longer do its job properly. Welcome to the Twilight Zone, where output does not equal input. Clarity is lost as your mix passes through what you assumed was a perfect audio transmission system.

Here is where the AD1890 shines. First, it is extremely forgiving of variations in the incoming data. Second, the signal it sends out is controlled by a clock that is completely isolated from the incoming clock signal. It "re-clocks" the data stream, and any jitter that was embedded in the original just plain disappears. The output is an improvement over the input.

—David Torrey

depending on what digital device is feeding it, a simple box containing this chip could eliminate the problem. See the adjacent sidebar for details.

5. The AD1890 "speaks" the correct data format of both consumer SPDIF and professional AES/EBU (Cannon XLR jacks), so you can expect many manufacturers to provide both types of connectors. This will help you to freely mix consumer and pro gear. As a bonus, pro audio boxes may give you the option to strip off SCMS copy code, since the AD1890 ignores this data. Many studios will find this feature alone to be a major convenience. Consumer boxes will undoubtedly preserve the copy code in order to stay in compliance with current law.

AS GOOD AS IT SOUNDS?

All of these features make sense only if this device has excellent audio performance. Does it? Definitely, and for a number of reasons. First, it processes signals in 20-bit digital words, a great improvement over the 16 bits stored on a CD. This yields a dynamic range of over 120 dB, with outstanding noise

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FXR!

The FXR's are the first dazzling results of A.R.T.'s 3 year superchip development program. Tucked inside the rugged steel enclosures is a new V.L.S.I. microchip with a stunning new level of power and precision. This provides for spaciousness and clarity that used to cost thousands of dollars.

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check out the FXR's at your local dealer.

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- New high speed digital V.L.S.I. superchip
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- Room reverbs
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- Stereo chorus
- Stereo flange
- Gated reverb
- Reverse reverb
- Stereo panning
- Separate input, output and mix controls and L.E.D signal/clip indicators

The new A.R.T. ASIC shown in proportion to a penny. Three years and hundreds of thousands of dollars have yielded one of the most powerful audio chips ever.

Through a scanning electron microscope, you can see the gold plated connecting wires that are welded to the microchip.

At 100 times it size, you can see the immense number of micro-circuits on the A.R.T. superchip. Each handles an audio function.

ART

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World Radio History

and distortion specs. Second, as you drop the level of the input signal, the noise and distortion scales down by the same amount. This is the way such things should work, but not all digital circuits do this. Third, the dejittering action may actually produce a signal that is better sounding than the original.

Okay — but how does it *sound*? Many people believe that great specs mean great sound. This is not necessarily true, though specs can often give you some good hints. There were two separate prototype systems available for test, both built around the AD1890. It is reasonable to assume that production boxes will use a very similar circuit, since there are only a few ways to hook up this device.

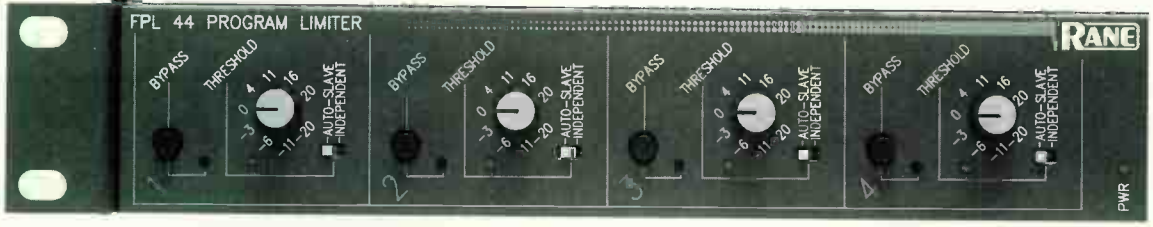
Most people will use the AD1890 as a sample rate converter, so the test converted audio from 48 kHz to 44.1 kHz, as well as the reverse. The reference system was a high quality D/A-A/D converter setup that I prefer for analog mastering. For a listening environment, I use our mastering facility, which includes two time-aligned monitor systems, custom amplifiers, tube-electrostatic headphones, and similar tools of the trade. The source material was mostly original master tapes along with some CDs. Music ranged from rock to classical organ music.

The decision? Very close, except at the extreme top, where the AD1890 was more detailed. The analog system lacked a bit of clarity by comparison. When I turned the playback system *way* up (on a quiet passage), I found the noise floor of the AD1890 to be noticeably lower. This might explain where some of the extra detail came from: less interference. Regardless, my frame of reference shifted, and the analog system now feels like a very subtle special effect to be used for adding top-end smoothness. The AD1890 is a trustworthy reference, and that is what studio engineers need.

It won't be long before you can get your hands on commercial processors based on the AD1890. Check one out on your own source material. In the meantime, rumor has it that Analog Devices can't get people to return their evaluation systems. This sort of backhanded compliment signals a winning product. And me? Of course I'll return the prototypes. Just as soon as I remember where I mislaid them. Check back with me in 1999. EQ

David Torrey is chief engineer at IMPS Music, a mastering/replication facility for independent labels. He has designed two recording studios and one disc mastering facility and has recording engineer credits on six CDs in the last two years and mastering engineer credits on hundreds. He also designs analog circuits, and specializes in lunatic-fringe high-end microphones and signal processors. He can be contacted at 800-677-8838.

SLAVE TO PERFECTION



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The FPL 44 Quad Program Limiter makes a difference you can't hear. Its four independent ServoLock limiters effectively guard against system overload, speaker damage and annoying feedback. Yet its program-dependent ratio assures just the right amount of gain reduction at each instant – no more, no less – so that you won't hear it working.

As if that weren't enough, the FPL 44 also includes a unique AutoSlave feature, which ties selected channels together so that they all respond identically to the limiting requirements of any one channel. Which preserves the tonal balance and stereo imaging of multi-way speaker systems. All this squeezed into a compact HR format.

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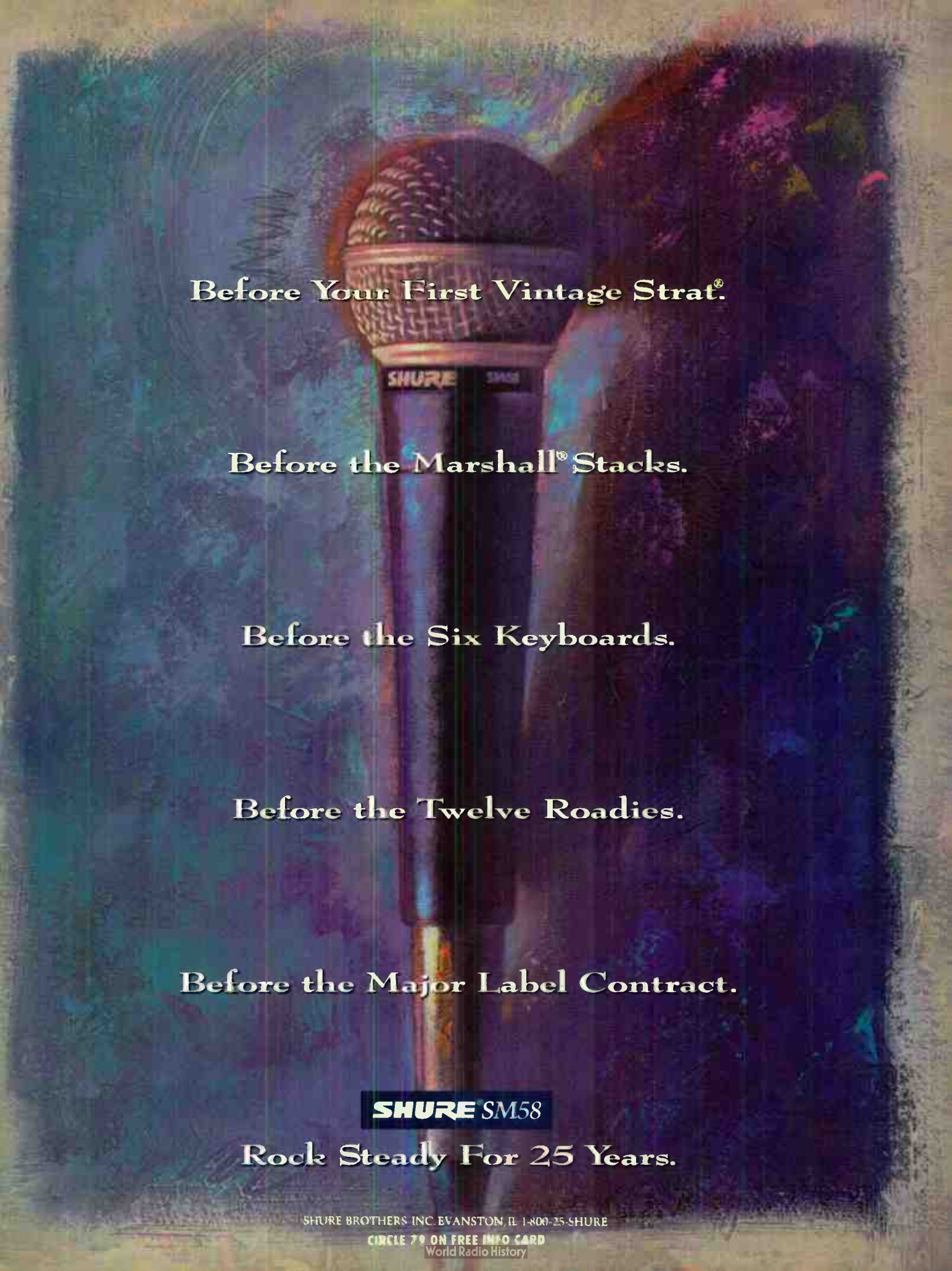


World Radio History

Let's Get Small

We are entering a new era in recording where small is really the "next big thing." Smaller recording environments are more creative. Smaller consoles (i.e., Euphonix) are capable of handling megatracks while maintaining a rational work surface size. And the Alesis ADAT allows you to build a digital system of up to 128 tracks one small step at a time and at an incredibly affordable (smaller) price.

Sure, it may look very impressive when you walk into a big control room entirely filled with equipment, but apart from the ridiculous hardware costs, all the intimacy is lost. And, of course, the cost factor is important. I don't believe you can get a million dollars worth of investment back on a 96-channel console and a pair of digital multitrack tape machines in a realistic length of time. Studio time today is the same as it was 10 years ago and the only way to combat that is to have cost-effective equipment that doesn't compromise the quality of the sound.

Case in point: the project I am currently working on with Carl Wilson (Beach Boys), Jerry Beckley (America), and Robert Lamm (Chicago), which focuses on rich vocal harmonies. At this stage, we are currently putting the finishing touches on a group of songs that will ultimately become the record.

Another member of the project is Phil Galdston (1993 ASCAP Songwriter of the Year). He's co-written some of the songs with Carl. So that's the team; it's the five of us who are involved in every shape and form.

As you'd expect from a project of this type, we have been recording a tremendous amount of vocals, in terms of layering and punching in and

Photo by Ed Colver

Multiple ADAT systems are changing the way this producer makes his hits

BY STEVE LEVINE

World Radio History

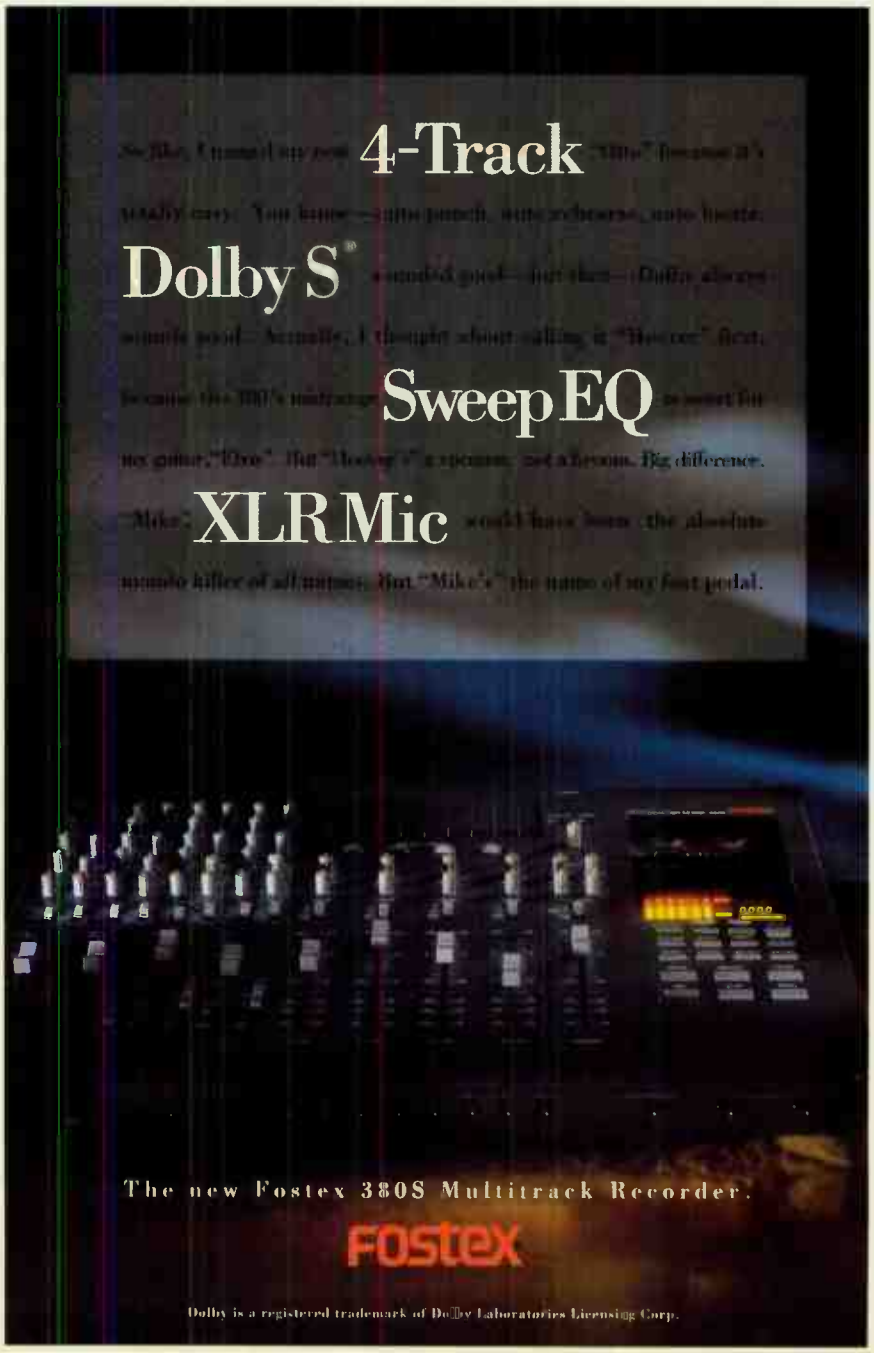
out. And I discovered things using the ADAT system that I thought were actually better than with my trusty Sony PCM 3324. The multiple machine configuration is great because you can organize your session eight tracks at a time. That's a huge advantage — we'd have the master on one machine, the lead vocals on another machine, and individual tapes of each singer on their own machines. If Jerry had the lead vocal, for example, I'd let him have eight takes on one tape, then digitally combine that into our master lead vocal tape, and that would be Jerry's performance. Then if Carl were singing the second verse, he'd have his own piece of tape with eight performances and we'd choose the best lines and bounce that down. And then we'd do the same with Robert. On another tape we'd have the three combined lead vocals.

This is where the ADAT system is exceptional because you can just add more machines as the need arises. We had situations where, depending on how the song went, we wanted to try out different vocal harmonies; would it be Robert singing this harmony, or Jerry singing it? And that allowed an incredible amount of creative freedom because you weren't eating up hundreds of dollars' worth of tape. We could just pop in another cassette and say, "Okay Robert it's your turn now." And we were then able to choose who we thought sounded best on each performance. I couldn't have done this with the Sony because, with two Sony machines you have more tracks, but with the ADAT system you have the ability to slide more individual slaves around. You couldn't do that with my two 3324s; you'd be working with a bigger piece of tape and you'd have to go to a whole different section of the tape and you would be losing what was on tracks 1 through 8.

We did have one situation where the ADAT threw a little bit of a loop and chewed a tape up. (I believe this may actually have occurred due to flight damage to the machine.) I carefully threaded the tape back into the cassette and ironed it all out. After two plays it dropped out and after about the fourth play it played back perfectly. That's a huge round of applause to the error correction of the ADAT. It's a very robust system.

I've recorded some of the material at my project studio here in California, where I rent space from Acme Sound, but because of the band members' touring commitments we did mixes from my two Sony PCM 3324 24-track digital recorders to ADAT in New York, did all the vocals on the ADAT, and then transferred them back to multitrack. That is an exceptionally versatile method of working.

I feel that, eventually, I will use the ADAT format exclusively, but for the time being I still use the Sony DASH machines as well. For many projects, it's more convenient to have all 24 tracks on a single reel of tape; sometimes I'm working with 12 tracks of drums and it's easier for me to have them on a single machine, which has no lock-up time between units. I travel between London, Paris, and Los Angeles quite a bit, and the 3324 is installed at most of the top-end facilities, so I don't have to cart racks of ADATs around. Sometimes we get access to a 3348 so we can add 24 more tracks



CIRCLE 37 ON FREE INFO CARD

World Radio History

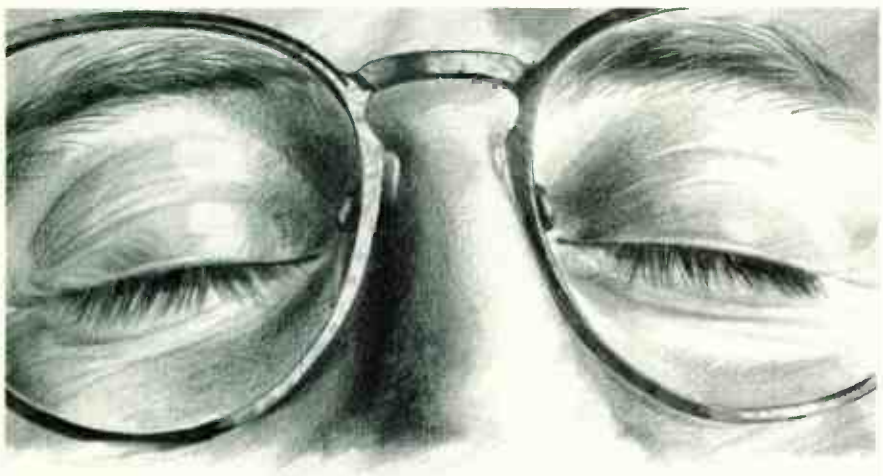
onto the same reels we started on my 3324s, but that gets expensive. Also, the 3324s are paid for and I have 11 years worth of tape recorded within that format. I guess you can say that I'm sort of going through a transitional period at present.

What makes this all possible is the Alesis BRC. Although you can synchronize up to 16 ADATs without a BRC, for larger systems (16 to 128 tracks), the BRC Master Remote Control reads and generates SMPTE timecode, generates MIDI timecode and MIDI clocks, provides control over timing, individual track delays, tape offsets, track selection, automatic record rehearse and punch-in, and allows for complex copy-and-paste assembly editing.

While the BRC is the master of the entire ADAT system, it can synchronize to a variety if sources. Three ports on the back of the BRC provide inputs for standard 48 kHz clock, Video Sync, or SMPTE. You achieve external synchronization easily. Simply connect the appropriate cable to the BRC, and turn on the External Sync button. My use for external sync is usually for digital transfers. I use an Apogee AD500 A-to-D converter, which outputs AES/EBU digital, plus a word clock. Having the Apogee's 48 kHz clock going to the 3324, the Akai DD1000 hard-disk recorder, and the ADATs via the BRC has been faultless. I transfer between the Sony 3324 and the ADATs using an Apogee standards converter, and Alesis's AI-1 AES/EBU digital interface. Sometimes, if the tracks need some manipulation like smoothing out a pop or level matching, I'll digitally transfer tracks from the ADAT to the hard disk and then over to the 3324.

I don't think people have quite caught on to what's possible with several ADATs and a BRC, using the ability to offset machines and control track delays. A great effect I used with two 3324s on Culture Club records was true flanging with tape machines: You copy a track from one machine to another that's a half-second ahead of the original, then run the advanced signal through a delay line to get a flanging that can be ahead or behind the original. Most digital delay units can do flanging and phasing on their own, but it's just not as rich sounding as being able to go right through the zero point to the other side, like they did on "Itchycoo Park." With the ADATs and a BRC, I can duplicate my two-3324 trick at much lower cost. It's easy to copy tracks from one ADAT to another, since the BRC can assign which tracks will travel on the optical interface while tape offset slips the source machine behind the record machine. Then I turn off the offset and play back using the AI-1 digital converter to send the advanced track digitally into a Lexicon 300 delay unit, which has its own AES/EBU digital input.

Slipping and sliding tracks in time is a valuable tool to have; you never know when you'll need it. Many of my tracks aren't MIDI-sequencer-based; I use an Akai S1100 sampler or a Wendell triggered from live drums. Even when the unit reacts to the trigger immediately — and the Wendell is incredibly fast — there are samples in my library that need to be pulled ahead of the beat to sound right



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because they have a little bit of air at the start. By offsetting the machine a few frames ahead and digitally copying a track from one ADAT to another using the optical digital interface, I can place the track that's triggering the drum replacement wherever I want it in time using the track delay feature of the BRC. I'd do the same thing and connect the advanced track to a sidechain input to make sure a gate (like a Drawmer) opens up just before the first transient.

I had one of the first BRCs on the market and it is true that there were a few little bugs in it, but Alesis has been fantastic on that level. I'd say, "Look, here's the bug," and they fixed it. One of the bugs was that the Auto Punch would trigger when the machines weren't locked up. That's since been remedied. I also had some criticism about the logic of some of the operational processes. For example, for Auto Punch I felt that the process could be accomplished with less button pushing and Alesis has taken heed to that fact and I believe they are working on making it a simpler procedure. On the other hand, loop jumping to subsequent tracks is a feature that you simply won't find on any other remote.

When I first used digital 11 years ago it pissed me off immensely because I knew the benefits of digital audio and I was battling against "old wives" who were saying, "Oh, you mustn't use digital, it does this and that to the sound," but no one ever discussed the real advantages of digital. There was the audio quality to rave about, of course, but I have always been recording digitally in order to move tracks around, do digital editing, and things like that, which I now take for granted. Now, suddenly a whole new world of people, because of ADAT and multiple ADAT systems and BRC, are discovering how fantastic it is to be able to do a digital vocal comp, for example, or to extend things and be very creative by moving various sections around. You can marry tracks on subsequent machines without upsetting them for the most natural phasing; actual effects as well as musical things. So for me, I'm very excited about the ADAT system, because it makes my crusade for digital that much easier.

continued on page 123

Multi/Send Personal Mix System

Personal Mixer PLUS a Headphone System

Custom monitor mixes from a single monitor send
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"The most accurate preamps we've ever used."
Jack Vad, Chief Engineer San Francisco Symphony

"Frankly, we are amazed at the sonics of the HV-3."
Bob Fernandez, Warner Brothers Pictures Scoring, (Last Action Hero, etc.)

"The Millennia preamp beats anything I've ever tried. My entire studio moved up a notch when I bought mine."
Michael Hedges, Windham Hill Guitarist

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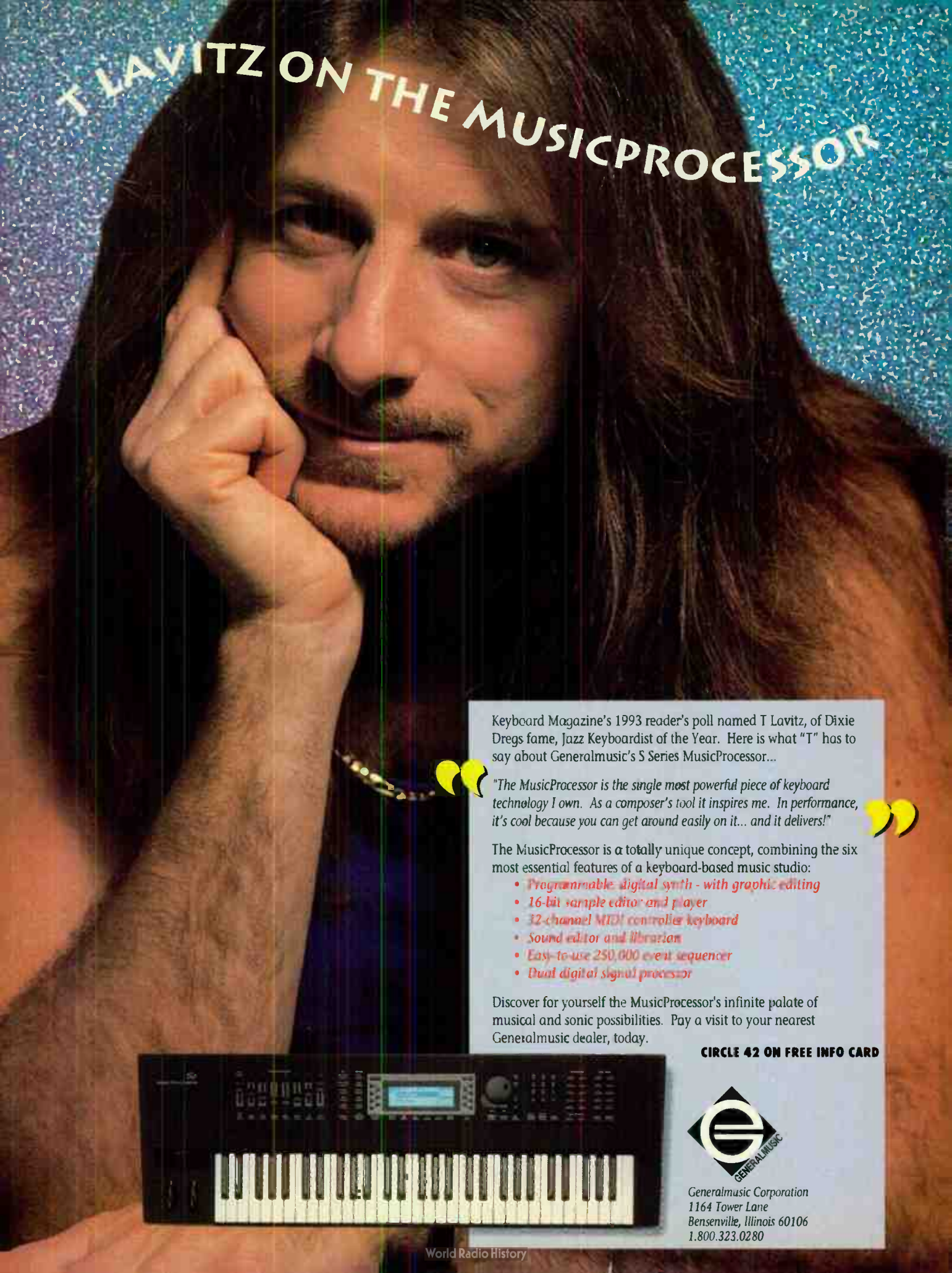

Keyboard Magazine's 1993 reader's poll named T Lavitz, of Dixie Dregs fame, Jazz Keyboardist of the Year. Here is what "T" has to say about Generalmusic's S Series MusicProcessor...

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World Radio History

Au Natural

It's room ambience and the right mics that count when it comes to capturing great sounds

BY ED STASIUM

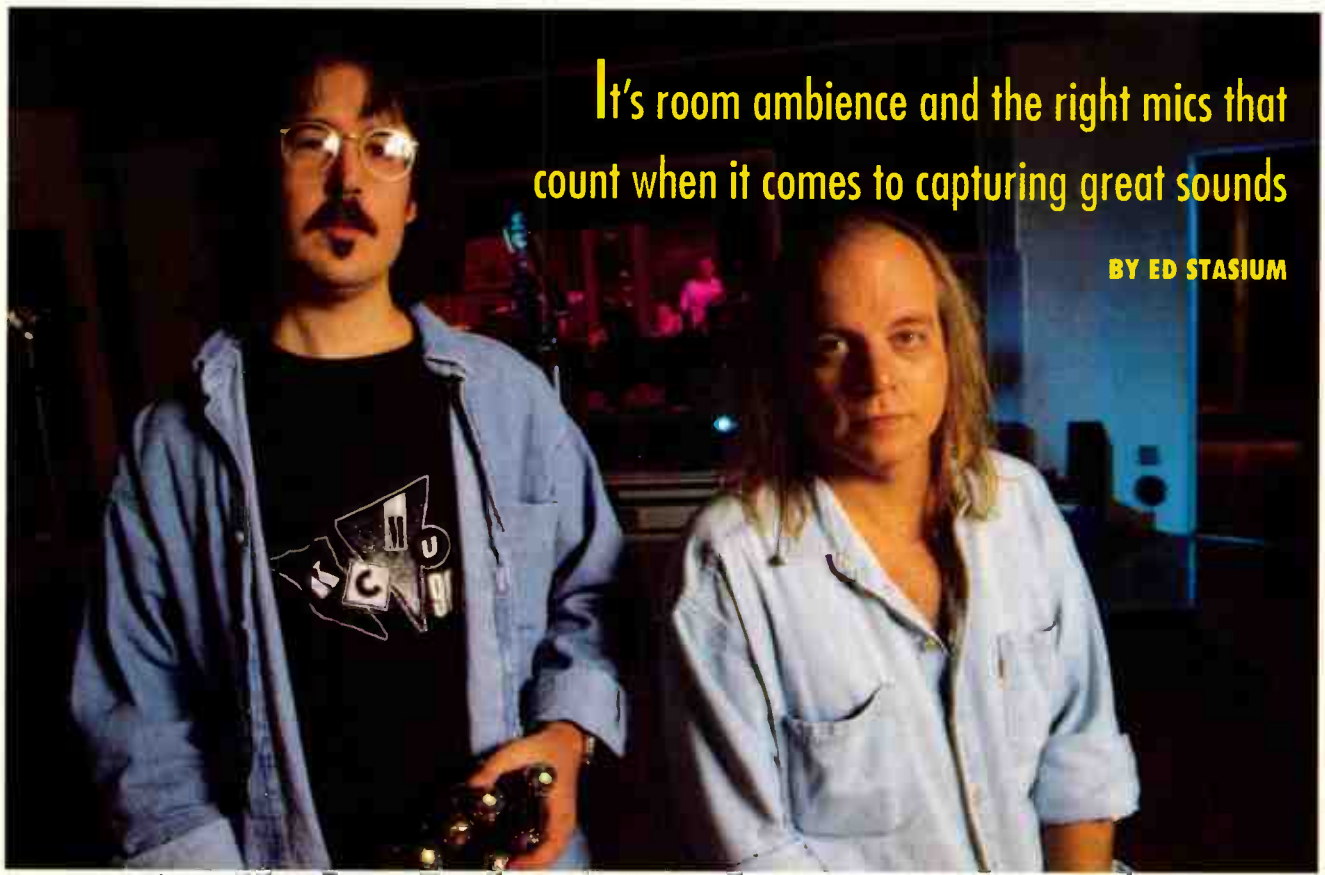
How do I get my mic sounds? What are the secrets to that natural edge that so many people tell me they hear in my recordings? I'm going to share some secrets with you, but let me start with a few stories that might give you some insight into how I view studio techniques in general.

In 1972 I bumped into a friend who told me that Tony Camillo and Tony Bongiovi were building a studio in Tony Camillo's basement in Somerville, New Jersey. It was called Venture Sound. I began hanging out at the studio and learning the ropes down there by just being around, doing this and that, recording my friends, etc.

One time Bongiovi said, "Come on Eddie, I want you to see a real session." So he took me to a Kool & The Gang session at Mediasound in New York. They were doing vocals. After about an hour, Tony said, "Eddie sit down and continue with this. I'm going out to get a sandwich." I said, "Okay." I had no idea what I was doing; none whatsoever. So I just started recording; it was right into the water — he threw me right in — sink or swim. My first professional recording session and I'm laying down vocal tracks for a top-ten act. And vocals can't be recorded direct, so here I was relying on the mics and a wing and a prayer to get me through. Shortly thereafter Tony returned. But I was now on my way.

Then, back around 1975, I answered an ad for an engineer at Le Studio [later, Group Andre Perry] in Morin Heights, Canada. I knew they had a Trident console there and I was a big fan of Tridents. I applied and was hired. I was thrilled because I was a fan of British recording and the Trident sound that came out of that period; Queen's *A Night At The Opera*, all the Elton John things, the Ken Scott stuff. At Le Studio I was working with Roy Thomas Baker, and he was talking about room sounds, which was something I had never even considered previously. It was always close miking with Bongiovi and Camillo.

Thanks to Roy, I finally figured out how the British recordings sounded the way they did: ambience. Another aspect of the recording that relies on mics and acoustics. Prior to that, my experience was with everybody hanging blankets all over everything and recording direct. Baker was doing things such as hanging mikes up in the room — something that was quite



Ed Stasium and Paul Hammingston make beautiful music together with Audio-Technica mics and dynamic room ambience.

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Before you spend a nickel on a high-end studio reverb, spend a minute reading this.

We think studio owners are tired of those do-it-all boxes offering a million simultaneous effects. Today it's quality, not quantity. Special effects done incredibly well, with reverberation topping the list. That's the new 9120.

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The 9120 has 22 effects, like trigger-controlled gating, built-in time/tempo delay calculator, vocal eliminator, surround sound simulation, and pedal-controlled pitch-bend. A chorus section generates three different effects: chorus alone, chorus followed by reverb, and delay followed by chorus followed by reverb. All stored in 99 beautiful presets.

Need to tweak your patches? The 9120 has an incredibly intuitive front panel, using nine quick control keys and seven dials. Effects can be changed instantly, glitch free. Throw in a 20-bit processor with 16-bit resolution, 64-times oversampling A/D conversion, and you've got one killer machine!

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World Radio History

a revelation to me. And at Le Studio we had every fancy mic you could think of to work with.

So what does this all have to do with miking techniques? Here's the point: I don't believe in throwing around a lot of technical jargon. I know what I want to hear and I make sure I find a way to get it. The room ambience has as much to do with getting the right sound as the mic itself. Never underestimate the importance of just throwing yourself into the water and figuring out how to swim.

That's the way I have approached every recording session — whether it was my early work with the Ramones at the Power Station, my recordings with Living Colour, or the project I just finished up with Baby Animals. My engineer, Paul Hammingson, and I use various mics to get our sound. Lately, we've been using the Audio-Technica 40 Series mics a great deal. I use the 4033's for vocals and they're also great on percussion.

I look for an open sound on vocals. A vocal mic needs tons of its own gain so you're not bumping up a lot of noise afterwards. The 4033 seems to adjust to whatever application it's assigned to, even when there is a high SPL to deal with. It has a 10 dB pad that you can put in if need be and it doesn't clamp the sound down. We've been using Audio-Technica 4051's as overheads; they emphasize the clarity of the cymbals.

I also use them on acoustic instruments. On the Baby Animals record, we recorded Nuno Bettencourt; he wrote a song with Suzy De Marchi, the singer, on which he played acoustic guitar. We popped up a couple of 4051 mics and didn't even EQ them or anything. We just ran the 4051's through a couple of Langevin preamps that Paul has, and Boom! — there was the sound we were after. That mic really sounds great on acoustic guitar.

I've been pleased with it on a Hammond organ too. With a Leslie, I like to get the closeness of the rotors spinning and I like to get just enough of the room in so it doesn't sound too dry. The 4051 has a really smooth frequency response across the entire range. It has great off-axis response and you can remove the cardioid capsule and replace it with an omni or

continued on page 123

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THERE ARE MANY DEVICES THAT CAN BE USED TO COLOR YOUR AUDIO SIGNAL.

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THE NEW SERVO 240 AND 150 POWER AMPLIFIERS

The job of a power amp is simple, but not easy. Unlike a delay, EQ or compressor, it's only supposed to increase the level of your audio signal – without changing *anything*.

That's why we're so pleased to introduce the new Servo 240 and 150, power amps designed to do their job without doing a number on your budget.

AUDIO INTEGRITY

Let's talk about the criteria that make up a good amplifier. Frequency Response: The Servo's wide, flat response from 20 to 50 kHz easily covers the entire frequency spectrum. All lows, highs and mids come out at the same time, in the proper relationship to one another.

Transient Response: The Servo reacts faithfully to the incoming signal without clipping it.

Total Harmonic Distortion: The amp shouldn't add any harmonic information of its own. The Servo's low THD of 0.03% gives you clear, open-sounding reproduction in any setting.

The Servo 240 provides 120 watts a side into 4 ohms; the 150, 75 watts a side into 4 ohms. And if you really appreciate the value of numbers, consider a signal-to-noise ratio of 103 dB; a damping factor exceeding 100 and crosstalk greater than 83 dB. Impressive, but they don't begin to tell you how good these amps *sound*.

RELIABILITY

As if audio performance wasn't enough, both amps include intelligent protection circuitry that minimizes the possibility of speaker damage and heat overload problems, *before* they happen.

DURABILITY

The 240 and 150 are also fitted with an all-steel chassis and a lightweight anodized aluminum heat sink to ensure the ultimate in roadworthiness and long life. Plus helpful features like 1/4" *and* push spring output connectors.

The Servo Amps from Samson Audio. Now you can get all the performance, protection and practical features you want – at the price you *need*.

Servo 150 Servo 240

SAMSON AUDIO

For more information about the new Servo 240 and 150 Power Amplifiers or other Samson Audio products, please contact Samson Audio, a division of Samson Technologies Corp., P.O. Box 9068, Hicksville, NY 11802-9068 (516) 932-3810 FAX (516) 932-3815

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SOU

NDQUAKE HITS NY

AES HERALDS A NEW AGE OF RECORDING AND SOUND

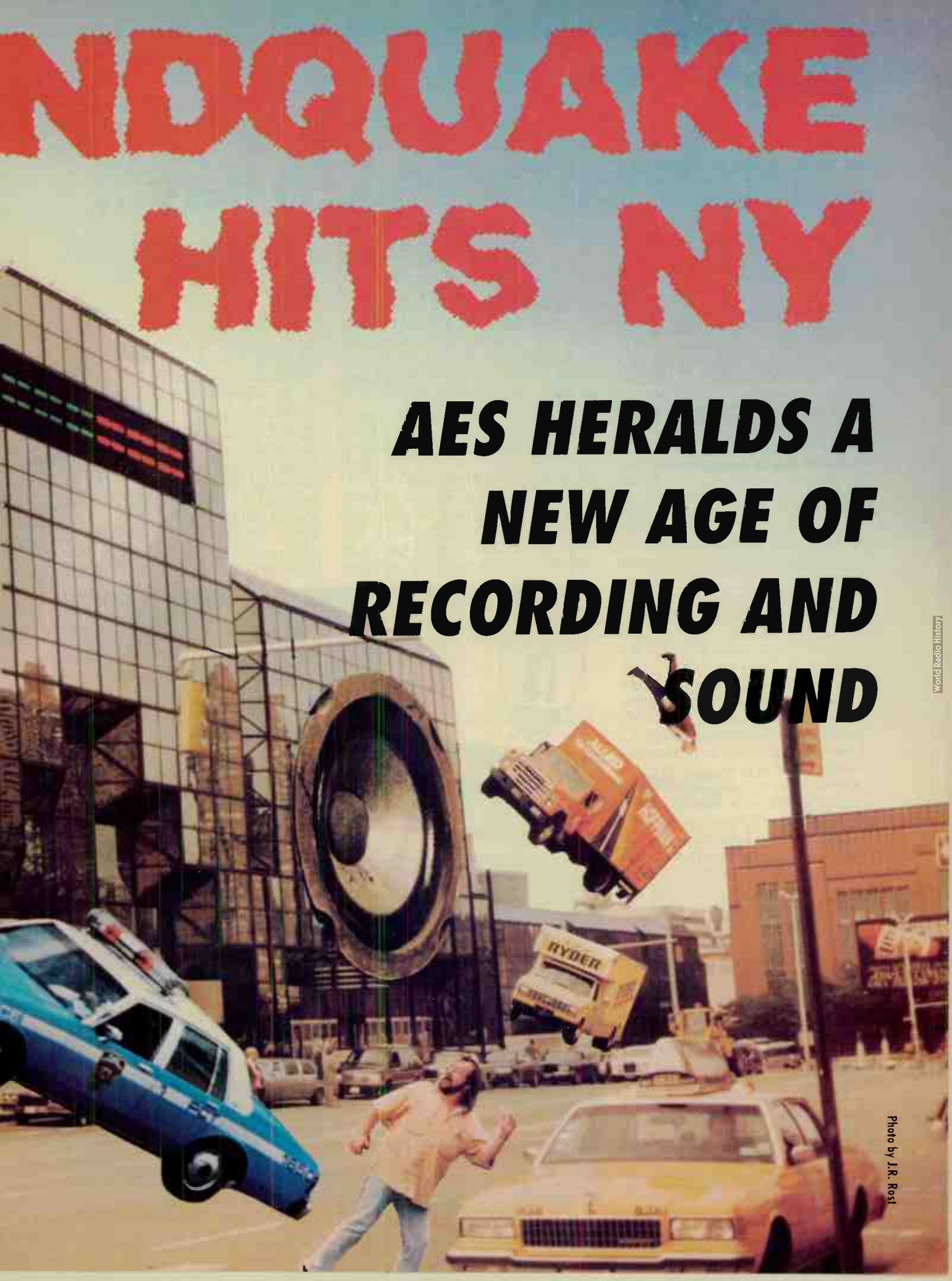


Photo by J.R. Rost

World Radio History

AES NY 1993 SOUNDQUAKE

and digital worlds remains to be seen.

• The yearly "Which computer is on top?" contest should be fun. Last year saw IBM clones swarm into the audio market, a reversal of strategies (and fortune) for Apple, and the introduction of the Atari Falcon030. But Apple's bloodletting has also been rewarded by getting more people into the Mac, clone companies are going through a shakeout, and Atari is actually shipping machines. So, we'll see what the new fall fashions are in hip computing.

WHISTLE WHILE YOU WORKSHOP

Workshops and technical papers are getting increasingly relevant and less dry; with the current deceleration of new technology, this may be the year that a lot of convention attendees spend some time educating themselves at the various presentations. Although space prevents covering all the sessions —that's what the AES guide is for — here are some of the highlights that were planned.

One workshop I definitely wasn't planning to miss is "Computer Control of Sound Systems" (9 A.M. on Thursday), because I'm on the panel. This is a hot topic, since standardization is just around the corner and the industry needs to make some far-reaching decisions. Other panelists include Herbie Hancock, Roger Nichols, Ted Rothstein, Bob Moses, and David Scheirman. Part 2, which concentrates on actual computer-control technologies, continues at 1:30 P.M. Unfortunately this means I'll have to miss the "Digital Music Tech Session," also scheduled for 9 A.M.

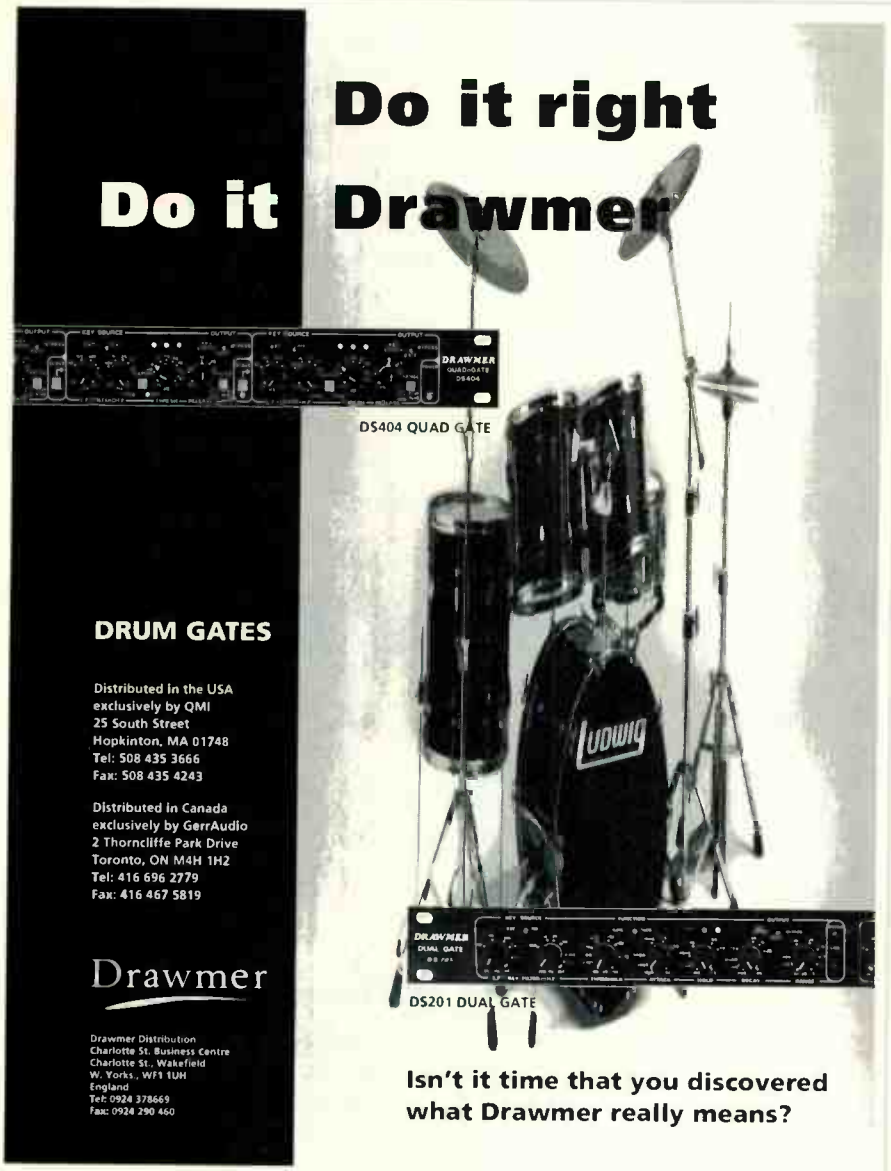
There are a lot of seminars dealing with topics in psychoacoustics, auralization, perceptual encoding (can we improve data compression?), and DSP, with considerable coverage in both technical papers and workshops. Other choices: On Friday at 9 A.M. there's "Audio in the Age of Multimedia" (with participants from 3DO, Microsoft, Silicon Graphics, Philips, Aware, and Mediavision discussing the audio requirements and directions of multimedia), and "Live From New York — It's Saturday Night!" This collects members of the audio team from *Saturday Night Live*, who will talk about the challenges involved in working on a live variety show, and there will be excerpts from comedy sketches and musical performances.

NARAS is there to present the 5th Annual Grammy Recording Forum on the "Art of Mixing," chaired by Bruce Swedien and featuring some of the most successful engineers and producers in the music business, on Friday at 1:30 P.M.

BACK TO REALITY

If you couldn't make it to the show, take heart: you can buy cassettes and preprints for many of the papers and workshops. After slogging through AES for four days, however, you're probably better off soaking in what you've learned over a meal at one of New York's famed restaurants. In fact, veteran AES attendees often schedule a massage within a few days of returning from AES (affluent ones schedule vacations).

The AES convention is quite a science fair. Approach it with the right attitude, and you'll be presented with enough ideas and questions to hold you for another year (or at least until NAMM). EQ



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Cleans up and details instruments, vocals and mixed program material on stage or in the studio. Dynamic self-adjusting circuitry lets you dial in just the right amount of sparkle and sizzle you want. HF Detail and Hiss Reduction work together so you can actually cut hiss while adding High Frequency Detail. LF Detail solidifies the bottom while removing mid-bass mud.

274 Quad Expander/Gate

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Four independent channels of high-performance gating or downward expansion in any combination of stereo pairs or mono channels. Patented dbx VCA and RMS detection circuitry provides ultra-fast attack times to preserve the character of percussive sounds and an incredibly smooth release that won't chop off reverb tails or hanging guitar chords.

Now, with the dbx Project 1 series of signal processors, there's no need to settle for second-tier equipment to save money. Those ever-abundant budget brands have touted great pricing but have never matched dbx quality, reliability and experience.

dbx® PROJECT 1

dbx Project 1 is ideal for both studio and sound reinforcement applications. Each unit delivers real dbx sound and reliability, plus innovative new performance enhancements—at the same price of other models with fewer features.

By using the latest technologies, we've streamlined the manufacturing process to reduce production costs. At last, you don't have to forego the quality and features you want to stay within budget.

So now that we've talked price, isn't it time you talked to your nearest dbx dealer and asked for a demo?

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TUBE BE OR NOT TUBE BE

The VT-1 Vacuum Tube Microphone Preamplifier from D.W. Fearn employs vacuum tube technology combined with computer-optimized circuitry. Company president Doug Fearn designed the VT-1 for his own recording and when others experienced the handcrafted device, Fearn recognized commercial potential and is now making the unit available direct for $2000. Contact D.W. Fearn, P.O. Box 57, Pocopson, PA 19366. Tel: 215-793-2526. Circle EQ free lit.#101.

PRESERVATION

Mezzo Storage and Archive products are a new line of solutions for storage and preservation of audio in data form. The line has been introduced in response to the fact that fewer than half of all Pro Tools users are using any form of back-up. All Mezzo tape back-up drives include Mezzo Media, a software designed specifically for digital audio applications. Many digital audio data files are compound formats that are not recognized by standard back-up programs. Mezzo simplifies the process while taking steps to ensure that data is transferred quickly (like intelligently seeking and transferring only changes). In addition, Pro Tools System Accelerator users have the advantage of background transfers, allowing them to record and edit in the foreground. Optional PortaMezzo is a removeable storage and archive solution that allows you to move a lot of data from one location to another without delay and to move off-line storage to online in moments. For complete details, contact Grey Matter Response, Inc., 1119 Pacific Avenue, Suite 300, Santa Cruz, CA 95060. Tel: 408-423-9361. Circle EQ free lit. #102.

THE MIDAS TOUCH

Caig Laboratories has just introduced ProGold, a special formula designed for cleaning gold surfaces, base metals, and other precious metals. ProGold is a non-abrasive/non-corrosive formula that conditions gold to efficiently transmit electrical signals. ProGold coats the entire connector surface, to provide protection from abrasion (insertion resistance) and wear, arcing, RFI and intermittent connections, tarnishing and atmospheric contamination. It is available in spray, liquid, precision dispenser, wipes, and pen applicators. For further details, contact Caig Laboratories, 16744 West Bernardo Drive, San Diego, CA 92127-1904. Tel: 619-451-1799. Circle EQ free lit. #103.

ABSORBED IN YOUR WORK

The Cutting Wedge from Systems Development Group is an acoustic absorption panel made from top-grade, extra durable foam that offers tear resistance and shape memory. Made of two-pound density polyester, it features a simple saw-tooth pattern. It is designed to provide an attractive, affordable solution wherever standing waves, comb filtering, or excess reverberation detracts from musical performance or decreases intelligibility. Cutting Wedge expands listening positions in control rooms and helps to sweeten ambience. For complete details, contact Systems Development Group, 5744 Industry Lane, Suite J, Frederick, MD 21701. Tel: 800-221-8975. Circle EQ free lit. #104.

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MADE IN THE JADE

The Soundtracs Jade production console is the English manufacturer's new flagship model. The Jade is available in various configurations and frame sizes. Fully loaded, it's a 48-channel console with automation, gates, patchbays, and prewiring for 48 tracks. It is also available down to 24 channels without patchbays or automation. The console is equipped with dual inputs on every module — each with fader and mute automation, EQ, and dynamic gate processors on every channel. It also features DSP multiprocessor technology. In addition, all the monitors have a 2-band equalizer and can share the unique FdB parametric equalizers with the channels. Other features include balanced inputs, outputs, and busses to minimize hum and RFI interference; and extended bandwidth electronics on the circuits to ensure that phase distortion is kept to a minimum. For more info, contact Samson Technologies. P.O Box 9068, Hicksville, NY 11802-9068. Tel: 516-932-3810. Circle EQ free lit. #105.

NEW CLASSIC

Neumann has just introduced the TLM 193, a large diaphragm, double membrane cardioid condenser mic designed to accommodate critical recording and live performance applications. The TLM 193 employs the same capsule used in the U89i/TLM 170 family. Frequency response is 20 Hz - 20 kHz. Self noise is -10 dB, maximum sound pressure is 140 dB before overload, and dynamic range is 130 dB. It comes with a swivel-mount adapter and a foam-lined wooden case. Retail price is $1295. For more details, contact Neumann USA, 6 Vista Drive, P.O. Box 987, Old Lyme, CT. 06371. Tel: 203-434-5220. Circle EQ free lit. #106.

PRO PROCESSOR

Symetrix is debuting the 601 Digital Voice Processor. This programmable sound processing device is designed for a variety of applications including use as a digital transfer processor/format converter and digital workstation front end. Don't let the name fool you, however, its digital engine works on

any signal, not just voice. It features a studio-quality analog mic preamp, 48V phantom power, and 24-bit stereo digital signal processing. The digital multiprocessor offers full parametric EQ, single-ended noise reduction, de-essing, compression, Automatic Gain Control, gating, downward expansion, and stereo echo. For complete details, contact Symetrix, Inc., 4211 24th Avenue West, Seattle, WA. 98199. Tel: 206-282-2555. Circle EQ free lit. #107.

HAVE YOU HEARD...

D&R will be displaying a new mixer at AES named the Vision. Our sources say it will have the same proven sonics and specs as their larger consoles such as the successful Orion, but at a price point that is affordable to smaller budgets. Rumor has it that the first Vision in the U.S. will go to Michael Pinder, formerly of the Moody Blues, who will be using it on his new solo album. **Alesis** is providing free upgrades for all ADAT owners. The upgrades will make the ADATs BRC-compatible. The BRC remote is the full-function remote controller that features digital track bouncing, SMPTE MIDI timecode and MIDI clock generation, individual track delays, tape offsets, automatic record rehearse, and punch-in and continuous record...**Grey Matter Response** is consolidating all of its operations into a new Santa Cruz location. It will occupy the entire third floor of the LOGOS Building at 1119 Pacific Avenue. The LOGOS Building was one of the first structures to be erected after the devastating 1989 Loma Prieta earthquake...**Behringer** will be at AES with several products including the Ultraflex EX3000, a multi-band sound enhancer...In London, **Bunk, Junk and Genius Recording** (BJG) is the second UK customer for the digital version of the **Dynaudio Acoustics** M4 Digital monitors. The 4 x 12-inch-based M4 Digital employs a four-way 20-bit digital crossover coupled with over 5500 watts of transient amplifier power per channel...**Passport Designs** has announced the release of Passport Producer Pro, a real-time, interactive multimedia production tool that offers multimedia producers interactivity, path-based animation, external device control, video support, and extensive graphics and text capabilities. .A **DDA** Q-Series mixing console was recently installed at the 1200-seat Lake City Church in Madison, WI. The 32-channel console was specified and installed by the Madison branch of Milam Audio as part of an overall audio system upgrade at the church. **Applied Research & Technology** (A.R.T.), manufacturer of the Phantom Series consoles, as well as a variety of other pro audio products, is celebrating its 10th Anniversary in the music and pro audio industries this year...**Demeter Amplification** will be debuting the new VTCL-2 stereo tube compressor/limiter at the AES show. The VTCL-2 incorporates the highest grade of modern H-Fi components in its construction. It features an all-tube audio path, variable attack and decay, 40 dB of compression and limiting, electro-optical control, polypropylene capacitors and full regulation of B+ and filament voltages...**Digidesign** is also celebrating is 10th Anniversary. Started as a two-man operation that manufactured sound chips for digital drum machines, Digidesign is now a World industry leader in random access digital recording technology on the Apple Macintosh and Windows-based computer platforms. **E-mu systems** has announced that Bon Jovi keyboardist, David Bryan, is employing E-mu's Vintage Keys digital sample playback modules in lieu of a vast arsenal of classic keyboard equipment for the band's 1993 Keep the Faith World Tour, which began in February and will run through January of next year.

World Radio History

RADICAL PLATFORM

UREI is premiering a new modular line of signal processing units. Dubbed the Platform Series because of its flexible "building block" characteristics, the line includes a series of signal chain electronics "cards" designed to provide clear signal quality with flexibility, compact size, and remote capabilities. Unique to the design of Platform is a bus that allows summing and intermodule communications. The first six module units to made available are: GATE1 Gate Module; COMP1 Compressor/Expander module; P.EQ1 Parametric Equalizer Module; M.IN1 Input Module, OUT1 output module; and CPU1 and CPU2 Computer Interfaces. For further information, contact UREI, 8500 Balboa Blvd., Northridge, CA 91329. Tel: 818-895-8190. Circle EQ free lit. #112.

FRIENDLY LIBRARIAN

E-mu Systems is shipping a new Remote Controller/Librarian software option for the Macintosh. It provides complete control of all EIIIx functions from the screen of any Mac. The EIIIx Remote Controller functions offer complete control of up to seven EIIIx units at the same time. The Librarian catalogs entire sound libraries, including sounds on internal and external hard drives, CD ROMs, and M/O cartridges. It allows for fast browsing and searching regardless of whether or not mass storage peripherals are online. Audition From Disk allows you to preview individual samples directly from a hard disk, CD ROM or M/O cartridge without the need to load into EIIIx memory. The Remote Controller/Librarian is available for $295 retail. For complete details, contact E-mu Systems, 1600 Green Hills Road, P.O. Box 660015, Scotts Valley, CA 95067-0015. Tel: 408-438-1921. Circle EQ free lit. #113.

SIMPLY RED

Focusrite is premiering their extended Red Range of signal processing equipment at AES. This Focusrite line is easily spotted by its distinctive red aluminum housing. The company will be showing the Red 1 four-channel microphone preamplifier, Red 2 two-channel equalizer, and the new Red 3 dual-stereo compressor limiter. Red 3 provides two channels of limiting with comprehensive user control capabilities. The limiter is a separate section with its own control and associated side chain circuits. The compressor offers variable attack and release control, along with a gain makeup facility. Two illuminated analog VU meters display the output signal level or can read gain change. The two channels are completely independent for use as separate mono processors, and a separate stereo mode is available when channels are linked. This stereo mode not only links the compressing and limiting functions, but also operates from only the lower set of front control panel controls, allowing the unit to operate as a true stereo device. For the whole story, contact Group One Ltd., 80 Sea Lane, Farmingdale, NY 11735. Tel: 516-249-1399. Circle EQ free lit. #114.

PERK UP YOUR EARS

JBL Professional is showing its 4400A line of affordable studio monitors at AES. The "A" versions enable extended listening without experiencing the ear fatigue factor associated with extended monitoring. The two-way 8-inch 4408A is ideal for the smaller room, the 4410A is a three-way monitor designed in a vertical array, and the 4412A three-way system fits environments requiring maximum low-frequency output from a bookshelf speaker. The low-frequency transducers feature Symmetrical Field Geometry (SFG) magnet structures that minimize harmonic distortion. For further information, contact JBL Professional, 8500 Balboa Blvd., Northridge, CA 91329. Tel: 818-893-8411. Circle EQ free lit. #115.

GET A CUE

New from Fostex is the D-10 DAT Master Recorder, engineered for ease-of-use in project studio applications. It's the only DAT machine at its price point that offers a cue to modulation feature and onboard RAM that allows instant starts and eliminates latency problems. Auto Cue eliminates missed cues and loose edits. Pro R-time can be recorded on tape and can be displayed on the front panel. With RAM- and tape-based Scrub and jog/shuttle control, the D-10 emulates reel rocking and editing on analog recorders. The D-10 retails for $2850. For more information, contact Fostex, 15431 Blackburn Ave., Norwalk, CA. 90650. Tel: 310-921-1112. Circle EQ free lit. #116.

World Radio History

Higher Performance, More Responsive Automation. Only One Name To Consider.

Only one console is capable of combining sophisticated automation and transparent sonic performance in a compact, realistically-priced package — SOLO Logic.

Automation That Responds To Every Move You Make

Unhappy with compromise, we set out to create a new-breed automation package for Logic. Incorporating 12-bit VCA automation (4,096 increments on each fader) along with superior Mute processing speed (1/120th of a second), it matches the responsiveness of top studio automation systems.

Logic Automation follows anything you do in real time. You can make smooth, accurate fades without the "zipper step-noise" found in lesser systems. And, because of the system's phenomenal muting speed, you can actually use the mutes to get gating effects.

Requiring no external computer or sequencer, this on-board system provides Record, Play, Trim and Isolate modes, each controlled from the individual channel.

Audio Quality That Exceeds Digital Specifications

Reflecting the same dedication to excellence as Logic's Automation, the audio section features our superb-sounding EQ (4-Band with swept mids), splittable between Inputs and Monitors.

Features That Meet Your Needs In Any Application

All Logics come equipped with a full meter bridge featuring a high-resolution LED meter for each channel. MIDI Machine Control which interfaces with, and controls, today's most popular analog and digital formats.

Not to mention switchable Direct Outs; 2 MIDI ports plus serial interface and nulling indicators on each channel.

For greater flexibility, Logic is available in either 24 or 32 channel versions, creating up to 80 inputs on mixdown with Mute automation. It also comes with an outboard 19-inch rackmount power supply.

SOLO Logic — The one console designed to satisfy everyone's desire for excellence at an affordable price.

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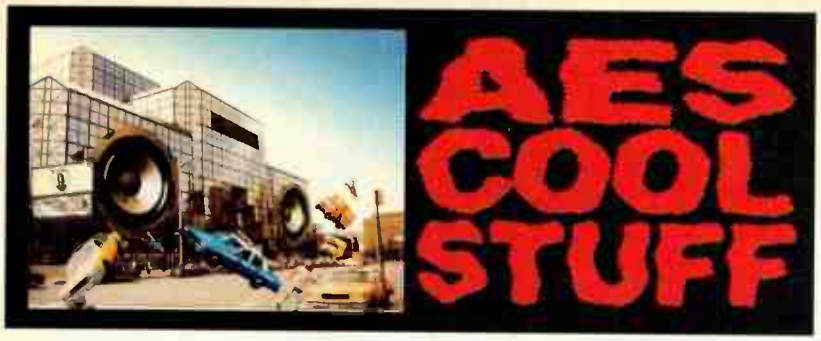
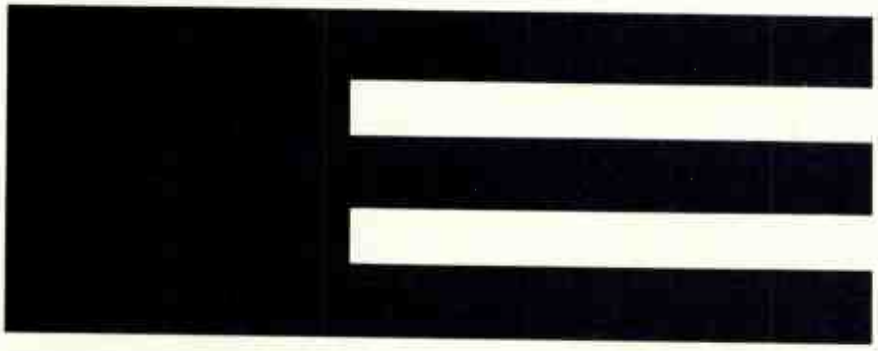


MANLEY MONITOR

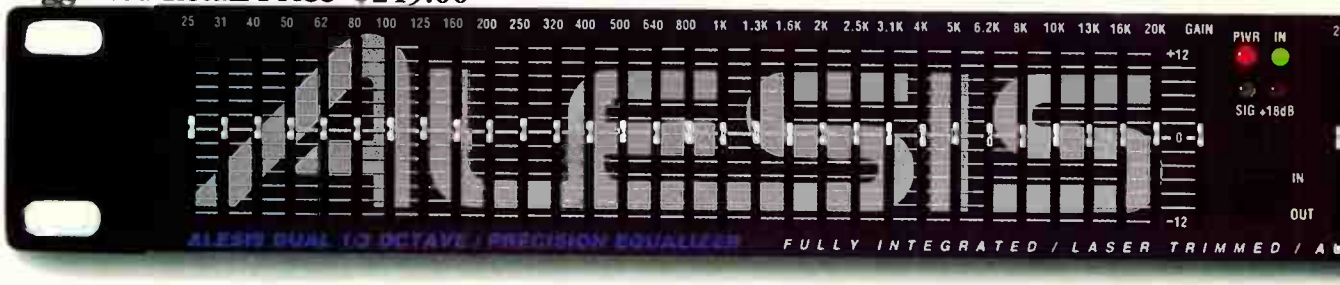
New from Manley Labs is the Manley 10-inch nearfield monitor. It utilizes the Tannoy 10-inch dual-concentric rolled rubber surround paper cone driver and The Mastering Lab crossover design. The non-resonant cabinet is constructed of 1 1/2-inch thick MDF finished with black laminate and solid oak sides. The front-mounted controls allow continuously variable high frequency adjustment. For more details, contact Manley Laboratories, 13880 Magnolia Ave., Chino, CA. 91710. Tel: 909-627-4256. Circle EQ free lit. #108.

GETTING A HEAD(SET)

Sennheiser's newest addition to its headphone line is the mid-sized and moderately priced ($59) HD 435. Despite its low price, the HD 435 employs drivers that are close in size to those used in the company's top-line 5-series headphones. The HD 435 is supra-aural with neatly fitting on-the-ear cups that are comfortable during extended listening. It also features Sennheiser's Open-Aire design and modular, user-replaceable earcups, ear cushions, and headband. Triple-wound voice coils and neodymium-ferrous magnets are employed in the construction for high sonic performance. It's equipped with an oxygen-free copper cable reinforced with Kevlar. The cable is terminated with a 1/8-inch stereo phone plug and a 1/4-inch phone plug adapter is included. Nominal impedance is just 32 ohms and the HD 435 comes with a two-year warranty. For more info, contact Sennheiser Electronic Corporation, 6 Vista Drive, P.O. Box 987, Old Lyme, CT. 06371. Tel: 203-434-9190. Circle EQ free lit. #109.



Suggested Retail Price $249.00*



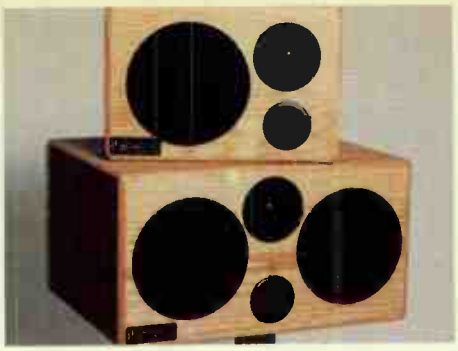
EQ. Clean and Precise. The right EQ to fix a track or shape a mix. Or to flatten the response of your studio monitors.

Introducing the Alesis M-EQ 230. The only EQ you should put between you and your music.

Featuring *two* 30 band channels for incredibly precise control. Each band is laser-trimmed to 1/3 octave ANSI/ISO centers, and features ±12dB of boost or cut so you can really dig in where you need to. Plus, to protect your speakers if power is interrupted, we've included Auto Power Muting.

And thanks to our exclusive Monolithic Surface Technology™ you get two channels instead of one in a one space 19" rack. For only $249.

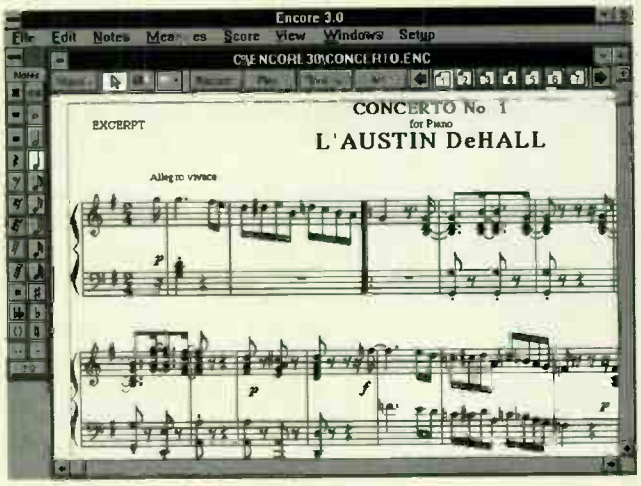
World Radio History



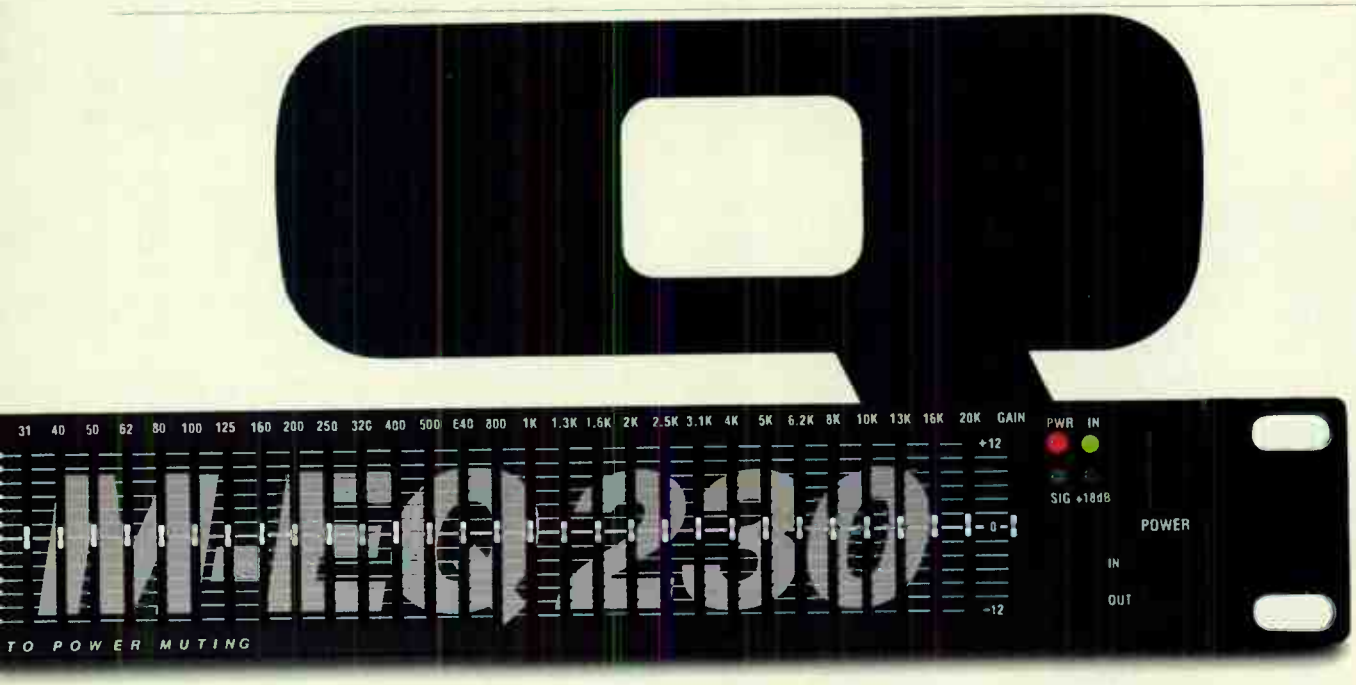
B BOP

Digital Designs' new "b" series studio monitors feature dual bass alignment that allows two bass alignments from one speaker by the use of a port plug that can be pulled out or left in depending upon the preference for a particular mix. There are two models, the DD161b (4 ohms) and DD261b (8 ohms). Acoustic suspension provides a faster transient response and tighter bass with a gradual low frequency rolloff, and the bass reflex movement provides deeper bass extension with a faster rolloff and more kick. Frequency response is 45 Hz - 20 kHz on the DD161b and 38 Hz - 20 kHz on the DD261b. The 161 handles 100 watts and the 261 handles 200 watts. They retail for $602 and $830, respectively. For further details, contact Digital Designs, 100 N. Quapah, Suite K, Oklahoma City, OK 73107. Tel: 405-946-4500. Circle EQ free lit. #110.

MAKE A NOTE OF IT



Passport has added upgrades to its PC and Macintosh versions of its Encore music composing and notation software. Encore's transcription engine transcribes MIDI input and standard MIDI files with great accuracy. Notation can be displayed and edited on the computer screen, and played back as an entire score or as individual parts on MIDI instruments or sound cards. The user interface offers new menus; a new expression palette that allows you to save your expression for personalized markings in any font, size, or style; and an extensive array of symbols. New editing features include a slur function that lets you automatically slur between two selected notes with a single command. EPS support makes it easy to export complete or partial scores into programs such as Aldus PageMaker and Microsoft Word. Suggested retail is $595. For registered users, the upgrade is available direct from Passport for $99. For complete details, contact Passport Designs, 100 Stone Pine Road, Half Moon Bay, CA 94019. Tel: 415-726-0280. Circle EQ free lit. #111.



With audio performance rivaling the very best, the M-EQ 230 is a great EQ that doesn't cost a lot of money. Now you can finally get excited about an equalizer.

When it's time for a little EQ, get a lot of EQ with the Alesis M-EQ 230 Precision Equalizer. For mixes, instruments and PA, there really isn't any other choice. Ask your Alesis dealer.

ALESIS

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STRONG IQ

White Instruments is currently premiering the 4700 IQ 1/3-octave equalizer. The 4700 IQ features 28 1/3-octave filters — 31.5 Hz - 16 kHz. On I.S.O.standard frequency centers, the 4700 is ± 10 dB range adjustable in 0.5 dB steps. Close center frequency tolerance is ± 5 percent. Adjacent filters sum with less than 0.25 dB ripple. The device also features adjustable high- and low-pass filters. High-pass is from 10 Hz - 160 Hz in eight steps, and low-pass is from 6 kHz - 32 kHz in eight steps. All functions of the Model 4700 IQ are digitally controlled. Non volatile memory using EEPROM eliminates the need for battery replacement. The 4700 only takes up 1 3/4-inches of rack space and is available in a two-channel version, the 4700-2 IQ. Both are the same size and are fully compatible with the Crown IQ 2000 network. For more information, contact White Instruments. P.O. Box 698, Austin, TX. 78767. Tel: 512-389-3800. Circle EQ free lit. #118.

UP FRONT

KRK Monitoring Systems is introducing the Model 6000 professional studio monitors. The 6000 features a passive, two-way crossover point of 2.4 kHz. Preliminary specs include a frequency response of 62 Hz - 15 kHz, nominal impedance of 8 ohms, and sensitivity of 89 dB with a maximum power handling of 75 watts and maximum SPL of 106 dB. The Model 6000 is priced at $649 per pair. For complete info, contact KRK/Group One, 80 Sea Lane, Farmingdale, NY 11735. Tel: 516-249-1399. Circle EQ free lit. #117.

DIGITAL DESK

Sony is premiering the DMX-S6000 all-digital audio mixing console. With superior digital sound quality, the DMX-S6000 offers automation, four flexible frame sizes and configurations, and an ergonomic control surface. Sony's proprietary digital signal processing technology allows the console to deliver internal 32-bit processing accuracy with 24-bit SDIF-2 digital ins and outs. Frame sizes range from 24 x 24 to 64 in and 48 out. If you're in the market for a big-time board, contact Sony Audio Products, 3 Paragon Drive, Montvale, NJ 07645-1735. Tel: 800-635-SONY. Circle EQ free lit. #119.

NICE VIEWS

Digidesign has introduced a new software-based option for their popular Pro Tools multichannel DAW. The software, called PostView, integrates digital video with Pro Tools sessions and also provides for direct video transport control of external video machines. With PostView, video is captured from a video source and stored on a hard disk as a PostView "Movie" (some additional third-part devices are required for playback). Then, audio tracks can be assembled using ProTools while watching the PostView Movie on screen with the ProTools session. PostView Movies serve as a fast, random-access reference for adding sound effects, music, Foley, dialog, or other audio to the visuals. With PostView, you no longer need to shuttle an external videotape recorder back and forth while assembling audio tracks. For a broader view, contact Digidesign, 1360 Willow Road, Menlo Park, CA 94025. Tel: 415-688-0600. Circle EQ free lit. #120.

BALANCING ACT

The Hafler division of Rockford has introduced the Model 9505 trans-*nova* Balanced Amplifier. The product introduction is in response to the popularity of the trans-*nova* among audiophiles and professional studio users. Starting with the trans-*nova* power core, each (+) and (-) port of the input differential stage has been buffered with a high impedance JFET buffer pair. This allows direct signal access to the differential amplifier without conversion to unbalanced form. Deactivating the balanced mode is accomplished via a rear panel switch that grounds the negatived balanced inputs, effectively converting the amplifier to unbalanced inputs. Unbalanced inputs are accessed via standard gold-plated RCA jacks. The 9505 is available in 17-inch black or 19-inch silver rackmount finish. The Silver 19 retails for $2200, the Black 17 retails for $2100, and the optional rack ears are $70. For more information, contact Rockford Corporation, 641 South Rockford Drive, Tempe, AZ 85281. Tel: 800-366-1619. Circle EQ free lit. #121.

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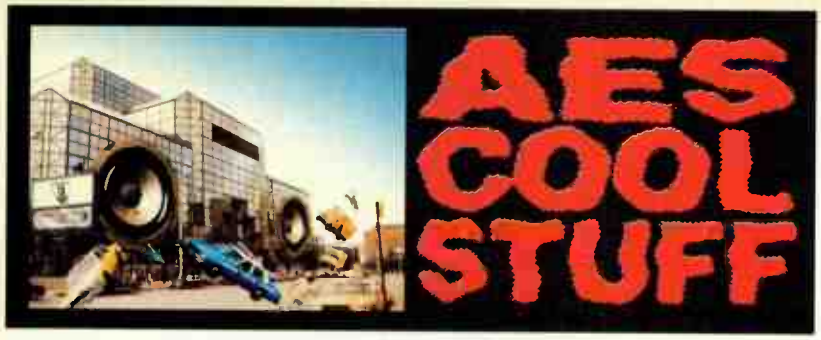


SCRUB A DUB DUB

Dbx has introduced its new 296 Spectral Enhancer, a dual-channel processor for cleaning up and detailing instruments, vocals, and program material in studio or music playback applications. The U.S.-manufactured 296 features two independent channels, providing you with selectable amounts of high-frequency detail enhancement, low-frequency detail enhancement, and hiss reduction. An LED meter advises you as to how much hiss reduction is being employed. The LF detail adds bottom while simultaneously reducing the mid-bass mud often associated with narrow-format analog recording. For more information, contact AKG Acoustics, 1525 Alvarado Street, San Leandro, CA 94577. Tel: 510-351-3500. Circle EQ free lit. #122.

CAN WE TALK?

Studio Technologies StudioComm Series is adding communications functions to digital audio workstations with the introduction of new products. The StudioComm series consists of a rack-mounted central controller, a desktop control console, and one or more portable talent amplifier units. Used in conjunction with a digital audio workstation, the units provide a full set of monitoring, communications, and dubbing functions. The Model 50 central controller and the Model 51 control console are sold together to create the flagship StudioComm system. The Model 50 provides the electronics associated with the seven stereo line inputs, two control room monitor outputs, studio monitoring capability, a stereo line level output for use as a copy output, LED indicators, and rotary knob controls for actual operation of the system. An internal microphone is included for three communications functions: talk to studio, talk to headphones, and send slate tone with voice audio to the dub output. The StudioComm Series is fully configurable. All settings are stored in non-volatile memory to remain constant during power down. For more information, contact Studio Technologies, 5520 West Touhy Avenue, Skokie, IL 60077. Tel: 708-676-9177. Circle EQ free lit #123.

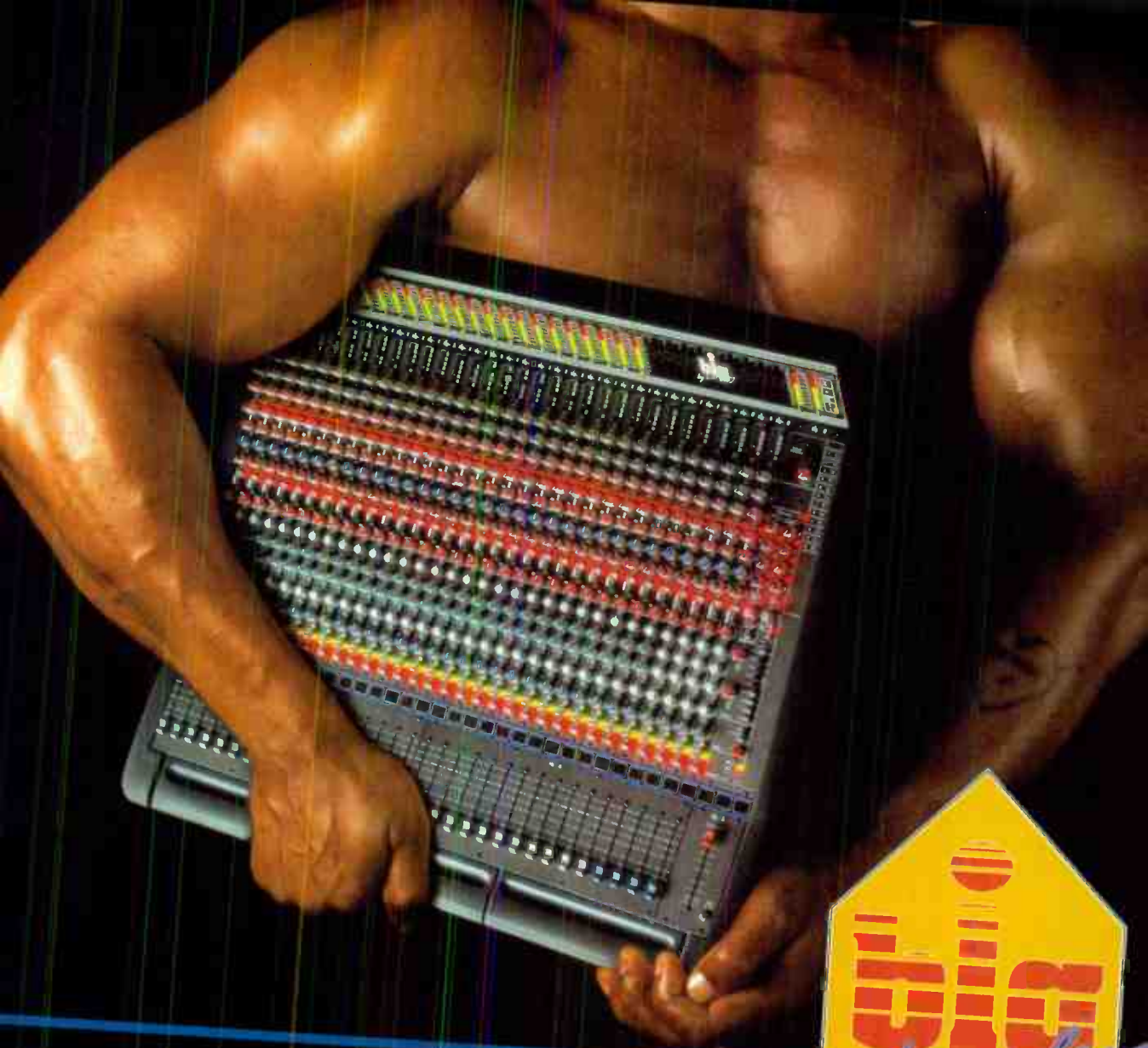
EXTENSIVE X2

Alesis is introducing the X2 recording console, a 24-channel, 24 in-line tape monitor, 8 group professional recording mixer. It has been designed to be a complement to the ADAT. It features a 4-band EQ section with two fully parametric midrange controls with overlapping frequency ranges of 45 Hz to 1 kHz and 640 Hz to 15 kHz and sweepable bandwidth controls of 1/6 octave to 2 octaves. The X2 is equipped with three 56-pin ELCO type connectors providing balanced +4 dBu ins and outs of all tape send and tape return facilities for up to three ADATs. During mixdown, the 24 input channels, 24 monitor channels, and eight stereo effects returns can be combined for a total of 64 inputs, each with its own EQ, pan, level, aux send and automated mute. For more details, contact Alesis, 3630 Holdredge Ave., Los Angeles, CA 90016. Tel: 800-5-ALESIS. Circle EQ free lit. #124.

ROM A LOM A DING DONG

The CD3000 CD-ROM sample player from Akai, being introduced at AES, is the only instrument available that is literally built around CD-ROM technology and it's the first sampler that includes a built-in CD-ROM drive. Loading and removing discs is accomplished right from the front panel. The CD3000 allows you to fully edit every program and sample. With the CD3000 you can create SetUps, small files that are saved to disk via a standard 3 1/2-inch floppy drive. When you load a SetUp, the CD3000 automatically loads specified programs and their samples (even from different partitions on the CD-ROM disc), as well as edit information related to the samples. Another time-saving feature of the CD3000 is the Tag function. When using external hard disks connected to the CD3000's built-in SCSI port, Tags allow you to mark any combination of programs and/or samples for automatic loading. Retail is $3995. For more information, contact Akai Professional/Digital, 1316 East Lancaster, Fort Worth, TX 76102. Tel: 817-336-5114. Circle EQ free lit. #125.

World Radio History



The incredible BIG system includes AMEK SUPERTRUE automation, AMEK VOICE RECALL and, optionally, AMEK VIRTUAL DYNAMICS™.

If you're writing soundtrack, making a record, or in post production, BIG keeps your options open. No matter how many times the context of the job changes you can :

- Remember every knob and switch setting in your mix and RECALL it later on.
- Automate the fader moves and mutes against timecode.
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There is no other system like this in the world for the money. Until BIG, consoles with these facilities cost a fortune.

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Fax: 06721 13537

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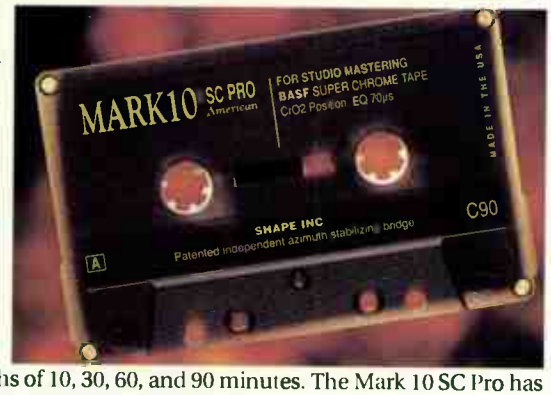
ON YOUR MARK



Shape Professional Products, which will be introducing a line of pro-quality data storage products for the audio, video, and computer industries, has released its first product line — the Mark 10 SC Pro audio cassette. It is available in four initial lengths of 10, 30, 60, and 90 minutes. The Mark 10 SC Pro has a patented independent bridge that stabilizes the tape path and achieves and maintains the highest degree of azimuth alignment possible. Optimum frequency response is directly related to low values of azimuth error. If azimuth alignment is not correctly maintained, the audio cassette loses its ability to accurately reproduce its recorded material. For example, a cassette that demonstrates 7 degrees of azimuth error would cause a high-end signal to play back at a level that is 3 dB lower than the level at which it was recorded. For more information, contact Shape Inc., P.O. Box 366, Biddeford, ME 04005. Tel: 207-282- 6155. Circle EQ free lit. #127.

A VAST ARRAY OF INCREDIBLE SOUNDS

The Kurzweil K2000 Series truly crosses over from synthesizers to high-quality digital analog/samplers. Featuring Kurzweil's Variable Architecture Synthesis Technology (VAST), you can take any sound source and process it with virtually all known (and several new) forms of synthesis. Kurzweil's new K2000S and K2000RS feature pre-installed and tested SMP-K/R (keyboard rack) hardware and Version 2.0 software. Version 2.0 software (included in the sampling option) can read sample libraries from a number of outside sources and formats including Akai, Ensoniq, and Roland, as well as utilizing the Kurzweil 40-disk DL sample library. For complete details, contact Kurzweil Music Systems, 13336 Alondra Blvd., Cerritos, CA 90701. Tel: 310-925-3200. Circle EQ free lit. #129.

SOUND INVESTMENT.

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Ross Systems

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The newly developed RCS Series loudspeaker enclosures are indeed an investment in sound. These enclosures are offered in a wide variety of configurations, allowing for a system design that will insure accurate reproduction of your specific sound requirements. Our components have been carefully utilized to produce the best combination of efficiency, frequency response, and power handling in each model's respective price range. This performance, combined with our three year warranty, provides the means for a sound investment!

- Trapezoidal cabinet design allows easy configuration of speaker arrays.
- Rugged black carpet covering
- CNC punched steel perforated grill
- High power internal crossover assemblies
- Biampable three way systems
- Edge wound high-performance RCS transducers

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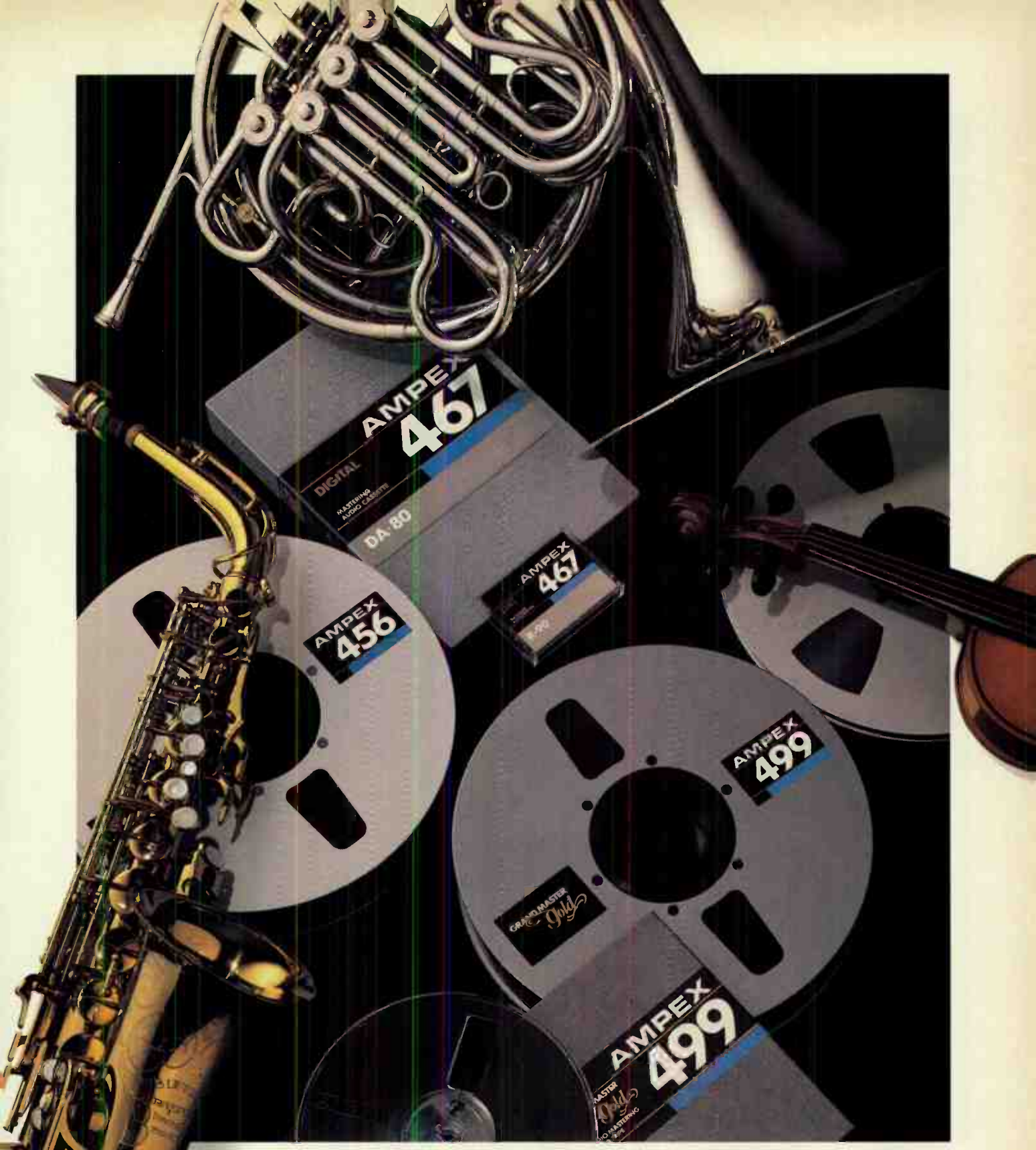

More records go gold on Ampex than on all other tapes combined.

AMPEX

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  Mastering & Pressing Cleanest, Hottest 12" Vinyl!
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  Neve Digital EQ, Sony Digital Editing. Major Label Mastering.

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FOR THE DISCRIMINATING STUDIO

Marantz has just introduced the CDR610 CD recorder. It incorporates all of the features of its predecessor, the CDR600. This new model incorporates a 16-key wired remote control that is capable of controlling the CDR610, as well as CD players, cassette decks, and DCC recorders. Other new features include true AES/EBU digital I/O and calibration pots for matching the digital meters to another reference. For current CDR600 owners, an upgrade program is being made available directly from Marantz Professional Products that will convert a CDR600 into a CDR610. And Marantz is offering a blank disc program. If you own either model, you may purchase up to 40 discs per month at a cost of $15 each. For further information, contact Marantz Professional Products, 1000 Corporate Blvd., Suite D, Aurora, IL 60504. Tel: 708-820-4800. Circle EQ free lit.#130.

NO MORE BOOM

Acoustic Sciences Corporation (ASC) has introduced their new Project Studio Acoustic Systems, designed to optimize your control over your room acoustics. The system is simple; trap the front and rear walls of the room with Studio Towers, stop the wall reflections with Studio Panels, and use monitor stands for a clean low end. ASC Studio Towers can also be used to create an acoustic space for recording vocals or instruments. For more information, contact ASC, 245 Jackson, Eugene, OR 97402. Tel: 503-343-9727. Circle EQ free lit. #131.

NATURALLY GOOD

The new Dualflex II from Behringer is a multiband sound enhancer featuring Behringer's "Natural Sonic" processor with VSP (variable sound processing). This allows you to change parameter settings, sweeping between the Classic and Pop settings to create different variations of enhancement/excitement type processing. A tunable high-pass filter allows tailoring of the high-frequency enhancement. Retail price is $279.99. For more information, contact Samson Technologies, P.O. Box 9068, Hicksville, NY 11802-9068. Tel: 516-932-3810. Circle EQ free lit. #132.

World Radio History

EINSTEIN to the RESCUE

THE WRITER

'This is the perfect console for the writer/producer and you don't have to be an Einstein to use it!'

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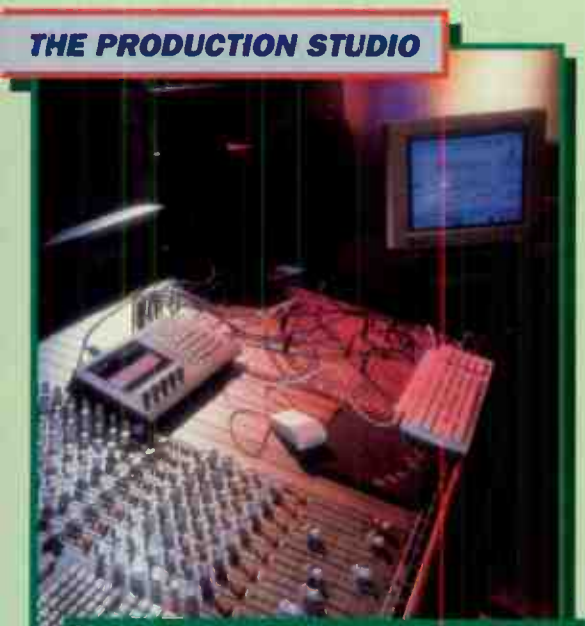
THE MULTIMEDIA PRODUCTION FACILITY

'Crawford's new Audio G room caters to our numerous advertising broadcast and corporate clients. This post production suite centers around a 32 output PostPro SD and SONY 3324 Digital Multitrack. The EINSTEIN SUPER E console with SUPERTRUE automation gives us an incredibly compact and cost effective way to bring all of these outputs into a quality signal path. We can mix all of the multitrack and PostPro SD channels and still have numerous automated effects returns with EQ.'

Steve Davis,Manager, CRAWFORD AUDIO SERVICES, CRAWFORD COMMUNICATIONS Inc, Atlanta, Georgia

THE PRODUCTION STUDIO



'Apollo chose an integrated digital recording environment for music production. The heart of our system is a Mac Quadra 950 running CUBASE AUDIO linked to two Alesis ADATs and two AKAI S1100s. The virtual nature of the system means that we need plenty of ultra-high quality audio inputs and high speed,accurate automation. When you weigh it up,what else is there but AMEK's EINSTEIN?'

Calum Maclean & Andy Haldane
APOLLO RECORDING, Glasgow,Scotland

THE AUDIO-FOR-VIDEO STUDIO

'Sophisticated audio-for-video production demands a console with lots of inputs, great flexibility and powerful automation. For my new studio I demanded all of this, plus a clean layout, compact size and a reasonable price. AMEK's EINSTEIN was the clear choice. It was the easiest equipment decision I had to make!'

James Klotz, Owner/Engineer, SYNCHRONIZED SOUND, Atlanta, Georgia

AMEK

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World Radio History

CIRCLE 07 ON FREE INFO CARD

AES NY 1993
SOUNDQUAKE

EQ People of the Year

Our own subjective, unscientific, and prejudicial choice of those audio pros who defined the burgeoning project studio marketplace circa AES 1993 (In no particular order)

What's our criteria for the following list? We don't have any. We asked our contributors for some help. But when you get right down to it, any list of the year's most powerful, influential people in project recording is going to be downright subjective anyway. So why fight it? Here's our list. Go ahead and write your letters.

1 **Keith Barr/Russell Palmer/Marcus Ryle.** If ever there was a product that defined its market it is the ADAT. More than any other piece of gear in recent memory it has created a cost-effective way that home, project and commercial studios will interact and create digital music via tape. Keith Barr and Marcus Ryle had the inspiration and Russell Palmer had the guts to pull it off. Dare we overexaggerate — the rest is history.

2 **Greg Mackie.** His mixers sound great, are priced right and he's the one they (other console manufacturers) all aim to beat. The arrival of the Mackie CR-1604 mixer, in conjunction with the launch of the ADAT, has set a technical standard for sound quality and cost-effectiveness that is changing the face of product lines and studio spaces. Besides, these guys know how to have fun in a marketplace that, these days, is taking itself much too seriously.

3 **Sting/Hugh Padgham.** If you are rich and famous enough you can record anywhere. But not in just any home studio, mind you — a rack mounted SSL G Series/Sony PCM 3348 system that you can roll out of the living room like a fold-up ping pong table when the guests arrive for afternoon tea. The record ("Ten Summoner's Tales") proves it works. And the video on MTV publicizes the fact that project recording — even in castles — has come of age.

4 **Prince.** Then again, if you are rich and famous enough you can blow it all off and proclaim that you'll never use your mega-million dollar project studio again. You don't even need a name. No more recordings at Paisley Park for him, or so he says. Then again, he's spent so much time recording without watching the clock that he'll still be outputting outtakes long into the next century.

5 **Norio Tamura.** The president of Teac USA and vice president of its Japanese parent company has charted the TASCAM division's growth into the world's largest manufacturer of recording equipment — built on the premise that the project recording studio is the wave of the future. His support for the DA-88 design set the stage for the product's launch this year, adding momentum to today's affordable digital multitrack revolution.

6 **Jimmy Jam & Terry Lewis.** Some of us still have to work (and make music) for a living. And this production duo's performance on the new Janet Jackson LP ("janet") proves that with the lights out in Paisley Park somebody is still working a groove during those cold Minnesota winters.

7 **Michael (Mickey) Schulhof.** We know him from when he first cut his stripes for Sony by buying Jeep Harned's MCI, heralding the company's entry into the professional audio marketplace. Today, his power over both talent and hardware can change the course of recording throughout the world's biggest marketplace. His construction of Sony Music Studios marks the return of the record label-owned studio (if his westside facility added a few project recording rooms, it would all make a lot of sense). Either way, he's got the power to build the project recording marketplace and change the sound of recorded music forever — that is, if he reads this entry and decides to flex his muscles.

Sting & Hugh Padha

8 **Donald Fagen/Walter Becker/Roger Nichols.** The search for recorded perfection never ends. And Donald Fagen's new project, "Kamakiriad," is proof in point. Amazing music and sound — even if every beat was dissected into milliseconds and despite the fact that 20 bit experiments didn't make it to disc. It was recorded at both Donald and Walter's project studios in New York and Maui (respectively). Roger even lived to tell the tale (and mix monitors on tour). Ten years of work. The marathon men of recording. Thank goodness for those who never settle for less.

9 **Sidney Harman.** Slowly but surely he's picking up innovative and blue chip pro audio companies to create a turnkey system built upon the future of the project recording studio — everything from the mics to mixer to the monitors. The mogul who

World Radio History

already owns JBL, UREI, DOD. Allen & Heath, Lexicon, and Soundcraft just added the Austrian AKG group and (as a result) a good chunk of Amek to his nest. That's forty-years after he pioneered hi fidelity with his Harman Kardon brand.

10 Eddie Germano/Rick Stevens. What are the owners of megabuck studios like the Hit Factory in New York and the Record Plant in L.A. (respectively) doing on this list — that is by its very nature promulgating the new age of (less expensive) project recording? These guys bet the bank that project recording has raised the level by which you have to play in the commercial studio game. "Me too" rooms just won't cut it when your clients can get near the quality at home and own a project studio in the process. You have to offer something special — something that sets new standards for sound, design and service.

Honorable Mentions. Rick Rubin, leading candidate for the Phil Spector of the '90s, whose work with the Red Hot Chili Peppers remains a home studio breakthrough...**Chas Sanford** for giving HARP a reason to harp and helping the entire industry define what exactly is a project and commercial studio and how the two must coexist in the years ahead...**Len Feldman** for recognizing the need to bring the AES into the new age of multimedia and for his decades of inspiration to audio readers...**Bob Moses** for being the prophet of SC-10 computer control— probably the biggest industry non-standard since MIDI...**Dan Crewe,** the management muscle behind mix master Bob Clearmountain and master masterer Bob Ludwig. EQ

World Radio History

AES NY 1993
SOUNDQUAKE

And the Envelope, Please...

Nope, there's no *MIX*-up. Once again, *EQ* is proud to present our contributors' picks of whom and what they would like to see receive a prestigious TEC Award from *Mix* Magazine. Everyone at the show realizes the importance of these awards, so that's why we are printing our take on the festivities. Like last year, the purpose here is not to try to predict who the winners ultimately will be, but rather to allow our contributors to voice their opinions, even if their choices were not nominated for an award this year.

DAVE BRODY

Acoustics/Facility Design Company
Russ Berger Design Group, Dallas, TX
Sound Reinforcement Company
Showco Inc., Dallas, TX
Audio Postproduction Facility
Howard Schwartz Recording, New York, NY
Mastering Facility
Bernie Grundman Mastering, Hollywood, CA
Remote Recording Facility
Westwood One Mobile Recording Division, Culver City, CA
Recording Studio
Ocean Way Recording, Los Angeles, CA
Ancillary Equipment
Lexicon 20/20 AD analog-to-digital converter
Computer Software/Peripherals
Digidesign DINR Intelligent Noise Reduction Software
Microphone Technology
AKG Blue Line modular microphone system
Sound Reinforcement Loudspeaker Technology
JBL Array Series Model 4894
Studio Monitor Technology
JBL 4400A Series
Musical Instrument Technology
Korg Wavestation SR synth
Recording Engineer
Hugh Padgham
Remote/Broadcast Recording Engineer
Guy Charbonneau
Mastering Engineer
Bernie Grundman
Sound Reinforcement Engineer
Clive Franks
Audio Postproduction Engineer
Bruce Botnick
Record Producer
David Foster
Signal Processing Technology
Dolby Spectral Processor Model 740
Recording Devices/Storage Technology
Avid Technology AudioVision workstation
Sound Reinforcement Console Technology
Yamaha PM4000
Recording Console Technology
Neve Capricorn

BRUCE BARTLETT

Acoustics/Facility Design Company
Russ Berger Design Group, Dallas, TX
Sound Reinforcement Company
Showco, Inc., Dallas, TX
Audio Postproduction Facility
Skywalker Sound, San Rafael, CA
Mastering Facility
Effanel Music, New York, NY
Recording Studio
The Power Station, New York, NY
Recording Engineer
Hugh Padgham
Remote/Broadcast Engineer
Ed Greene
Mastering Engineer
Doug Sax
Sound Reinforcement Engineer
Stanley Miller
Audio Post Engineer
Shawn Murphy
Record Producer
Russ Titelman
Ancillary Equipment
Crown VZ-5000 amplifier
Computer Software/Peripherals
Techron TEF-20Hi acoustic test system
Microphone Technology
Crown Differoid Technology
Sound Reinforcement Loudspeaker Technology
TAD TCM Series
Studio Monitor Technology
Genelec 1038A
Musical Instrument Technology
E-mu Systems Vintage Keys
Signal Processing Technology
Dolby Spectral Processor Model 740
Recording Devices/Storage Technology
Digidesign Session-8 XL workstation

World Radio History

Sound Reinforcement Console Technology
Yamaha PM4000
Recording Console Technology
George Massenburg Labs HRT9100

CHRIS FOREMAN
Acoustics/Facility Design Company
Perceptions, Inc., Los Angeles
Sound Reinforcement Company
Showco, Inc., Dallas, TX
Audio Postproduction Facility
Skywalker Sound, San Rafael, CA
Recording Studio
Ocean Way Recording, Los Angeles, CA
Sound Reinforcement Engineer
Stanley Miller
Audio Postproduction Engineer
Shawn Murphy
Ancillary Equipment
RPG Diffusorblox acoustic building material
Computer Software/Peripherals
Techron TEF-20Hi acoustic test system
Microphone Technology
AKG Blue Line modular microphone system
Sound Reinforcement Loudspeaker Technology
JBL Array Series Model 4894
Studio Monitor Technology
JBL 4400A Series
Musical Instrument Technology
Yamaha QY20 production center
Signal Processing Technology
Lexicon LARES
Recording Devices/Storage Technology
Soundcraft Vienna
Recording Console Technology
Soundcraft Spirit Folio

DAVID FRANGIONI
Acoustic/Facility Design Company
Walters-Storyk Design Group, Highland, NY
Sound Reinforcement Company
Showco, Inc., Dallas, TX
Audio Postproduction Facility
Skywalker Sound, San Rafael, CA
Mastering Facility
Bernie Grundman Mastering, Hollywood, CA
Remote Recording Facility
Le Mobile, North Hollywood, CA
Recording Studio
The Hit Factory, New York, NY
Ancillary Equipment
TimeLine Lynx-2 synchronizer
Computer Software/Peripherals
Digidesign DINR Intelligent Noise Reduction software
Microphone Technology
Sony C-800/C-800G tube microphones
Sound Reinforcement Loudspeaker Technology
Meyer Sound Labs MSL-2A
Studio Monitor Technology
Genelec 1038A
Musical Instrument Technology
Kurzweil K2000RS sampler
Recording Engineer
Hugh Padgham
Remote/Broadcast Recording Engineer
David Hewitt
Mastering Engineer
Bernie Grundman
Sound Reinforcement Engineer
Robert Colby
Audio Postproduction Engineer
Bruce Botnick
Record Producer
David Foster
Signal Processing Technology
t.c. electronic M5000 audio mainframe
Recording Devices/Storage Technology
Fostex PD-2 portable timecode DAT
Sound Reinforcement Console Technology
Allen & Heath GL-3
Recording Console Technology
Amek BIG by Langley

HECTOR LA TORRE
Audio Postproduction Facility
Skywalker Sound, San Rafael, CA
Mastering Facility
Sterling Sound, New York, NY
Remote Recording Facility
Effanel Music, New York, NY
Recording Studio
Skyline Studios, New York, NY
Recording Engineer
Ed Cherney
Remote/Broadcast Recording Engineer
Ed Greene
Mastering Engineer
Greg Calbi
Sound Reinforcement Engineer
Stanley Miller
Audio Postproduction Engineer
Shawn Murphy
Record Producer
Russ Titelman
Computer Software/Peripherals
Techron TEF-20Hi acoustic test system
Microphone Technology
Sony C-800/C-800G tube microphones
Studio Monitor Technology
Peavey PRM-308si
Musical Instrument Technology
Kurzweil K2000RS sampler
Signal Processing Technology
Dolby Spectral Processor Model 740
Recording Devices/Storage Technology
Nagra D 4-channel digital field recorder with timecode
Sound Reinforcement Technology
Yamaha PM4000
Recording Console Technology
API Legacy

WADE MCGREGOR
Acoustics/Facility Design Company
Russ Berger Design Group, Dallas, TX
Sound Reinforcement Company
Electrotec Productions, Inc.,

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AES NY 1993 SOUNDQUAKE

Canoga Park, CA
Sound Reinforcement Engineer
Stanley Miller
Ancillary Equipment
RPG Diffuserblox acoustic binding material
Microphone Technology
Bruel & Kjaer APE Acoustic Pressure Equalizer
Sound Reinforcement Loudspeaker Technology
EAW KF650i virtual array system
Signal Processing Technology
Ensoniq DP/4 Parallel Effects Proc
Sound Reinforcement Console Technology
Midas XL3-16

DAVID MILES HUBER
Acoustics/Facility Design Company
studio bau:ton, Los Angeles, CA
Audio Postproduction Facility
Skywalker Sound, San Rafael, CA
Mastering Facility
Bernie Grundman Mastering, Hollywood, CA
Recording Studio
Skyline Studios, New York, NY
Recording Engineer
David Bottrill
Remote/Broadcast recording Engineer
David Hewitt
Mastering Engineer
Bernie Grundman
Audio Postproduction Engineer
Shawn Murphy
Record Producer
Mitchell Froom
Ancillary Equipment
TimeLine Lynx-2 synchronizer
Computer Software/Peripherals
Digidesign DINR
Microphone Technology
Sony C-800/C-800G tube mic
Sound Reinforcement Loudspeaker Technology
TAD TCM Series
Studio Monitor Technology
Genelec 1038A
Musical Instrument Technology
Korg Wavestation SR synth
Signal Processing Technology
t.c. electronic M5000 audio mainframe
Recording Devices/Storage Technology
Amek/TAC SR6000
Recording Console Technology
Neve Capricorn

MARTIN POLON
Acoustics Facility Design Company
Harris, Grant Assoc, Iver, England
Sound Reinforcement Company
Showco, Inc., Dallas, TX
Audio Postproduction Facility
Howard Schwartz Recording, New York, NY
Mastering Facility
Bernie Grundman Mastering, Hollywood, CA
Remote Recording Facility
Effanel Music, New York, NY
Recording Studio
The Hit Factory, New York, NY
Recording Engineer
Hugh Padgham
Remote/Broadcast Recording Engineer
Ed Greene
Mastering Engineer
Bernie Grundman
Sound Reinforcement Engineer
Robert Scovill
Audio Postproduction Engineer
Shawn Murphy

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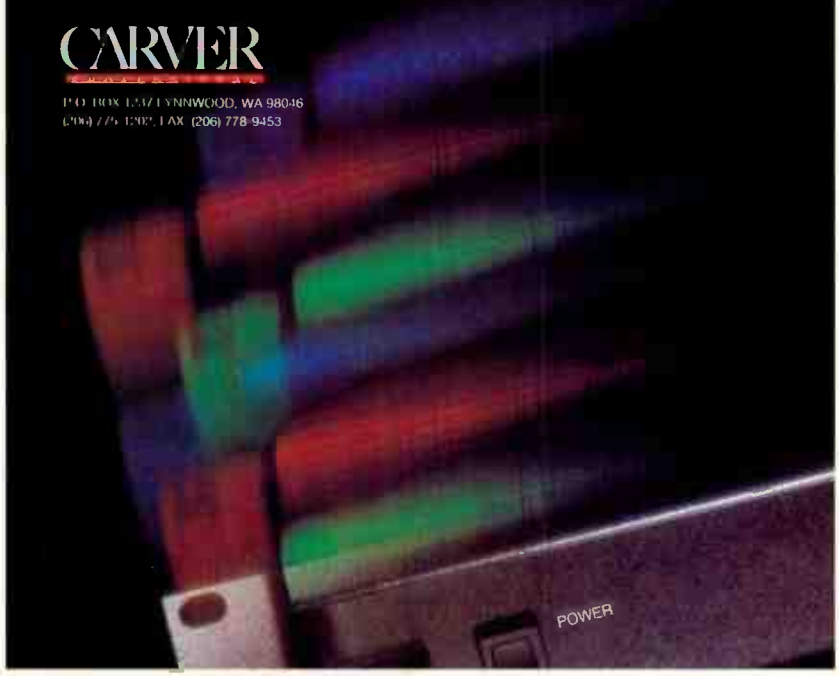

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CIRCLE 20 ON FREE INFO CARD

World Radio History

Record Producer
David Foster
Signal Processing Technology
Dolby Spectral Processor Model 740
Recording Devices/Storage Technology
Sony PCM-3324S 24-channel DASH digital multitrack
Sound Reinforcement Console Tech
Yamaha PM4000
Recording Console Technology
Neve Capricorn

TIM TULLY
Recording Engineer
Hugh Padgham
Audio Postproduction Engineer
Ken Hahn
Record Producer
Daniel Lanois
Computer Software/Peripherals
Digidesign DINR
Musical Instrument Technology
Kurzweil K2000RS sampler
Signal Processing Technology
Digidesign Session-8 XL workstation

EQ

ANDERTON'S PICKS

Like last year, my gig is to vote in fewer categories but explain the reasoning behind the choices, so here goes...

Computer Software/Peripherals: This is a perfect example of why awards can be meaningless: you could make a strong case for any of these products being #1. But keeping technical innovation in mind, I'd have to go for Passport's Producer (I'm disqualifying Cubase Audio because I voted for Cubase last year) since it's essentially a new type of software product.

Musical Instrument Technology: Emulator IIIXP? Nice, but doesn't offer anything truly new. Vintage Keys? A sentimental favorite that will probably win, but the vintage sample thing has been done before. The Wavestation SR, K2000RS, and JV-880 are extensions of existing products that have already been recognized as technically innovative, and actually, so is the QY20. But I'm gonna vote for the QY20 anyway, just because it is so incredibly cool and I take my QY10 everywhere I go.

Signal Processing Technology: Yet another category where all the choices would work for the top slot. Nonetheless, I'll cast my vote for the Dolby Model 740 — one of those rare magic boxes that can improve just about whatever you put through it. The Aphex C2 Aural Exciter does a similar job, and provides a more limited version of the same type of effect for about one-fifth the price.

Recording Devices/Storage Technology: This one's a tie: Digidesign for Session-8XL (not because hard-disk recording is any particular technical breakthrough — it's the concept and user interface that gets the kudos here) and the AudioVision workstation, just 'cause it's cool.

Record Producer: Mitchell Froom gets my nod for not being afraid to take chances, rejuvenating the careers of good artists who just needed better production, liking vintage synths, and not being full of himself.

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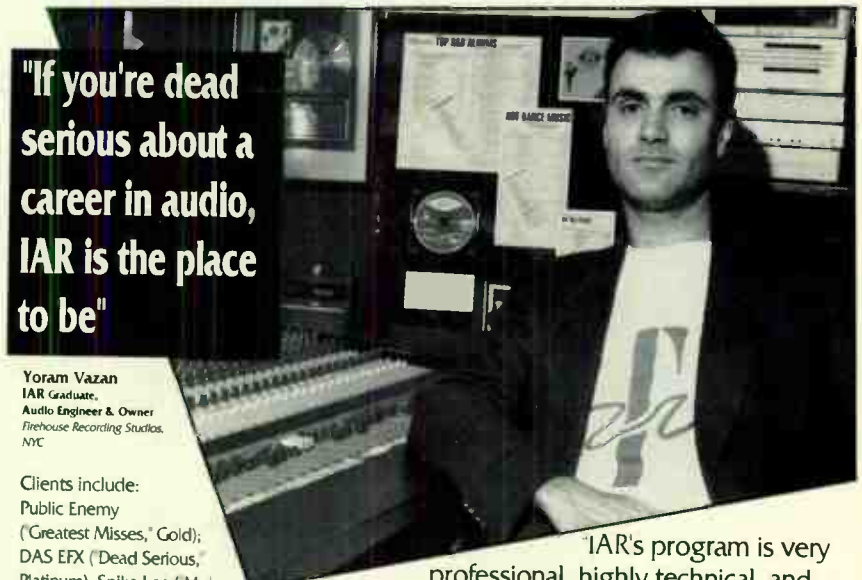

Clients include: Public Enemy ("Greatest Misses," Gold); DAS EFX ("Dead Serious," Platinum); Spike Lee ("Mo' Better Blues," featuring Gang Starr); EPMD; MC Lyte

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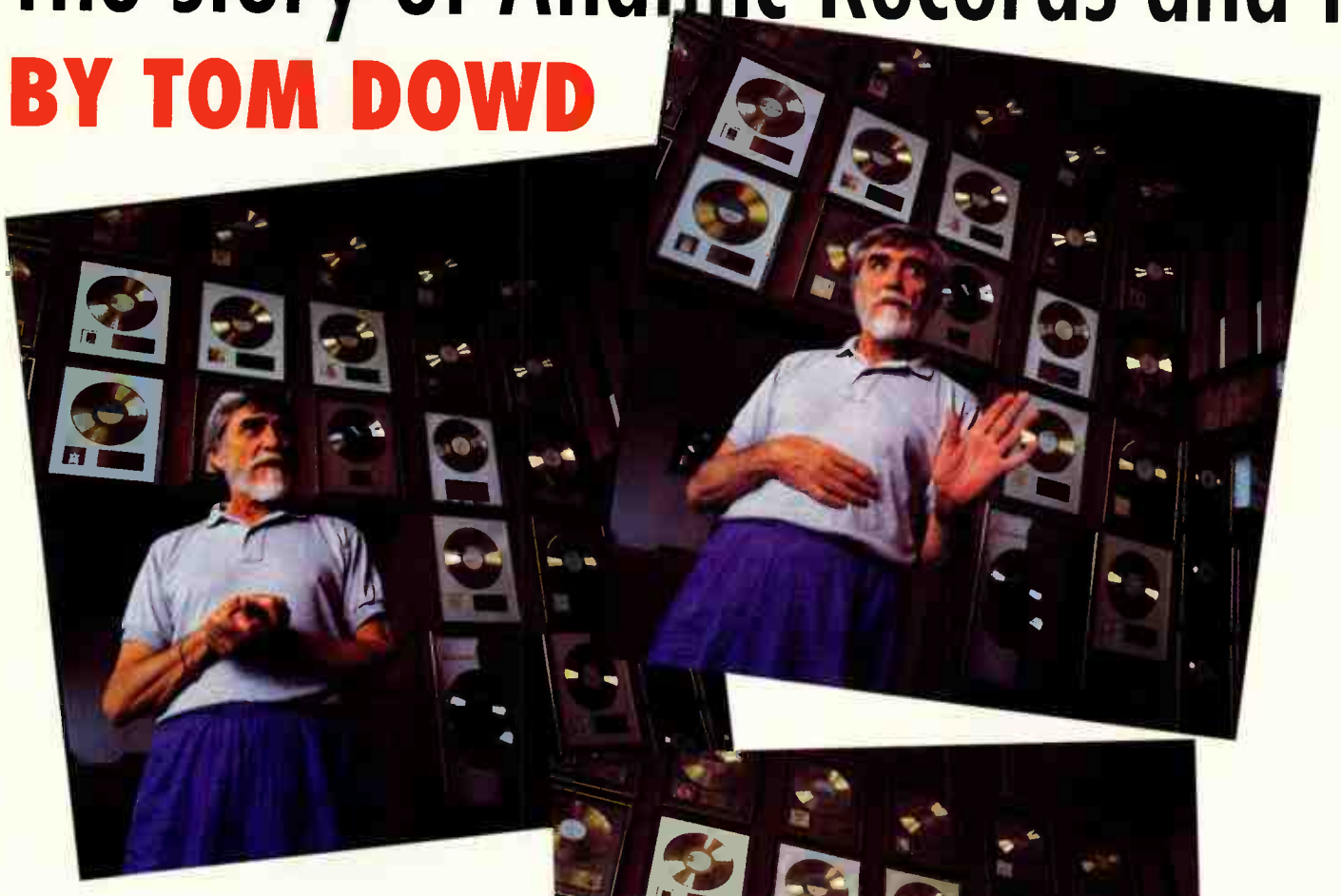
World Radio History

Dowd o

The story of Atlantic Records and t

BY TOM DOWD



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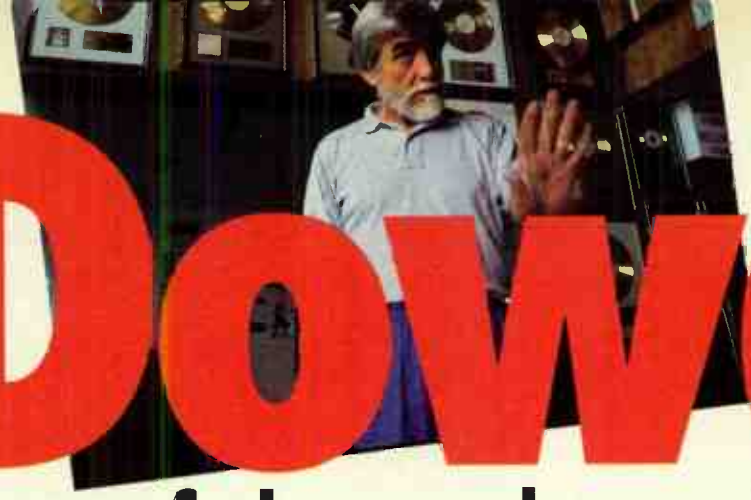


n Dowd

e emergence of the multitrack age

I joined Atlantic Records in the late 1940s when it was still a fledgling experimental organization. I began as a consultant and soon thereafter joined on as a full-time employee. The original Atlantic recording studio was located above Patsy's Restaurant on West 54th Street in Manhattan. The shipping room was on the fourth floor and the studio was on the fifth. The building itself was a woodframe affair and the floors were craggy and squeaked. Nonetheless, Ahmet (Ertegun) and Jerry (Wexler) were sticklers for clean sound and I was determined to get it.

The studio was actually the company's offices by day, and desks were pushed out of the way by night to accommodate recording sessions. Soon the offices were moved a block away and I was able to quit moving furniture and build an echo chamber in the room where the accounting offices had once been.

Then again, the equipment in those days wasn't much more sophisticated than the room. The mixing console was a portable piece of RCA radio equipment that consisted of an RCA OP-6 and OP-7. The OP-6 was a four-position mixer and the OP-7 was designed for remote radio broadcasts. Tape had not been introduced as a viable recording medium until 1950, so most records were cut directly to disc on a cutting lathe. Some recordings were made on tape's predecessor, the wire recorder, but it was an extremely unstable and unreliable medium with relatively poor fidelity. Atlantic recorded direct to disc until 1951. Before the introduction of the Neumanns, I was using RCA 77 BX's, RCA 44 BX's, Western Electric 639A's and C's, a Western Electric "Salt Shaker," and a pair of Emory Cooke mics made by M.W. Kellogg and Company.

Photos by Deborah Gray Mitchell

World Radio History

AND ALONG CAME STEREO

It was Emory Cooke who first introduced stereo at an AES Convention in 1953 at the Hotel New Yorker. He demonstrated the new technology with a recording of a train coming down a track and the Queen Mary blowing her foghorn; it nearly scared everybody to death. He was a brilliant man. He also owned a little cutter head, which is what Atlantic was mastering with in those days. He was the one who introduced me to stereo, and I duplicated his system.

In 1951 we acquired an Ampex 400 that was a portable tape recorder that traveled at 7 1/2 and 15 ips and was naturally mono, since that was the only thing Ampex made. Ampex was still holding the line in mono. But I had this Magnacord and we did some jazz on that device — Wilbur De Paris, Lenny Tristano, those types of guys.

The pattern for the integration of stereo into the recording business was established this way: first came the Ampex 350 stereo machines with two small, 7 1/2-inch rack amplifiers with their own inputs and outputs and record and erase heads. Unfortunately, you couldn't overdub or bounce track-to-track on 2-track machines and the engineers were screaming that the signal-to-noise was not tolerable because mono machines were 10 or 15 dB quieter. The next innovation was to take three tracks and put them on a 1/2-inch tape so that they would shut the engineers up by being wider, having greater separation between tracks. Three tracks on 1/2-inch were better than two tracks on 1/4-inch, geometrically speaking.

Then the tape manufacturers started becoming sensitive — predominantly 3M and then, trailing, Ampex. They started using new formulas and making better tapes. All of a sudden, the next evolution — perhaps a year later — was the 4-track 1/2-inch tape machine. By 1957 or 58 they were running that way. The next year, various studios were reviewing different engineering criteria to determine whether to go 3- or 4-track.

Believe it or not, the early Ampex multiple-track machines were not constructed with overdubbing in mind. Ampex was more interested in getting three tracks — and in some cases, four — onto a 1/2-inch tape. The company never thought anybody would bounce one track to another track, so the repro heads and recording heads were not always wired in the same polarity. Therefore, when you bounced, and if you opened up two faders, there was cancellation instead of addition. But the only place you could hear that was in mono. When you played the tape in stereo everything sounded fine except to a trained ear, but if you put it in mono, one of the tracks had to disappear or suffer some loss, depending on the amplitude.

In fact, this was a problem on some early Beatles albums. I spoke to George Martin about it and he was not aware of it. They were servicing the radio stations with stereo product and when some of the albums were played in mono, you'd hear a voice or an instrument drop out and then suddenly come blaring back in again — it was very embarrassing. But by the late 1950s, the machines being turned out were wired in phase as overdubbing became commonplace. The decks at EMI's Abbey Road must have been quite old by the time the Beatles used them.

The studios were first employing the 3-track by putting the rhythm on one track, the horns and strings or background singers on the second track, and the principal vocal on the third. If they went to 4-track, it was more or less the same; you'd put the rhythm instruments on one track, the strings and horns on one track, the lead vocal on a third, and the background singers and solos on the fourth. You were mixing down predominantly to mono because stereo hadn't been introduced to the public in the form of a disc. (It was originally introduced, believe it or not, in the form of open-reel 7 1/2-inch tapes.)

Seated: Gene Paul, Bernhard Purdie with Aretha's boys, and Arif Mardin. Standing: Jerry Jammot, Cornell Dupree, Ralph MacDonald, Jerry Wexler, Aretha Franklin, Donny Hathaway, and Tom Dowd.

ATLANTIC OVERFLOW

Back at Atlantic, we were outgrowing our studio space. There were times when we couldn't record in our own studio because of the size of the orchestration; so if we did have to, I would lug the 2-track machine down to the New York Capitol Studio or Coastal Recording, and the engineer in residence would be doing the mono and I'd be doing the 2-track on the floor of the studio. We would release the stereo version of the mono album on Livingston Audio Tape and you could get a 10- or a 12-inch album on 1/4-inch tape. Can you imagine releasing a master tape on 2-track today? You know how many bootlegs you'd have overnight? But that practice was prevalent in the 1950s.

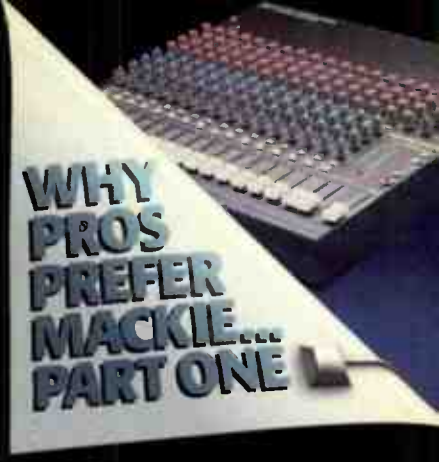
There were stereo recordings being made at the time with excellent fidelity and true stereo spreads, but they weren't generally recorded on 3- or 4-track machines. The Capitol California stuff was impeccable. Capitol had wonderful rooms for recording; they were just about the size of a basketball court. So when you put an orchestra in there you could visually set it up much the way you're accustomed to seeing an orchestra. When they'd mic it, they would more or less record it from the same traditional viewpoint. And the material was orchestrated live and played live. Today, you recorded this one day, that the next, and paste it all

World Radio History

STARR PARODI • COMPOSER, PRODUCER, ARSENIO HALL SHOW KEYBOARDIST

ABOVE: Starr Parodi and husband/co-producer Jeff Fair in their home studio. Essential equipment includes Akai digital samplers, Panasonic DAT, eight Korg keyboards and of course, two Mackie CR-1604 16-channel mic/line mixers.

"On the Arsenio Hall Show, many groups want to reinforce live drums with sampled loops from master DAT or master CD. I like to pump the volume of the samples high to get a big sound. When I do, the show's sound engineers come out of the booth and give me this 'you're doing it again' look...because the signal from the CR-1604 is so clean and hot that it regularly peaks their meters. Yet the 1604 never distorts. High headroom and dynamic range are why Jeff and I use Mackies in our commercial production studio and on the road...most other compact mixers in this price range artificially color the sound. Incidentally, not only does the Arsenio Hall Show use a total of four Mackies, but it's also the mixer I see most often in the racks of groups that we have on the show."



Starr Parodi/Parodi Fair Productions: Film trailers and television: El Mariachi, Trespass, Extreme Justice, Prelude to a Kiss, Mississippi Masala, Straight out of Brooklyn, Graduation Summer, Livin' Large, The Edge, Fame; Commercials: Subaru, Arco, Chrysler, Coors Pure Water 2000, Paramount Theme Park, Better Homes and Gardens, Charter Hospital and many more. In addition, Starr has released a stunning debut album, "Change," with another coming soon.

Before you buy a 16-channel mixer, call us toll-free. You'll learn why successful professionals who can afford to own any compact mixer overwhelmingly choose the remarkably affordable Mackie.

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Max to awaits his orders to be transported on his mission to discover the "secrets of OMNIMAX." From the Liberty Science's signature film "Welcome to the Max." © 1993 Rosalini Film Productions, Inc. Soundtrack by Wayne Sharpe.

Wayne Sharpe photo: Sheila Gracie
Starr Parodi photos: Peter Figen

Wayne Sharpe: Film music for 70mm "Welcome to the Max," "Atlantis," "Geresene Demonic;" Commercial scores for Revlon, Dristan, Cover Girl, NEC, Red Lobster and Hawaiian Punch national TV spots; MIDI consultant/programmer for Beach Boys, Tommy Shaw (Styx & Damn Yankees), Rick James, and others.

View from 10,000 ft. above Manhattan as Marta Valls to earth from outer space. From Liberty Sciences' signature film "Welcome to the Max." © 1993 Rosalini Film Productions, Inc.

"My soundtrack for 'Welcome to the Max' was mixed direct to six discrete digital channels at Toyland Studios through three Mackie CR-1604 16-ch. mic/line mixers combined via a MixerMixer. The producers wanted the cleanest possible sound and needless to say, the CR-1604s delivered as usual. I've used Mackies to produce my recent television commercials and movie soundtracks, and continue to be amazed at the sound quality that comes from such affordable mixers. I've also recommended CR-1604s to a lot of other musicians. All I can say is, 'Accept no substitutes.'"

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World Radio History

CIRCLE 57 ON FREE INFO CARD

While all the studios were going through this tortuous process of deciding whether to go to 3- or 4-track, I kept on scratching my head trying to figure out how Les Paul was doing some of the things he was doing.

together until it becomes a monolith instead of a stereo program.

AN UNFORGETTABLE MOMENT

Al Schmitt, who is a dear friend, was chuckling about going into Capitol last year and recording Natalie Cole with a 35-piece date where all the engineers were saying, "How do you do a 35-piece orchestra? We don't have that many mics and this and that." Al said he just stood there and giggled. He told them, "You put up two or three mics on the strings, you put two in front of the brass, one in front of the reeds, put a mic on everybody in the rhythm section and let me at the console." The younger school of engineers has never been exposed to that, so they're not accustomed to it. They're so accustomed to putting a mic on everything and then cranking everything, they don't realize that the arranger and the room are what contribute to the sounds.

But while Capitol was recording full orchestras direct to stereo tape and the major recording studios were all going 3- or 4-track, back at Atlantic we were exploring a different course. All the studios were going through this tortuous process of deciding whether to go to 3-track or 4-track and worrying about signal-to-noise. We too had a concern for signal-to-noise but I kept scratching my head trying to figure out how Les Paul was doing some of the things he was doing because I knew you couldn't copy two-to-two or one-to-one and not degenerate after the third or fourth generation. Yet listening to his records and analyzing them I realized he had four to five guitar parts, several vocal parts with bass parts, and everything else, and I could not for the life of me figure out how he was doing it until I got wind of this 8-track phenomenon.

I said to Atlantic, "Look, there's no use going 2-track, 3-track, or 4-track. We've been stereo since 1952 and all of the stuff we recorded in our own studio is stored in stereo." Every one of the records we had made between 1952 and 1955, had been recorded live to 2-track. So I said, "We ought to look into this 8-track proposition," and they said, "How much will it cost?" I described it to them and they said, "Well, what will it do for us?" I said. "We can remix our records, or we can correct errors, or we can leave parts out and then add them once we know what we want to add." And they said, "All right, go for it, Dowd." So I ordered an 8-track machine.

Now this was very cute — the only problem was that when I ordered the 8-track machine in 1957, there were no consoles out there that could accommodate it. So I had to sit down and design and build a console for a machine I hadn't seen yet. I breadboarded the thing for awhile, using trial and error. Finally I said, "Okay, I

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Standard equipment: illuminated push-buttons, shielded toroidal power transformer with 6-position voltage selector switch, silver plated XLRs, ground-lift switches, phantom power, polarity reverse and gain controls. Options include the Jensen JT-11-BM output transformer, VU-1 meter (shown), PK-1 meter, gold plated XLRs.

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CIRCLE 89 ON FREE INFO CARD

World Radio History

Jon Anderson says "Yes" to Audio-Technica 40-Series microphones.

Studio Notebook

AT4033

Jon Anderson is one of the most innovative of today's leading musicians. Co-creator of the seminal rock group *Yes*, his music has proven both popular and on the leading edge of musical thought. His current project is *Power of Silence*, an album for Geffen Records recorded primarily at his fully-equipped personal studio.

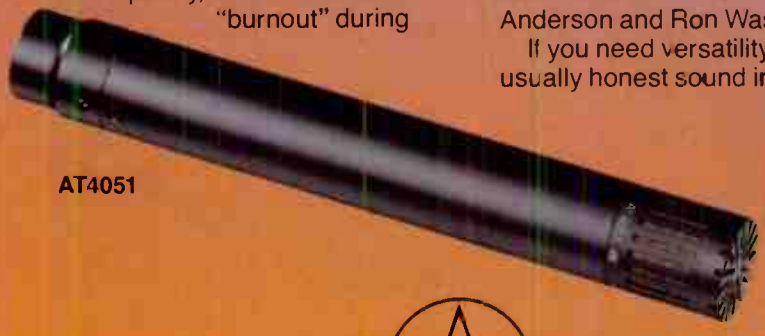
For this project Jon and his engineer Ron Wasserman used both the AT4033 and AT4051 cardioid microphones. Both were quite impressed by their ease of use. Ron Wasserman noted that Jon required almost no EQ to get exactly the sound he wanted, and that setup was much faster than with other studio microphones. In fact he said it almost seemed that the AT4033 would "automatically adjust" to whatever the situation required without "boominess" or need for compression.

This capability fit right in with Jon Anderson's desire to work very quickly, and to avoid talent "burnout" during repeated tests and takes. Jon has used many vocal mikes in his career, but he found the AT4033 remarkably clean despite high sound pressure levels and noted that "I could really get on it!" Ron also remarked on the amazing "clarity" and "unbelievably clean high end" of the AT4033 compared to his previous favorite microphones.

The microphones were used for many tracks including percussion, reeds, harp, acoustic guitar, and even a Bosendorfer grand piano. It was the consistently accurate response of the A-T 40-Series microphones to every challenge that made them so useful to both Jon Anderson and Ron Wasserman.

If you need versatility and unusually honest sound in your studio,

take a page from Jon Anderson's studio notebook. Try the remarkable Audio-Technica 40-Series microphones today. Available in the U.S. and Canada from **Audio-Technica U.S., Inc.,** 1221 Commerce Drive, Stow, Ohio 44224. Phone (216) 686-2600 Fax (216) 686-0719. In Canada call (800) 258-8552.



AT4051

audio-technica

INNOVATION □ PRECISION □ INTEGRITY

CIRCLE 14 ON FREE INFO CARD

World Radio History

Roger Hawkins, Jackie Dowd, David Hood, and Tom Dowd.

Miami back in the 1950s because there were different record conventions held in Miami annually — the NARM, for instance. The different companies would come to these conventions with samples of their year's projected releases. Atlantic was still a small company and the principals would come down and I would be charged with preparing a tape of two or three excerpts from the new Drifters album, the new Coasters album, and the new MJQ album, none of which was to exceed 30 seconds. And we would have about ten albums to play, which would take about 30 minutes. with a little introduction to each artist, and I would always prepare these on stereo tape.

We did not ship amplifiers, speakers, and equipment down there because — the God's honest truth — we couldn't afford it. So I would get a hold of Mac Emerman, who I knew had a professional pool of equipment down there, and I'd say, "Mac, can you ship me two speakers and a stereo McIntosh amplifier and a stereo Ampex? I'd make my tape, put test tones on the front of it, go down there, and tickle his machine up. I'd set it up in a little ballroom and play the stuff, and then we'd give the equipment back to Mac.

When Mac heard I had an 8-track, he came up to New York to see what the heck I was doing, and he also started getting inquisitive about the console. He said, "Man, we need to get this 8-track nonsense and we need a better console and this and that." He and Jeep Harned were thick as thieves and I had explained to Jeep the problems I had in the design of my console. He and Mac sat down and breadboarded a new console, the groundbreaker for MCI to get into the multitrack console business.

At this time, Atlantic's emphasis on recording had shifted in many strange ways: Ahmet was doing London and Los Angeles with an occasional stop in New York, Jerry was sticking predominantly to the blues aspect, and Ahmet's brother Nesuhi was strictly doing the jazz. I was dispatched once or twice down to Memphis to persuade Stax Records, which had a distribution deal with Atlantic, to move a little faster, and I got them out of mono into stereo, and out of stereo into multitrack. Booker T. and the MGs and Wilson Pickett, to name a few examples, were recorded in an old movie theater live and direct to tape.

The same thing happened in Muscle Shoals, another Atlantic recording haunt, because Jerry Wexler started going there and was saying, "Hey, we keep recording on this old-fashioned equipment." So I said, "All right, we can do this and that," and we ended up kind of influencing the South. Nashville was into 3- and 4-track because of the major studios. But the smaller guys such as Muscle Shoals, or any of the outfits in Memphis — the Mitchell Studio, the Stax Studio, Fame, or even the Elvis Presley Studio — were mono at best 2-track. Then a guy named John Fry down there started and went to multitrack and then to 8-track while the rest of them were still yawning, except for Stax.

All of a sudden, I was commuting about ten or twelve times a year to Memphis and five or six times a year to Muscle Shoals. I was going into Macon three or four times a year. I was seldom in New York. I'd be on the road; come home; listen to something; do this, that and the other thing; and go back out again.

I was wearing different hats on all these missions; sometimes I was needed for updating facilities, or for engineering, suggesting arrangement changes or conducting — you name it. Whatever had to be done, had to be done. Jerry bought a house in Florida and he'd always liked Criteria.

We started entertaining more and more things in Criteria. Toward the late '60s and by the early '70s we put in our own rhythm section and started bringing our artists down there rather than having us go all over the map.

STUCK IN THE SEVENTIES

By 1970, I was in residence at Criteria. I was still flying into Memphis, and still flying into Muscle Shoals. But by then my scope had broadened because once in a while Ahmet would flash me into London or out to Los Angeles, and I was bringing home different bits of things that would make me say, "Oops, what do I do with this, I've either got to add horns or go to New York to put the strings on." I was running around like a librarian holding ten things to do under my arm, not knowing what I was going to do first. Ultimately when it would come time to remix, I'd come back down to Miami and do it.

The next step was that we then put in a 16-track console in my Florida home. Because I had still been technically up to date, we came up with a 16-track console that was about 20 inches wide; they were 3/4-inch centers instead of those monstrous things you see today. We got two EMT echo chambers and hung them in my garage, and I had some Koss electrostatic earphones, and I would come home and have tapes arriving on the doorstep. In the morning it would be something from Muscle Shoals or Memphis, or something I had brought home from London or Los Angeles. I'd take a night and a day and rest. After taking a dip in the pool and blot up some fresh air, I'd figure, "Well, let me listen to this and see what the hell I have," and I'd start mixing. And maybe a day or two later, I'd send an

World Radio History

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World Radio History

The original Atlantic Records recording studio was actually the company's offices by day, and desks were pushed out of the way by night to accommodate recording sessions.

album up to New York and they'd say, "Hey, just great, but just change this cut, or mix this one down to sound like a single instead of stereo," etc.

So we were using Criteria to record and my home to remix in. If I couldn't remix at home, though, because it needed two machines, I'd do it at Criteria. I mean it got to be a pretty wicked operation.

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ERIC AND THE DOMINOS

It was during this period that Derek and The Dominos was created. Actual recording time on that project was only ten days. We'd arrive at the studio at about one and two o'clock in the afternoon and come out somewhere between one and three o'clock in the morning. They were ten- to twelve-hour days.

We recorded in Criteria Studio B on a very early customized MCI 16-channel console. At the time, the Ampex MM-1000 was the popular 16-channel ATR, but that's not what we used. Ampex got into a very bad habit where its machines didn't track at a uniform speed from beginning of reel to end of reel. That happened even on the 1/4-inch machines, and that's how MCI got into the tape machine business. It started out reworking Ampex tape decks so that they would travel at the same velocity at the very beginning of the tape as they would at the very end. So one of the machines we had at Criteria was an MCI, the other a 3M.

The thing that made the album a pleasure to do was that, unlike anything else I had done with Eric (Clapton), when this album was recorded, everybody went to very small amplifiers. I didn't have to worry about double stacks of Marshalls and insane combinations like that. Eric used a Fender Champ, and the biggest amp he used was a Princeton. When Duane (Allman) came in, he was using a Fender Deluxe or a small Vox. Carl Radle was using an Ampeg piggyback with a 15-inch speaker, and Bobby Whitlock just the organ or piano. The drummer, Jim Gordon, played with what the amplifiers were doing, so he was not a thrasher, so to speak. He wasn't generating pounds of perspiration to make noise. Nobody wore earphones, they simply listened to each other acoustically, playing softly enough so that they could hear each other.

Why they chose to do it this way, I don't know. When I did Cream, it was double stacks of Marshalls, a pounding drummer, and everybody playing full tilt, you wore earphones to hear yourself and to protect yourself against the din. Yet when we were recording the Derek and The Dominos album (*Layla and Other Assorted Love Songs*), if someone walked in with squeaky shoes it would spoil the take. The studio was a relatively small room for those

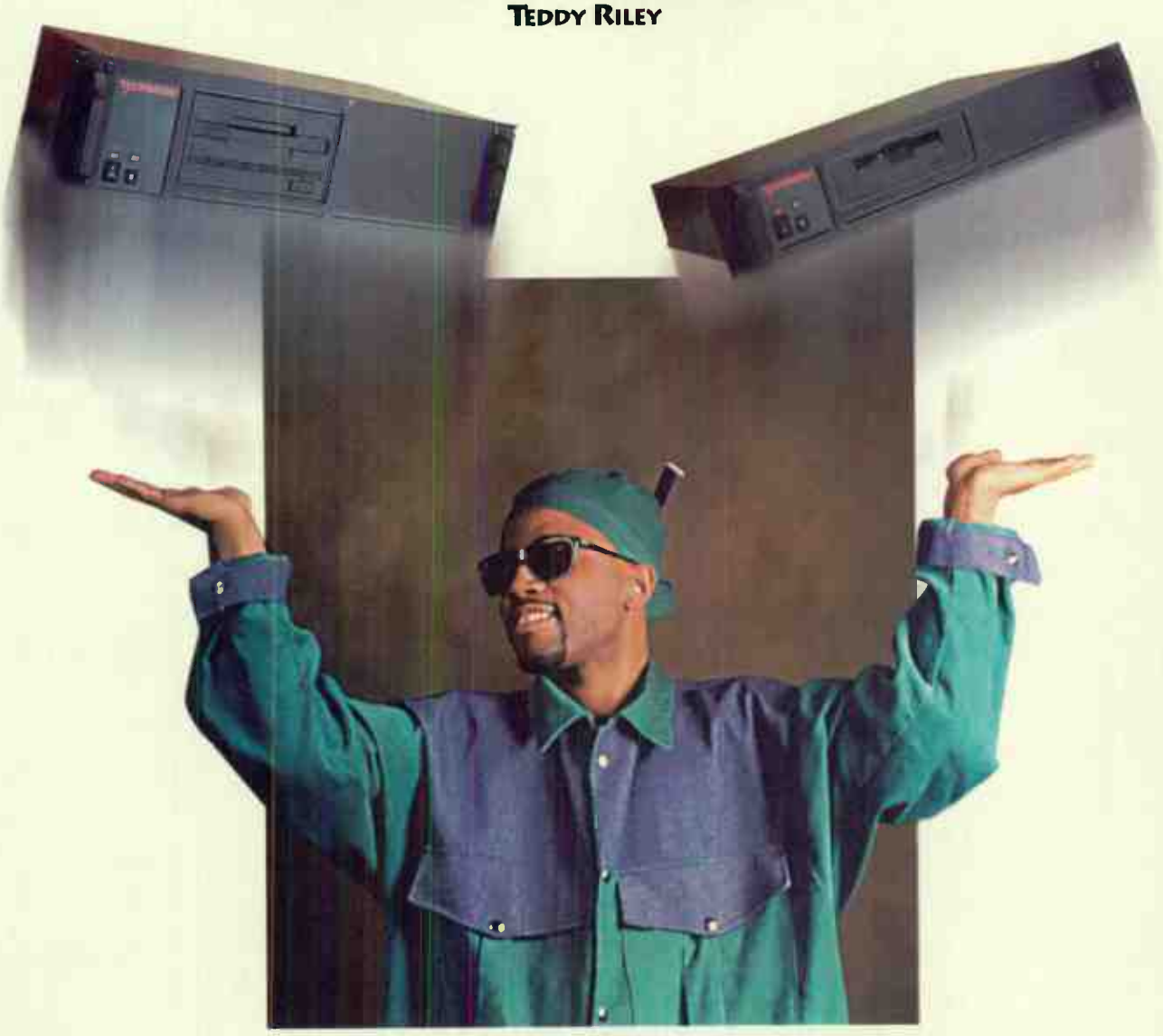
continued on page 123

CIRCLE 52 ON FREE INFO CARD

World Radio History

"DYNATEK PRODUCES"

TEDDY RILEY



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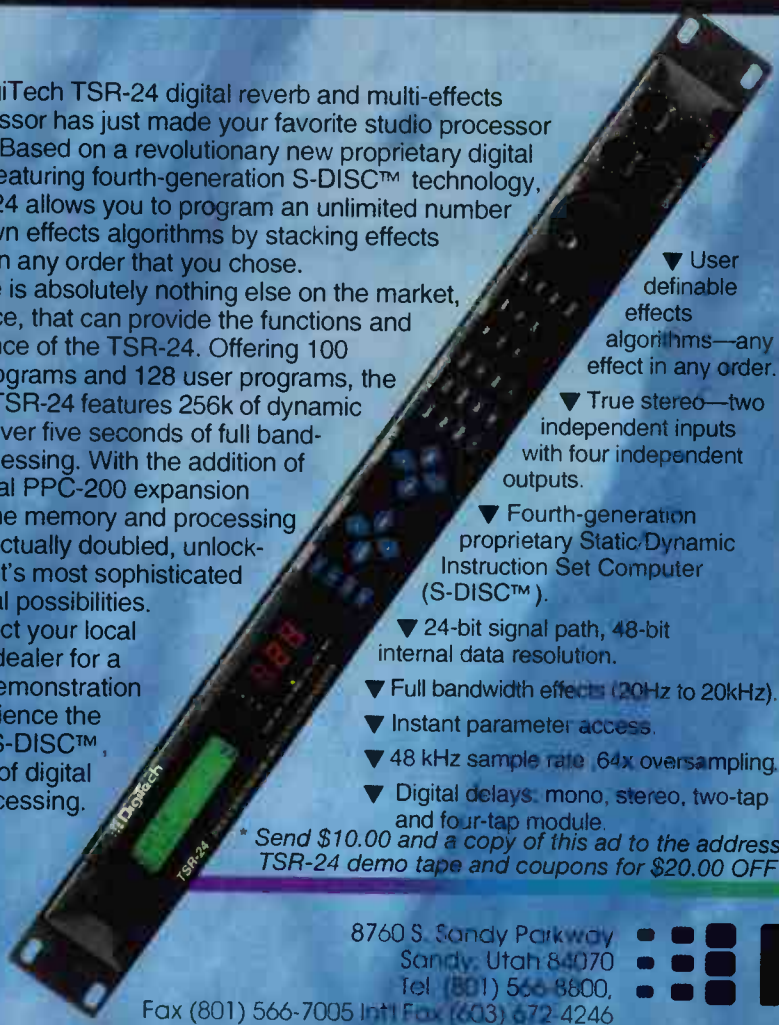

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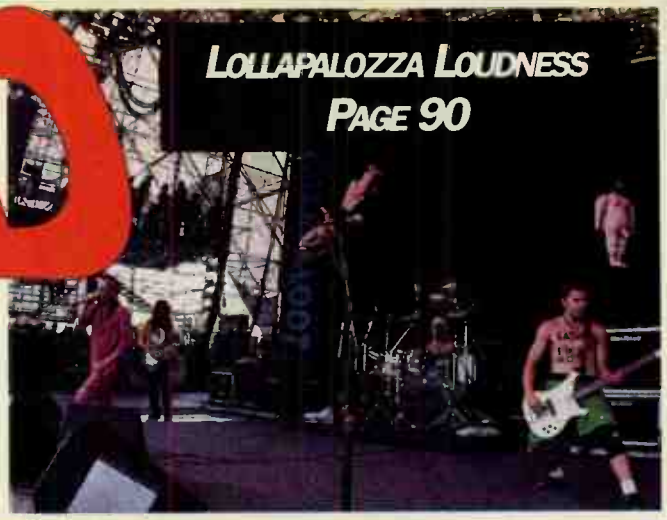
IN A BAND VAN



LOLLAPALOZZA LOUDNESS
PAGE 90

LIVE SOUND FOR THE GIGGING MUSICIAN

LIVE SOUND PERFECTED: STEELY DAN

INSIDE: ROAD TEST: BAG END ELF-1
ROAD WARRIORS

World Radio History

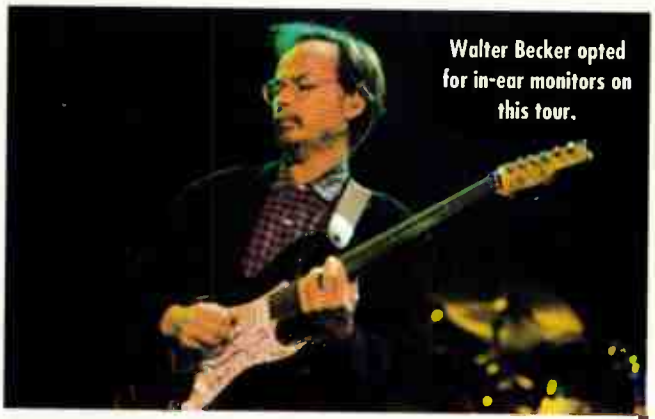
IN A BAND VAN

STEELY BAND IN A DAN

AFTER NEARLY 19 YEARS, STEELY DAN TAKES ITS ACT ON THE ROAD

BY ROGER NICHOLS

■WELL, IT FINALLY happened. After 19 years Donald Fagen and Walter Becker went on the road. The last Steely Dan tour ended in July 1974. This tour started in July 1993. To a lot of people, waiting for this tour was like waiting for a rich uncle to die or waiting for that bankruptcy to clear off your TRW credit report; you hope that it happens someday, but you can't count on it until after it happens.



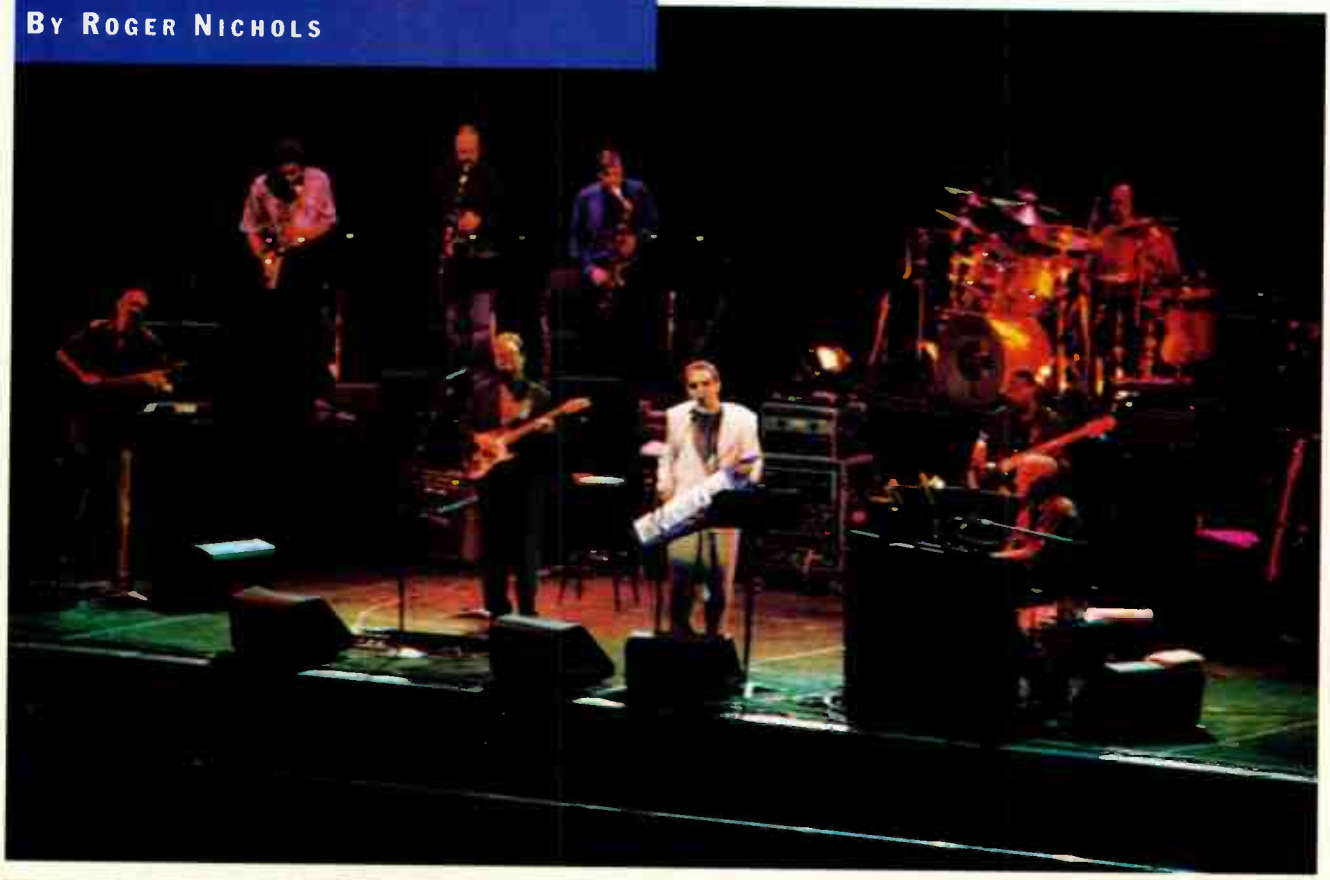
Walter Becker opted for in-ear monitors on this tour.

For the past year, Donald and Walter had been sort of planning to do this tour. In the summer of '92, Donald did a short tour with the "New York Rock and Soul Review." Donald was the host of a show that included Michael McDonald, Boz Scaggs, Phoebe Snow, and a heap of great musicians. Walter was on the tour too. He played guitar and sang a song or two to see if the experience of being on tour again would be tolerable. After the tour Donald and Walter checked each other's pulses and decided that since they had lived through one tour, the chances of a Steely Dan tour were pretty good.

July 1993, rehearsals began. Three weeks of rehearsing at S.I.R. in New York and then we hit the road. The band was comprised of Drew Zingg on guitar; Tom Barney on bass; Peter Erskine on drums; Bill Ware playing vibes and percussion; Warren Bernhardt at the piano; Brenda King, Diane Garisto, and Catherine Russell singing background; Bob Sheppard, Cornelius Bumpus, and Chris Potter on saxophones; and, of course, Donald and Walter. Donald played Fender Rhodes, DX-7II through a Lync remote keyboard and sang most of the vocals. Walter played guitar and sang a few songs from his forthcoming album.

House sound on the tour was mixed by Dave Kob of Clair Brothers. Monitor mixing was done by Ed Dracoules. Oh, and that is where I come in. I mixed ear monitors for Donald, Walter and Warren Bernhardt.

One of the biggest problems with live sound is that the musicians can't hear the right stuff on stage. Usually a monitor wedge is placed



Photos by Julian Jaime

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CIRCLE 96 ON FREE INFO CARD

World Radio History

CIRCLE 38 ON FREE INFO CARD

IN A BAND LAN

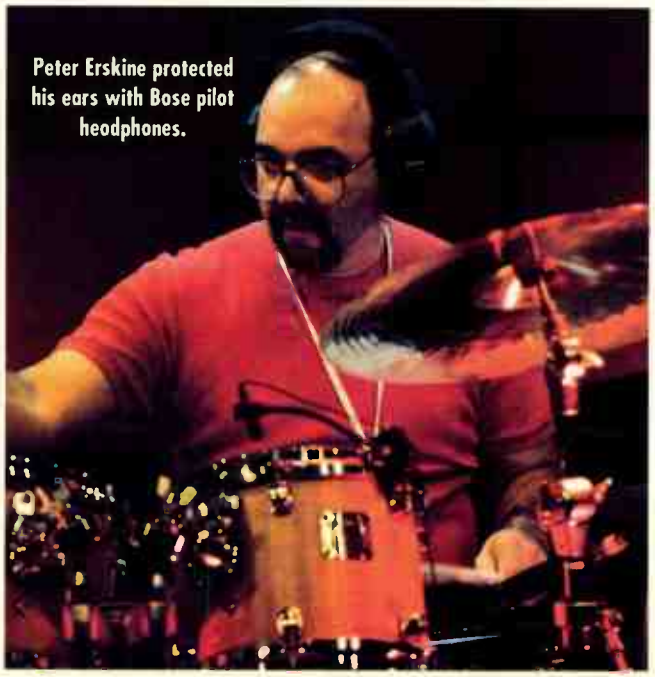
part of the band in this situation. The mix becomes more critical. If you are the guitar player with ear monitors and your guitar is not loud enough in the mix, you don't have the benefit of hearing what you are playing by standing in front of your guitar amp. Your ears are plugged up. It becomes important for the monitor mixer to know when things like that start to happen, so they can be prevented.

We also decided that if everyone in the band wore ear monitors that we would end up with an out-of-control "dynamics roller coaster." The cohesiveness of a band playing together would probably go right out the window. A good combination of ear monitors and wedges seemed the best choice. The side benefit to those using the wedges is that there are fewer of them contributing to the din on stage.

We're not done with the wireless stuff yet. Walter wanted to be completely free of encumbrances on stage. He also wanted to walk off stage during the last encore but didn't want to have a guitar part just drop out as he left. We decided to use the Nady dual-diversity system. The receiver has ten channels and we used a different transmitter for each guitar, thus minimizing changeover time. Just pick up the other guitar, switch channels on the receiver, and go.

The radio links for the ear monitors are operating at 175 MHz, while the guitar wireless was up at 950 MHz. One hundred and seventy-five MHz is more apt to reflect around in concrete structures and cause "picket fencing," in which the radio signal reaches the receiver from two different paths and is cancelled by being out of phase. You have probably noticed this effect when trying to listen to an FM station while driving through a city with tall buildings. We have had some picket-fencing problems, but by moving the transmitter antenna a few feet one way or the other we have been able to minimize the effect.

The radio link for the guitar was much better. First of all, frequencies of 950 MHz and higher do not suf-


Peter Erskine protected his ears with Bose pilot headphones.

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Studiomaster

P7

VISUALIZE: A professional console that can grow with your needs. Compromise in quality or features is never considered.

- An 8 buss console providing 40 equalised inputs and 16 track capability in its basic 16 channel format.
- Up to 88 equalised inputs and 40 track capability in its fully expanded 40 channel format.
- Full MIDI mute automation for channels, tape monitors and 4 of its 6 auxiliaries with 99 onboard recallable mute scenes, 4 independent mute busses and solo in place w/solo safe.
- A console where affordability is a direct result of an impressive 18 year reputation of quality engineering, innovation and design expertise along with a manufacturing know how that is second to none in the world.

Channel Features Include:

- 4 Band EQ with dual mid sweeps-high and low EQ assignable to the monitor path
- EQ defeat
- Input swap switching
- Direct/group output switching
- Inserts
- Individual 48v phantom power
- 20db pad switch
- 6 aux sends
- PFL on channels
- AFL on monitors, 100 mm faders and more
- Each channel provides 2 equalised inputs
- The P7's operating levels are switchable from -10dBV to +4dBm

Sub-group and MIDI command center include: the solo-in place/solo safe switching controls along with the 4 mute buss assignments and security system.

Each of the P7's 8 sub-groups are normalled to the direct tape outputs allowing for the permanent connection of tape lines. Changing the direct tape out status to a group out is as simple as flipping a switch. 4 fully assignable stereo aux returns with high and low equalisation provide for effects returns and or additional instrument inputs. Group inserts allow for the connection of additional effects processors.

Comprehensive Master Section Features:

- Built in talk back microphone
- 3 separate 2 track/tape feeds with a 'tape to tape' copying facility
- Dual 2 track returns to the console
- Main and near-field switching at the console

Is it any wonder that STUDIOMASTER mixing consoles have been the choice of major artists such as Phil Collins, Mike Rutherford, Chick Corea and many others... as the centerpiece of their home studios for years?

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CIRCLE 83 ON FREE INFO CARD

World Radio History

fer as much from this problem. Second of all the Nady system uses a dual-diversity receiver. That means that there are two receiving antennas spaced about 18 inches apart. The receiver always switches glitchlessly (is that a word?) to the antenna with the best signal. We never had any problems with the wireless guitar link.

There are hundreds of electronic reverb units out there, each with its pluses and minuses. One problem was deciding which one to use for the reverb Donald and Walter were listening to in their ear monitors. In the studio, Donald and Walter like very little reverb — basically none — when recording. The goal for the live tour was to come up with an ambiance that would add just enough presence for the ear monitor mix to sound as though there were no ear monitors. In other words, a headphone mix that sounded as though you weren't wearing headphones.

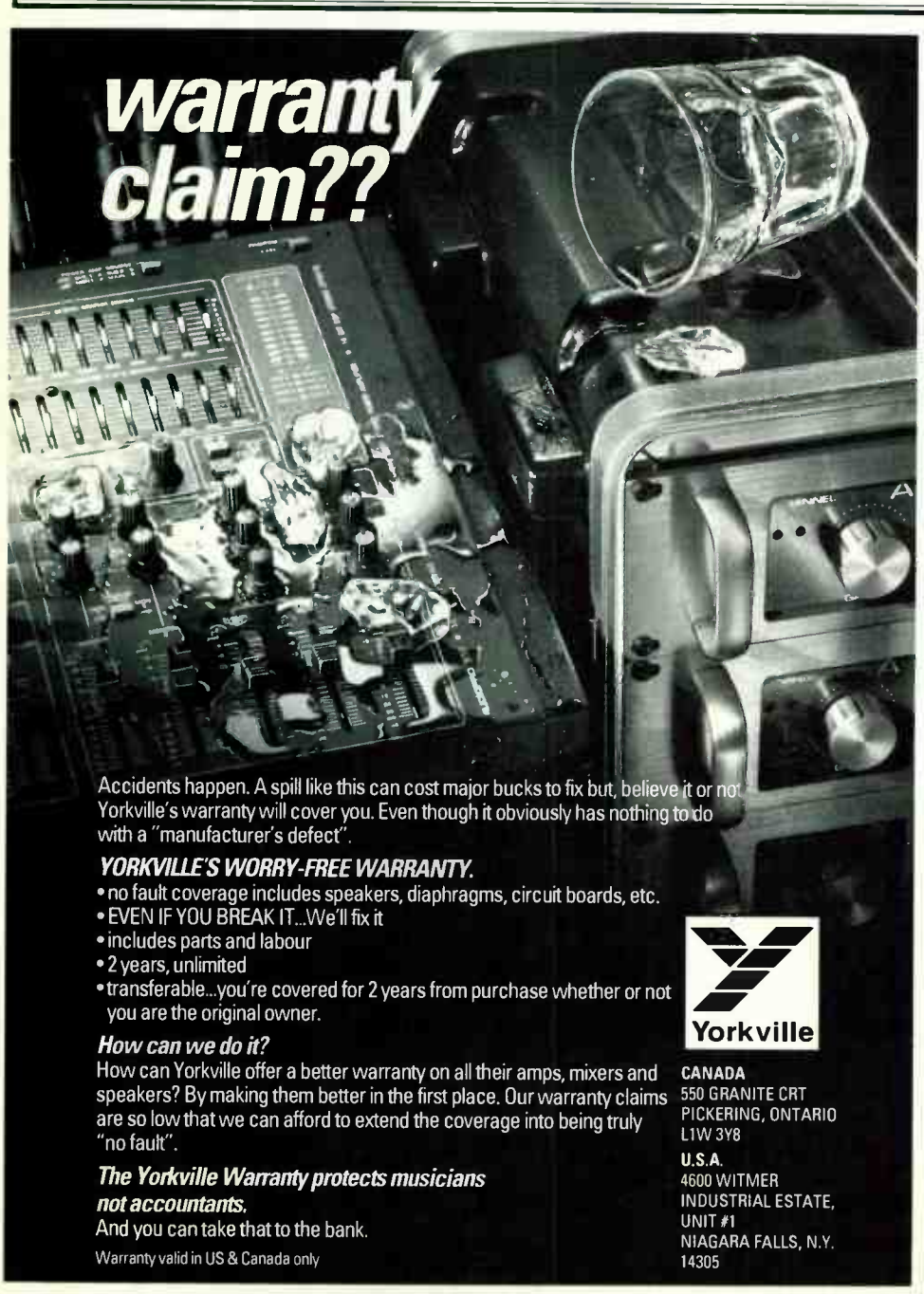
I tried a bunch of different reverb units. Close, but not quite. Then Eventide lent me one of its new DSP-4000 Ultra-Harmonizers. It is basically a building-block system that allows you to construct any kind of DSP effect you want. The unit's memory is filled with algorithmic building blocks that are used to construct echoes, reverbs, delays, phasers, choruses, EQs, pitch changers, and whatever else you can think of. Anyway, to make a long story short, I was able to build an ambiance program that was exactly what we needed. Smooth, no digital graininess, and I could adjust it to within a tenth of a noogie (technical term).

MAKING MUSIC

Before I forget, Donald and Walter did play some music. If you were lucky enough to see one of the shows, I venture to say that this could have been one of the most in-tune concerts of the decade. The only bad side was that in a three-hour show they could only play 25 of the songs the audience was screaming for. I guess they will have to come back next year and play some of the others.

The only thing I would do differently if there is another tour is to make sure that I get to ride with Donald and Walter on the Gulfstream II. I got the real "crew" vibe on this tour. Stay after the show until the load-out is complete, drive all night to the next city, load in and set up all the lights and sound equipment, do a sound check when the band arrives, do the show, and the cycle repeats.

I know that I have leaned on gear talk a lot in this article, but let's face it, the main reason for this tour was that it was an excuse to get new gear to play with. After all, we are charter members of the Gear Sluts, aren't we? It is our job.

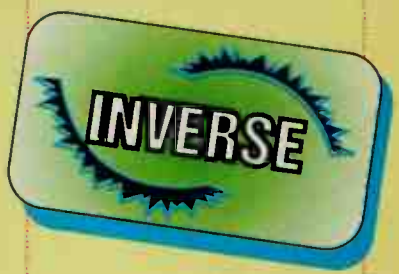


CIRCLE 97 ON FREE INFO CARD

World Radio History

Alex

SO MUCH SOUND. SO LITTLE MONEY.



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IN A BAND VAN

LOLLAPALOOZA: AMPLIFYING THE FREAKS

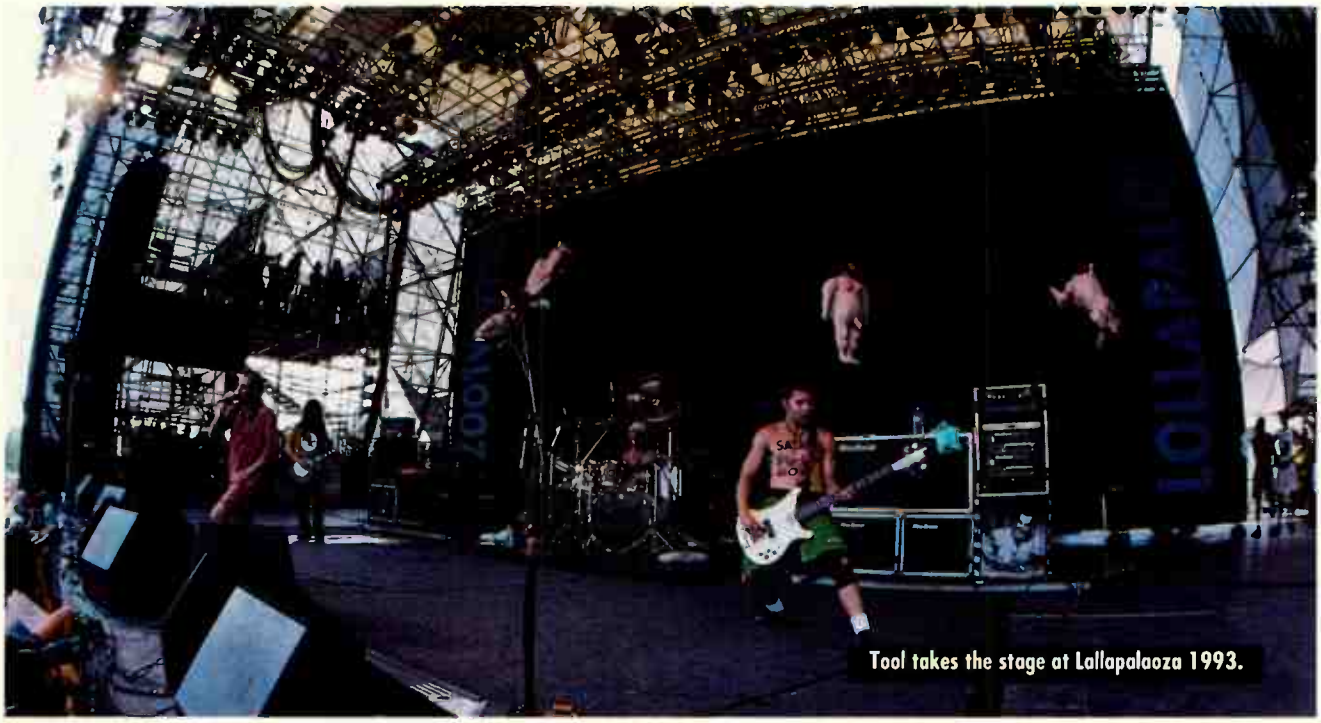

Photo by Rick Gould/ICP

Tool takes the stage at Lollapalooza 1993.

YOU'VE READ ABOUT THE BANDS, NOW FIND OUT HOW THEY PULLED OFF ONE OF THE BIGGEST GIGS OF THE YEAR

BY ROGER DARNELL

■WHETHER it was the first show in Vancouver on June 18, or the last one, 33 cities and seven weeks later, preparing Stage One for the tens of thousands of Lollapaloozans began the same way: the metal locks on seven tractor-trailers' loading doors were slid open, the doors swung out, and for a brief moment the massive assortment of gear stared out into the focusing eyes of the crew, who dutifully removed and set it up for the throngs who attended the series of sold-out shows.

One of the top grossing U.S. concert tours of the summer for the last three years, Lollapalooza's Stage One was the venue for this year's full slate: Rage Against the Machine, Babes in Toyland, Tool, Front 242, Arrested Development, Fishbone, Dinosaur Jr., Alice in Chains, and Primus. In each of the cities, Stage Two was erected from its own tractor-trailers for bands like Cell, Mosquito, and an array of local talent, along with continuity highlights like the The Runties' Porno Puppet Show, that filled any gaps in the air waves on show dates.

And the gear — the means by which the artists touched the thousands in attendance — went unsung (pun intended). Loaded-in, tweaked-out, heated-up, locked-down, exploited to — and nearly exploded — at the maximum tolerances, then dismantled and loaded out again. The piles of road-cases have now made the migration toward the next gigs or awaiting warehouses, as the sunshine has worked over the muddy pits left behind in thirty-four cities. Unsung, that is, until now.

Here it is: A spin on the gear on the sound-side, with highlights from the man who managed the job of getting it out and up and back down and in.

THE BOSS

Mark Naficy, Alice in Chains' house engineer, told me, "The man you want to talk to is Chopper." Chopper is Steve Borges, Lollapalooza's production manager. With a career that's so far included coproducing 1991's star-studded Walden Woods Benefit Concert at Madison Square Garden and a long list of other world-class music-industry events, Borges knows how to lay the tracks, load the event aboard, and get the show where it's going.

"We had three months of preproduction for this event," explained a cool, collected Chopper, preparing to go into the last few shows of the tour. "All the shows have gone on-time or ahead of schedule, we've been blessed with very good weather, and I have great people working around me — so it's as easy as can be expected." Though he quickly qualified, "It's been very busy."

THE GEAR

How much gear was involved in Lollapalooza? "Seven tractor-trailers full, which includes two semis full of PA, two semis full of lights, two semis full of main gear, and another tractor-trailer that has rigging and soft goods," Chopper answered, mentioning also that each of the bands had its own instruments, equipment, and staging.

Los Angeles-based ElectroTec provided the

World Radio History

tour's sound equipment.

"We had two sets of everything for the main stage," Chopper continues. "We had two 56-channel Gamble house boards with processing and two sets of monitor boards with processing and lines and mics, so that we could have two bands set up at all times.

"The sound gear held up very well. We had your average number of speakers get blown and be replaced. We had a little bit of damage to a couple of mics and wedges from a couple of overzealous performers, but that's about it."

A full-time production staff of 54 was supplemented at the local venues by hundreds of stage hands, security people, and other hired help. Co-stage managers Paul Lord and Randy Townsend laced talent and shows together on Stage One, with Dave "Wave" Foley managing Stage Two.

THE DAYS

6 A.M. saw the unloading of the show. At noon the doors opened. At 2 P.M. Stage One started and ran until about eleven o'clock.

Regarding the oppressive outdoor heat of the American summer, Chopper's bunch took the necessary precautions. "We've had to very carefully monitor the amp racks during the day of the shows because they got so hot. We ordered-up anywhere from 250 to 450 pounds of dry ice and blew over it with fans into the racks."

The show raged on through the day, with quick-change the principal name of the game. Chopper described the staging process: "Using the second house console and its wires, one band gets line-checked behind our software on the stage. They unplug, roll one band off, clear up the upstage distro from the band gear, roll it back, roll the risers out, distro back behind them, plug everything in that's already been line-checked and switch to the new band's gear."

Tear-down and load-out occur from the close of the show until at least 12:30 A.M. Showers, if you're

Dinosaur Jr.'s back line.

Photo by Rick Gould/ICP

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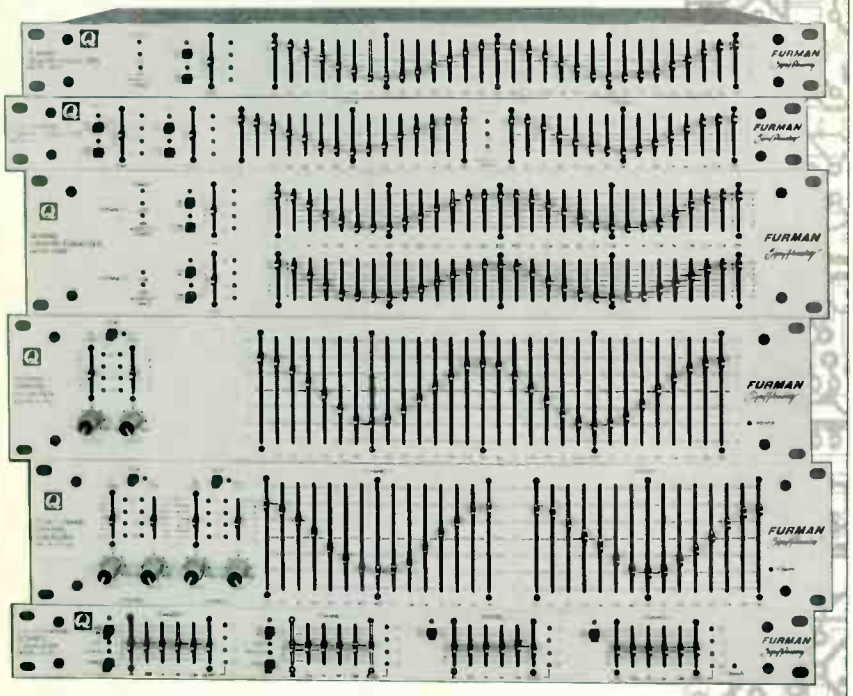
Graphic Details



It's attention to details that sets the new **Furman Q-Series Graphic Equalizers** apart from the competition. Details like constant-Q equalization for minimum interaction between adjacent bands and maximum graphic accuracy. State-of-the-art low noise op amps. "Straight wire" bypass function. Four segment meters that make it easy to find optimum signal levels. Beefy power supplies that assure long-term reliability. All six of our new EQ's feature silky-smooth sliders, and our long-throw sliders are 15 mm longer than those on most other premium graphics. And there's a dramatic new look, with pale gray front panels and tasteful deep blue and black legends.

Contact Furman for the full graphic details.

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FURMAN

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IN A BAND LAN

lucky, around one. To sleep at about 1:30 or 2.

GOING AWAY

Late March swept through to early August, and Chopper's job was quickly winding up. "Hopefully all of ElectroTec's and the band's gear will go away on the last night of the tour. I'll make some follow-up phone calls to make sure everything got to where we thought it was going, but the individual vendors really take care of making sure the trucks and the crews show up for their gear and that it gets back to their warehouses."

And then what? After go- go- going for a summer with the multicultural, megamusical caravan of the year, what's a body to do? Chopper says it's a week off at home before preparing for more road: he'll be production manager for Crowded House's tour of Africa and Canada. Asked if he thought the third annual event would be back for a fourth, Chopper didn't blink. "It would be stupid not to. Where else can someone pay one price to see and hear this many great bands at an outdoor concert while hanging out with their friends?"

WE'VE HAD TO VERY CAREFULLY MONITOR THE AMP RACKS BECAUSE THEY GOT SO HOT. WE ORDERED-UP ANYWHERE FROM 250 TO 450 POUNDS OF DRY ICE AND BLEW OVER IT WITH FANS INTO THE RACKS.

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CD3000

CD-ROM For The Real World

Akai proudly introduces the first sample player to really make sense for today's musicians and studios. Instead of buying yet another playback unit with a limited range of EPROM-based samples, you can have an instrument which grows with you - the CD3000, a 32-voice sampler with a built-in CD-ROM drive.

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To get your library off to a good start, the CD3000 comes supplied with not just one, but an incredible *five* CD-ROMs, free! These discs have been created by Akai and some of the foremost sound library developers in the world: East-West Communications, The Hollywood Edge, and InVision Interactive. This fact alone makes the CD3000 an unbeatable value. From there, you can go on to use any CD-ROMs created for Akai samplers.

There's a lot more, so visit your nearby Akai Professional dealer soon for a complete demonstration.

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CIRCLE 02 ON FREE INFO CARD

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IN A BAND VAN

GUNS 'N MELONS

BAND NAME: Blind Melon
MEMBERS: Roger Stevens, guitars; Christopher Thorn, guitars; Glen Graham, drums and percussion; Brad Smith, bass and backing vocals; Shannon Hoon, lead vocals
LATEST RELEASE: Blind Melon (Capitol Records)
WHERE THEY'VE BEEN: MTV 120 Minute Tour; Soundgarden Tour; opened for OZZY and Alice In Chains; 8-week tour headlining clubs; currently on the road opening for Guns 'N Roses in the U.S. and Mexico
WHERE THEY'RE GOING: Headed to Europe for four weeks. Touring various clubs and opening for Guns 'N Roses.
HOW THEY GET AROUND: Van — preferably a Ford Club Van
SOUND ENGINEER: Lyle Eaves
CONSOLE: Soundcraft Series Four
CONSOLE RACK: Eventide H3000SE; Yamaha SPX90II; Korg SDD2000; dbx compressors; Drawmer noise gates; dbx noise gates
EFFECTS: Eventide H3000SE; Yamaha SPX90II and Rev 5; Korg SDD2000
LOUDSPEAKER SYSTEM: ElectroTec Lab Q
AMPLIFIERS: Crest and Crown
OTHER GEAR: Shure microphones; Dunlop picks and effects; Pro-Mark drumsticks; Remo drumheads; Zildjian cymbals; Fender guitars and amps; Gibson guitars; Guild guitars; Ampeg amps; Marshall speakers; SWR speakers; D'addario strings
BEST LIVE EXPERIENCE: *Christopher Thorn* — Playing the Metro in Chicago and whenever we have really good live jams. *Brad Smith* — Whenever the crowd is listening with an open mind. *Shannon Hoon* — My best shows are my worst.
WORST LIVE EXPERIENCE: *Christopher Thorn* — Play-

ROAD WARRIORS

Photo by Gene Kirkland

World Radio History

ing in front of 40,000 people in Mexico City with all of my guitars out of tune because of an uncalibrated guitar tuner. *Roger Stevens* — Being in front of 40,000 people in Mexico and being hit by the pesos that the kids were throwing. *Shannon Hoon* — My worst shows are my best.

TOUR TECH TIPS: — All the members of the band agree: Hire good technicians who are interested in their jobs. Do not hire friends who want to hang around the band and try to be cool.

THE CRYING GAME

BAND NAME: Farrcry
MUSICAL GENRE: Hard Rock/Metal
MEMBERS: Craig Martin, Guitar; Randy LaPierre, Bass; Eli Facuseh, Drums; Ira Saltzman, Keyboards; and Mark Christian, Vocals
LATEST RELEASE: Mr. Red, White and Blue (Granat Records)
WHERE THEY'VE BEEN: Touring Florida and Puerto Rico
WHERE THEY'RE GOING: Touring the southeast U.S. and then to Europe in late November, early December
HOW THEY GET AROUND: Golden Eagle Group freight forwarders in the U.S. and Puerto Rico
SOUND ENGINEER: The sonic guru, "Captain Kirk Kelsey"
CONSOLE AND LOUDSPEAKER SYSTEM: House gear or rent
RACK: *Craig Martin* — Juice Goose, Yamaha SPX 90II, ART Proverb, DOD 15-band EQ, Rocktron Hush II CX; *Randy LaPierre* — BBE Sonic Maximizer, Dean Markley RM40 (bass head); *Ira Saltzman* — Ensoniq SQR, Roland D-550, Kurzweil 1000PX, Akai S1000, Frontera S1000, Furman power conditioner, Roland M120 line mixer, Gambetta MIDI Star Wireless; *Eli Facuseh* — E-mu Procussion, Mackie 16-channel rack mixer, Alesis DataDisk
CABINETS: *Craig Martin* — Marshall 30th Anniversary 4x12 slant; *Randy LaPierre* — Ampeg 4x10, Electro-Voice 2x15
GUITARS: *Craig Martin* — Washburn BU-3 guitars [2], Washburn SBF-80 acoustic/electric cherryburst; Seymour Duncan Full Schred pickups; *Randy LaPierre* — Ovation Celebrity Deluxe acoustic bass, Spector Bass, Yamaha RBX 800 Bass, Electra Fretless Bass; Alembic pick ups
KEYBOARDS: Roland A-50; Korg T2; Lync LN1000 controller remote keyboard; Electro-Voice 15" wedge keyboard monitor
ELECTRONIC PADS: 4 Kat 11" Drum Pads; 1 Kat 10" two zone pad; 2 Kat Kickat; Midi Kiti
CYMBALS: All Sabian — sizzle hats; 18" medium crash; 21" rock ride; 20" and 22" chinas; 8", 10", 12", 13" splashes
PEDALS: *Craig Martin/Guitarist* — Dunlop Cry Baby; Boss Rocker distortion; ADA MIDI channel switcher
MICROPHONES: Nady 201 wireless
BEST LIVE EXPERIENCE: Playing in front of 20,000 people opening for Firehouse at the Bayfront Amphitheatre in Miami on New Year's Eve with the crowd singing along to our songs! The rush of having that many people scream and yell their guts out for *you* can't be beat.
WORST LIVE EXPERIENCE: Being billed as "*Parkay*, with all the original members." We played, got fired, then rehired, all in the same night. The club owner kept yelling for us to play something he knew. Everything was wrong, from the club to the billing to the routing. We fired our agent immediately.
TOUR TECH TIPS: Always clean your guitars immediately after use, especially the neck. You can get two nights out of the strings! Never let an inexperienced crew set up electronic drums. In order to determine how many drumsticks to take on the road, multiply the number of sticks broken or lost per gig by the number of gigs on tour, then add a dozen!

World Radio History

IN A BAND VAN

NEW GEAR FOR YOUR NEXT GIG

ACOUSTIC ALCHEMY

The Acoustic Performer-8 is the latest addition to the Fishman line. It's a compact 2 1/2-channel speaker/amplifier (the "1/2" channel allows for a third input with less audio control than the two full channels) designed to combine the sound quality of a studio monitor with the sound volume and durability required for musical instrument amplification. While designed specifically for sound reinforcement of acoustic guitars, the Acoustic Performer-8 can also be used for piano or vocals. Incorporated into the unit is a high power MOSFET amplifier equipped with an 8-inch polypropylene cone driver and a 1-inch fabric dome tweeter. Digital reverb is included and may be assigned to either the transducer or microphone channel or both. There is even a notch filter to help control feedback. For complete details, contact Fishman Transducers, Inc., 340-D Fordham Rd., Wilmington, MA 01887. Tel: 508-988-9199. Circle EQ free lit. #133.

Fishman Acoustic Performer

PRESENTING THE LATEST IN SOUND REINFORCEMENT EQUIPMENT SO YOU CAN BRING OUT THE BEST IN YOUR BAND

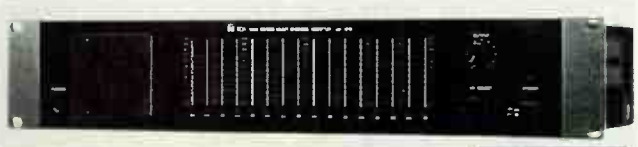
QUEST FOR POWER

Stewart Electronics is offering a family of three high-power PA amplifiers. The PA-1000 produces an honest, full-bandwidth 200 watts per channel into 8 ohms. It is also stable and happy into 2 ohms producing 500 watts per channel and it occupies just a single rack space. Stewart's "Switch Mode Power Supply" allows the amp to provide such high output in a small, lightweight and compact unit, weighing 11 pounds. The PA-1400 is rated at 300 watts per channel into 8 ohms, 500 watts per into 4 ohms and 700 watts a channel into 2 ohms. It occupies two rack spaces and weighs just 16 pounds. The PA-1800 is rated at 400 watts per channel into 8 ohms, 650 watts a side into 4 ohms and 900 watts per channel into 2 ohms. Into 4 ohms bridged it'll do 1800 watts. It also occupies two rack spaces and weighs in at 17 pounds. The three amps retail for about $1100, $1400, and $1700, respectively, and all carry a five-year warranty. For complete details, contact Stewart Electronics, 11460 Sunrise Gold Circle, Suite B, Rancho Cordova, CA. 95742. Tel: 916-635-3011. Circle EQ free lit. #134.

Stewart PA-1000, PA-1400, and PA-1800

ON THE LEVEL

New from TOA is the MP-1216, a multi-channel monitor panel that monitors up to 16 channels. It works with any combination of loudspeaker and line-level audio circuits. For visual monitoring, the MP-1216's front panel is equipped with a 12-segment LED display for each input. Each LED display is calibrated for 0.3 to 300 watts for 8 ohm loudspeaker circuits, and -30 dB to + 6 dB (ref. 0.775V) for line-level signals. Individual output channels can be aurally monitored by using the unit's internal speaker or headphone jack. The transformer is isolated and bridging inputs at the rear of the unit are equipped with screw terminals to provide permanent connections. The MP-1216 occupies two rack spaces and can be daisy chained to another MP-1216 for 32 channels. Retail price is $1398 and it comes with a three-year warranty. For more information, contact TOA Electronics, 601 Gateway Blvd., South San Francisco, CA. 94080. Tel: 415-588-2538. Circle EQ free lit. #135.


TOA MP-1216

INTELLIGENCE AND INTUITION

Behringer's new Autocom MDX1000 compressor/limiter features intelligent program detection with the

World Radio History

Behringer Autocom MDX1000

Auto switch deriving attack and release times automatically from the respective program material. The result is musically intuitive dynamics control with no pumping or breathing regardless of the amount of compression. The Autocom also features manual attack and release controls, hard and soft knee switching, balanced inputs and outputs, and stereo and dual-mono operation. It has a $329.99 retail price. For complete details, contact Samson Technologies, P.O. Box 9068, Hicksville, NY 11802-9068. Tel: 516-932-3810. Circle EQ free lit. #136.

Power Machine

Carver's new additions to its series of PM (Professional Musician) power amps have been designed from the ground up as all new models — they are not upgrades or overhauled old models. The PM-420 is suited for musical instrument amplification, project studio monitoring, and club applications. It puts out 200 watts per channel into 4 ohms. Comprehensive protection circuits include DC fault, thermal overrun, output short, and SOA current limiting into abnormal loads. Loudspeakers connected to the PM-420 are protected by a clipping eliminator circuit and output muting relays for on/off transient suppression. A front-panel resettable circuit breaker is provided, and a new power supply design allows unimpeded operation on any line current between 95 and 130 volts. Two sets of balanced 1/4-inch TRS rear panel connectors are provided to facilitate loop-through connection of multiple amplifiers. The rear panel also offers dual 11-detent level controls, mode switch (for normal, bridged mono or dual mono), and 5-way speaker binding posts. Retail price is $658. For more information contact, Carver, P.O. Box 1237, 20121 48th Avenue W., Lynnwood, WA 98046. Tel: 206-775-1202. Circle EQ free lit. #137.

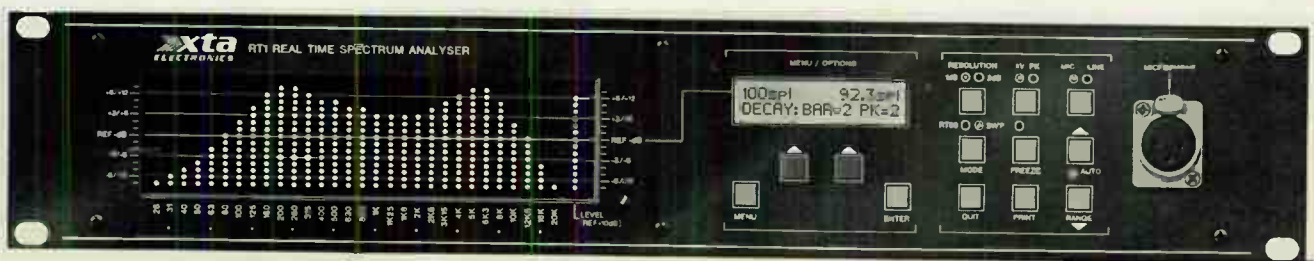
Carver PM-420

Get Into Analysis

XTA Electronics is offering the RT1 Real Time Analysis System. The RT1 combines 1/3-octave analysis, a true SPL meter, RT60 analysis, and a Swept frequency analyzer in a 2U rackmount housing. The RT1 features simultaneous bar and peak displays with separately adjustable time constants and a completely independent SPL meter display. The bright LED display provides comparative readings between two memories or between a real-time measurement and memory, a useful application for working to a house-curve reference, or any predetermined response curve. The swept analysis measurements use 1/12 octave tracking filters above 63 Hz. The time/level mode displays historical information on peak levels with an adjustable viewing window of 62.5 milliseconds to 256 seconds per column, providing over two hours of information on the LED display. Other features include A-weighting, rear-panel mic input, manual or auto range control, and sine wave output. For more information, contact Group One. 80 Sea Lane, Farmingdale, NY 11735. Tel: 516-249-1399. Circle EQ free lit. #TK.

In The Clear

Samson Technologies has introduced its flagship model wireless microphone system — the UHF Synth Series. This multichannel system features an RF level display on the front panel, so you can select the clearest frequency available in crowded wireless environments. Even in the



XTA Electronics RT1

World Radio History

uncrowded UHF band, the Synth Series offers 74 available frequencies in both the receiver and transmitter — with 11 available for simultaneous use. Samson's new circuitry and dbx noise reduction assure clear, transparent sound. The Synth Series is available in single and dual receiver true diversity formats (both in single-rack-mount housings). For further information, contact Samson Technologies. P.O Box 9068, Hicksville, NY 11802-9068. Tel: 516-932-3810. Circle EQ free lit. #138.

Keep On Jammin'

JamMan from Lexicon is a brand new product that offers a uniquely musical approach to creating echoes, samples, or loops. In the Echo mode, JamMan lets you set the tempo simply by tapping, rather than having to set a delay time. In addition, you can cut the delay time in half, thirds (triplets), or quarters. In the Sampling mode, you can either trigger the sample record or playback via front-panel tap, footswitch tap, or via input level audio trigger. In the Loop mode, the device lets you create infinite repeat loops that can provide rhythmic backups. You can layer on top of your loops with as much information as you like, and you can play over the top of them. As with the echo function, you set the tempo by tapping. If you are working with a device that uses MIDI tempo, JamMan can sync up to it. You can either slave to the MIDI tempo, or have JamMan calculate the tempo and the MIDI device will slave to it. JamMan provides eight seconds of memory, expandable to 32 seconds. To jam, man, contact, Lexicon, 100 Beaver Street, Waltham, MA 02154-8425. Tel: 617-736-0300. Circle EQ free lit. #139.

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Studio Software Report

Macintosh Digital Audio—Is it Still the Best?

Sample playback synthesizers and digital recording make audio editing software more important than ever. Does the Mac still make it?

By Tim Tully

FOR YEARS, the Macintosh and its creative third party software has been the king of the digital sound editing hill; but the landscape has undergone some recent changes. Sample-playing MIDI instruments boast better user interfaces and overall design, a glut of audio editors for the PC has emerged; and Alchemy—the venerable Macintosh sample editor—has been taken out of production. Do the Mac and its digital audio applications still sit at the top of this heap? Let's take a look.

The Basics

Digital audio editing software typically takes one of two basic forms. The first category contains software optimized to function as a digital multitrack recorder. These programs let you record, edit and play back performances, and have user interfaces modeled typically after a multitrack tape deck and mixing board. The second group is optimized for editing shorter sounds: principally, sounds destined to reside in a sampler.

Both kinds of programs load sampled sound from computer storage or from a sampler, and may (with the right hardware) be able to record sound themselves. They typically display a graphic representation of the sound's waveform, and can play the sound back. They both let you alter various parameters of a sound that may include volume, pitch, duration, and timbre, and allow you to cut, copy, paste, and mix sections of the sound.

The two groups differ in that sampler-oriented editors may have a function that maps samples to ranges and/or layers of a sampler's keyboard; lets the user upload the sound to the sampler, and load sounds for editing and playback into the computer's RAM. Recording-oriented software will usually play a sound from—and record it to—the computer's hard disk, and offer some form of non-destructive editing.

RAM-based methods make editing faster and use sound files on disk as backups against mistakes. Their shortcoming is that the size of the sound you can load depends directly on the amount of memory (RAM) in the computer—typically only a few megabytes. Disk-based methods let you work with longer sounds (up to the capacity of the disk), and use the hard disk's random access capability to allow you to create playlists. This "non-destructive editing" lets you define various sections of the audio to play in any order,

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Editorial

By Tim Tully

My pal Grumpmeier was complaining, as usual, at a local watering hole, throwing down one odd-looking concoction after another. "What's that?" I asked, after his fourth.

"Phil Spector," he mumbled between gulps. "Four parts Dewar's White Label, one part Johnny Walker Black, heavy cream, corn syrup, and chicken fat."

"Which reminds me."

"Uh-oh," I thought.

"What's this marketing fad about naming products after famous people? I mean, put the inventor's name on something, sure: Dolby, Neve, Moog, Juice Goose. But why name gear after somebody who's got nothing to do with it? Is it gonna make me play like the guy?

"What, can you only record classical music on a Mozart? Does a Hendrix make your guitar tracks flashy, and play 'em backwards? And wouldn't something produced on an Einstein be above the heads of most people, and sound different depending on where you sit?" He was turning apoplectic.

"And what about this film-editing system: Hitchcock? You got to put a few frames of yourself in every cut?"

Mercifully, Grumpmeier passed out. As I peeled the napkin he'd fallen onto from his cheek, I saw it was covered with scribbling. After wiping off the chicken fat, I realized the public deserved to know what it may be shopping for soon...

- *Clinton*—Dynamics processor with excellent initial response, followed by gradual and perhaps inexorable decay characteristic.
- *Perot*—Rabble-noise stimulator with advanced data simplification algorithm, attractive but misleading displays, and really wide stereo spread.
- *Dole*—High-impedance transfer network with strong attack characteristic. Removes all positive-going slopes and amplifies negative-going ones.
- *Quayle Box*—Tool for wealthy producers: simplistic, easy-to-use front end containing many knobs and lights, connected to absolutely nothing.
- *Tipper*—Content detector that labels tracks containing slimy, disgusting, putrid, obscene, and otherwise offensive material, to make sure kids listen to them first.
- *Fagen*—Unique delay line with resolution well into imaginary numbers. Minimum setting of eleven years.
- *Vangogh*—Stereo-to-mono convertor. Crude but effective. Direct interface with a Perot (above) not recommended.
- *Bojackson*—Multimedia automation system that does everything, and knows everything.
- *Marceau*—Highly effective noise reduction system.
- *Limbaugh*—White noise generator, with single (right-channel) output.
- *Sharpton*—Black burst generator
- *Hoover*—Marketed as a spectral purifier (red noise eliminator), but actually a pink noise generator. Although it isn't one, it has several features of vacuum cleaners. No longer in production.
- *Trump*—A high-gain, vertical amplifi-

EDITORIAL *continued on page 98-11*

EQ ■ October 1993
STUDIO SOFTWARE REPORT
AN EDITORIAL SUPPLEMENT TO EQ, PUBLISHED BY PSN PUBLICATIONS
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EDITOR Tim Tully
ART DIRECTOR Kathy Marty
EDITOR-AT-LARGE Hector La Torre

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regardless of their actual order on the disk. Hard disk programs usually offer destructive editing as well, but this takes longer than RAM editing and requires creating backup files and using twice as much disk space.

Sound Designer II

Digidesign's Sound Designer was the prototype. Originally a sample editor, it has evolved with Digidesign's hardware into the essential digital audio recording software, but still retains many of its sample editing powers. It can record two independent tracks of 16-bit audio at rates up to 48 kHz, and play them back from disk. It has an extremely easy-to-use playlist function and offers very good destructive editing as well.

For recording, SD II offers tape-deck-like mouse controls that are sensibly laid out and make the process quite simple (**Figure 1**). Editing a sound you've recorded in SD II is not only intuitive, but provides you options unheard of in a tape-based system. To locate an area for editing, you can "scrub" a section of the sound—i.e., play it back and forth at slow speeds—to locate editing points precisely.

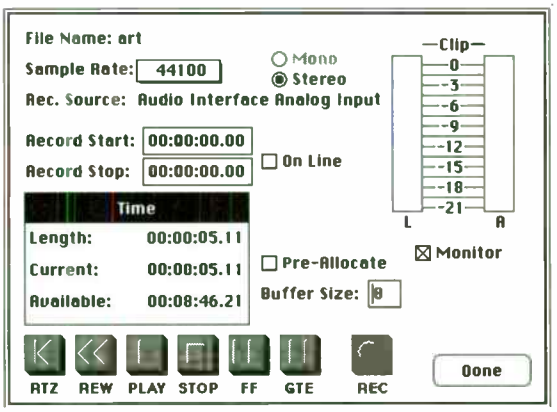


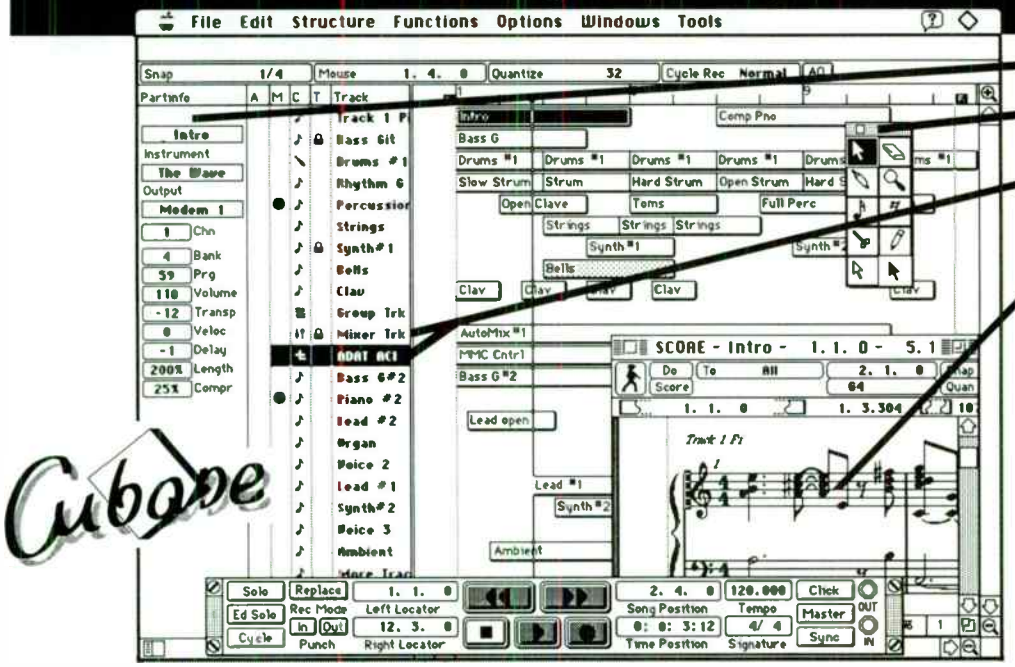
Figure 1: Sound Designer II's recording functions operate in a simple and familiar way.

Once a section is located and selected, non-destructive editing functions let you specify it as a "region" that is automatically added to a playlist. You use the playlist by dragging any number of regions into any position in time. When you start playback, the regions will play back consecutively in the order you specified. SD II also offers six different programmable crossfades you can insert between regions to make transitions even smoother. You can adjust the relative volumes of regions and fine tune their lengths as well (**Figure 2**).

SD II's destructive editing functions are useful for recording, but may be even more valuable when editing sounds for a sampler. There are of course the standard Cut, Copy, Paste and Mix commands that let you move around sections of a sound. More sophisticated editing functions let you reverse any section of a track, turn it to silence, trim heads and tails off a file, invert the waveform, normalize and change gain and do fade ins and fade outs with just a few mouse moves.

Digital Signal Processing (DSP) commands rely on the Motorola 56001 chip on Digidesign's sound cards and, while most of the software's functions can operate without one of these cards, the DSP stuff requires it. Along with mixing

"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.*

Graphics Style Toolbox - Includes 'grab and use' editing tools. Cut with a scissors and erase with an eraser. *Simplicity Equals Speed.*

On-Screen Virtual Mixing - Automate synth levels, pans and sys-ex parameters; transport functions of tape decks like the Alesis ADAT and Foxtex R8; mixing automation using MIDI mixers like Niche ACM or Mackie 1604. *The Command Center.*

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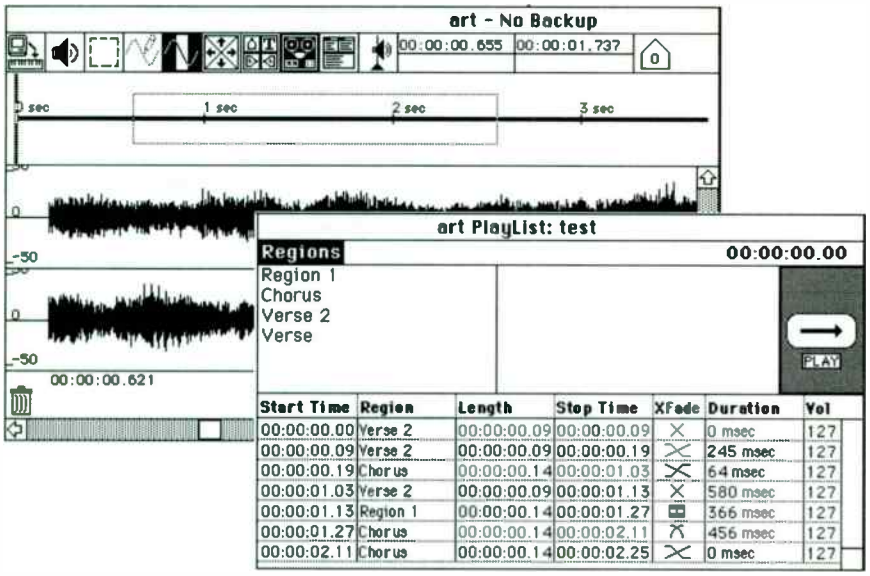

Figure 2: You can do destructive edits in Sound Designer II's Edit window, and also create a non-destructive playlist to reorganize playback.

sounds together, DSP functions let you convert a sound's sample rate, equalize it either graphically or parametrically, do sophisticated compressor/limiter/gating functions and get a Fast Fourier Analysis (FFT) of a sound. You can also compress and expand a sound's duration without changing pitch, and shift its pitch without affecting duration. While these destructive editing functions do give SD II some of the character of a sample editor, much of their benefit is lost because the program no longer supports communication with samplers, and cannot send its sounds directly to such units.

Digidesign also manufactures a series of add-on software modules that you can buy separately and drop into your SD II folder, seamlessly including their functionality in SD II. DINR, an amazing noise reduction system is the first in the series and can seriously reduce hiss, hum and other continuous noise from a file in real time.

Pro Tools

Digidesign's Pro Tools is a professional audio recording and editing system made up of both hardware and software. Additional hardware can expand the basic four-track system up to sixteen tracks, and the system is an extraordinarily capable one.

The Pro Tools software, completely redesigned in version 2.0, is essentially a non-destructive recorder designed for pure audio recording as much as for a/v post production. The program's two main windows—Edit and Mix—give you optimal performance for their respective functions. Edit (**Figure 3**) displays multiple tracks onto which you record or manually place and edit sounds, displayed as waveforms. Pro Tools' non-destructive editing is more direct than SD II's.

Rather than creating a playlist, you select all or part of any number of tracks in the Edit window, then drag the selection (or cut, copy and paste it) to another location. You can even record or import a MIDI track, edit it in a rudimentary fashion, and play it back. The Edit window's region list contains the names of all audio and MIDI regions you create in a session, even those you've

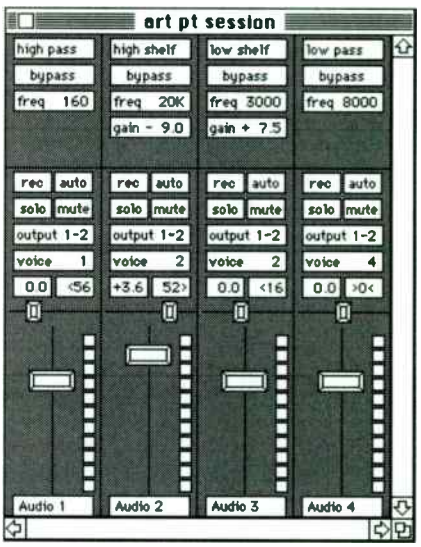

Figure 4: Pro Tools Mix window emulates a mixing board to facilitate the functions of mix-down.

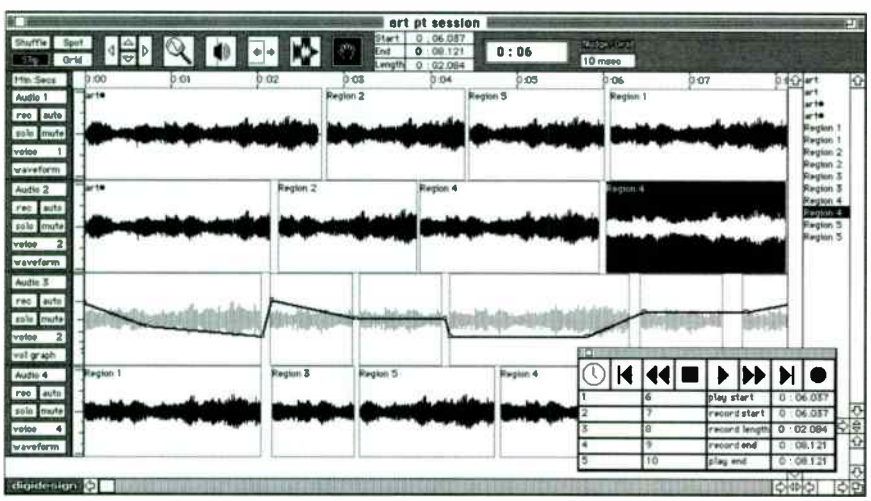

Figure 3: Pro Tools lets you non-destructively drag pieces of sound to any track or time to edit playback order.

deleted. It gives you an excellent visual way of managing your sound files, a task that can get sticky when working with disk-based and virtual audio. The Mix window (**Figure 4**) presents a mixing board-like environment that includes on-screen faders, LED-type meters, and familiar controls for such functions as pan, EQ, solo, mute, record enable and so on. It offers sophisticated, multi-mode digital equalization, flexible automated volume control and two effects sends.

The program can sync to SMPTE, has a spotting mode that automatically moves a selected section to any given SMPTE location, and has an excellent scrub function.

Pro Tools has no destructive editing

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features, but will automatically open any selection in Sound Designer II (sold separately) where you can have your way with it, then reload the edited sound in your Pro Tools session.

Figure 5: Deck 2.0 not only offers comprehensive recording, editing and mixing features, it can also function as an all-digital post production studio for QuickTime movies.

Pro Tools is very impressive software and, perhaps most importantly, offers a real professional level of functionality in an amazingly simple user interface.

Deck

OSC's Deck 2.0 is similar to the Pro Tools software in many ways. Deck uses three main windows—the track, transport and mixer windows—but adds a QuickTime window that gives it a unique extra dimension.

Deck's transport window, in addition to its standard shuttle controls, has six "location time" and six "mixer state" pop-ups that let you quickly auto-locate a session and take "snapshots" of mixer settings you can invoke at any location or time. It sports a loop mode that plays any given section repeatedly, for rehearsal, and has an easy-to-use punch in and out feature. The Track window contains four tracks, displayed as waveforms that can be edited with essentially the same techniques as Pro Tools'. The Mixer window presents meters, pan and level faders, various selector buttons and also offers a useful set of preprogrammed crossfade slopes. It offers a number of methods of pan and level automation, including envelope drawing and real time input from such MIDI controller hardware as the Lexicon MRC or a synthesizer (**Figure 5**).

To help manage large audio files, Deck 2.0 has a Compact Session command that erases any audio recorded in a session that is not used after editing.

While running Deck, you can launch OSC's very capable MIDI sequencer, Metro, and switch between the two applications easily, to develop MIDI tracks that synchronize perfectly with the audio. Deck can also synchronize to any source of SMPTE timecode. It will "trigger sync" in record mode and do continuous resync in playback mode. This

DIGITAL *continued on page 98-15*

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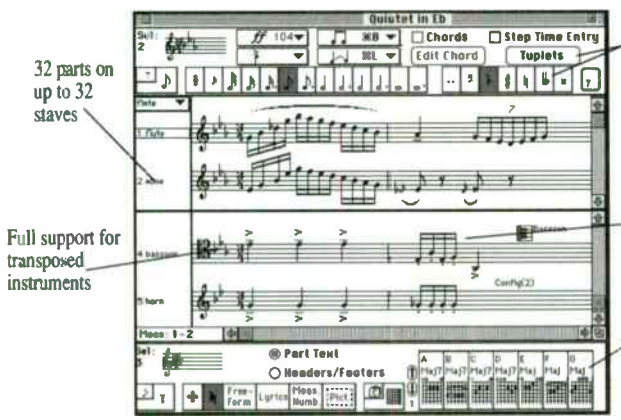

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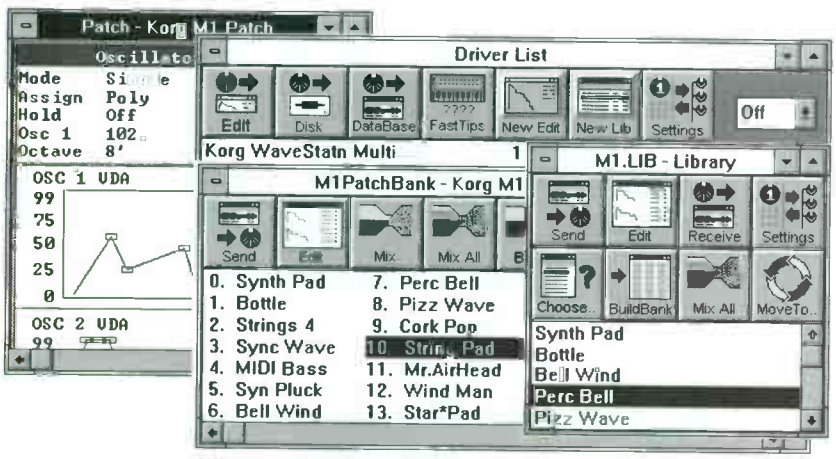
The Secret Life of Walter SMDI" (Shareware, $25)

A new shareware program, *"The Secret Life of Walter SMDI"* (no kidding) loads samples from any MIDI instrument that supports SMDI (currently only the Kurzweil K2000 series and the Peavey SP) into the Mac and saves them as AIFF files. It will also send AIFF files to the sampler. On Macs using Apple's new Sound Manager 3.0, the program auditions AIFF files directly from disk.

Interval Music Systems
310.478.3956



Windows MIDI Quest 4.0

Windows MIDI Quest 4.0 ($319; upgrade from v3.0: $75)

Sound Quest is shipping version 4.0 of its editor/librarian for Windows (price above) as well as DOS, Macintosh, Amiga and Atari ST ($299; upgrade from 3.0, $59). The program supports over 100 of the most popular MIDI devices. It features icon bars, improved graphics editors with automated MIDI channel selection in multi/combi editors and the ability to save data in four file formats. The Windows version includes a fully native Windows graphic implementation including standard fonts, sliders and icons. Sound banks can be exported directly into Cakewalk allowing the user to select patches by name while sequencing.

Sound Quest
604.874.9499

MIDI Max Pak Version 2 ($249.95)

Big Noise Software is shipping five bundled MIDI programs for Windows that perform complementary functions and can all run smoothly and simultaneously. *SeqMax* is designed as a fully professional MIDI sequencer that lets the user compose in either the pattern or linear track mode. It offers full staff notation where all 64 tracks can be viewed, and lets the user add many kinds of music notation, symbols and lyrics. *MixMax* is an automated mixer application whose many controls can send and respond to any MIDI message. It will run the Mackie CR1604 mixer, MOTU's MIDI Mixer 7 and the Fostex DCM100. A General MIDI panel provides 16 sets of controls for volume, pan, portamento time, portamento on/off, reverb and chorus. MixMax will record any moves made on up to 200 of its on-screen faders, pots and buttons. Users can arrange the controls on the screen in any configuration they choose.

TapeMax controls a tape deck or any machine that responds to MIDI Machine Control. It has transport controls, record enable buttons, and eight locate buttons. *JukeMax* will play any number of MIDI sequences in a preprogrammed order for live performances. It will also scroll any lyrics the user has typed into a SeqMax sequence as the song plays, in any available font face or size, to facilitate cross-stage reading. *LibMax* is a universal librarian that is completely user-configurable.

Big Noise Software
904.730.0754

Editors for Galaxy Plus Editors ($49.95 each; $99.95 for all four)

Opcode Systems is shipping four new editors for *Galaxy Plus Editors*, its universal Editor/librarian program for the Mac. The new editors work with the Roland JV-80, JV-880 and R-8M, Lexicon LXP-1 and Korg 01/W, 03R/W, 01/WFD and 01W/Pro family of instruments. Galaxy Plus Editors lets musicians create, edit and save patches for many different MIDI synthesizers and send either single patches or banks of sounds to the instrument at will. In addition to the new editors, Opcode has released librarians for E-mu Vintage Keys, MPS and MPS+Orchestral; Roland JV-30; Yamaha TG500; Korg A4 Guitar and Bass; Rocktron Intellifex, Peavey PC-1600; and Ensoniq DP/4, KS-32 and TS-10. These editors are available for Galaxy Plus Editors and for Galaxy.

Opcode Systems
415.856.3333

Inspire III GG M/O Drive ($4895)

Alphatronix has announced a new magneto/optical drive shipping in limited quantities that is even faster that its previous record-setting M/O drive, the Inspire II. The *Inspire III*, model GG promises to be extremely useful for digital audio applications since it uses new double-density optical disks that hold 650 MB of data per side. The unit writes the outside tracks of a disk more densely than inside tracks to make the drive actually faster on the outside tracks by requiring less travel for the read/write head. The drive has a maximum sustained throughput of 2.2 MB per second, and an average seek time of under 19 ms. In perspective, as late as last year, the fastest optical drives had seek times in the range of 80- 90 ms. The inspire III can read both

World Radio History

650 MB and 1-gigabyte disks previously on the market. All the Inspire products have built-in compatibility with disks written on most of the other drives on the market. The Alphatronix drives are supported by Digidesign for use with their multitrack digital audio systems.

Alphatronix
800.849.2611

Encore 3.0 ($595)

Passport announced major upgrades to both the PC Windows and Macintosh versions of its music notation program, *Encore*, a composing and printing program that transcribes live MIDI input and standard MIDI files and prints publication-quality scores and parts. Version 3.0 offers new menus, a new expression palette that lets users save their own expressions for personalized markings in any font, size or style, and an extensive array of symbols including notes, rests, accidentals, slurs, ties, grace notes, and many more. Encore graphically displays and plays back nested repeat structures, including variable barlines and multiple endings. A score can contain multiple clefs, tempo changes, key and time signatures, and a percussion staff allows the user to notate values on a single line.

The new version lets users automatically notate guitar tablature for up to eight strings in any tuning, so that music entered with a MIDI keyboard will be converted to correct guitar fingering with the correct tablature markings and symbols. There is a new slur function, new dynamics marks, and crescendi and decrescendi marks that control volume in MIDI playback. MIDI controller changes can be inserted in the score, as can text and lyrics. Encore 3.0 supports the EPS file format for exporting scores to applications such as Aldus PageMaker or Microsoft Word, and it supports Apple's MIDI Manager, which allows it to run with other programs.

Passport Designs
415.726.0280

Coactive Connector (PC/Windows: $149; Mac $29; bundled with software: $179)

Coactive Computing has released a family of very low-priced products aimed at allowing small installations to network Macs and PCs. The products are particularly useful for studios who produce multimedia, MIDI music and/or digital audio on one platform and have to deliver it on another. The *Coactive Connector* is packaged as a complete networking solution in a single box and can connect up to 32 personal computers. It offers both a background printing feature and file conversion capabilities. The connector, which can usually be installed by first-time users in about five minutes, connects to the PC's parallel port and the Mac's LocalTalk port (it is self-terminating to simplify connections). The Macintosh connector supports LocalTalk protocol and the use of any existing telephone wiring that is used in such networks as Farallon's PhoneNet. The Coactive network only requires 65 K of the computer's RAM, since most of the networking functions are processed by the connector's 32-bit microprocessor. The Coactive Connector was designed to support a range of computers from the most basic 8088/XT PC up to the latest Macs and Windows-based PCs. The connector is sold as a PC-to-PC system, a Mac-to-Mac system and a Mac/PC system that includes the appropriate products for connecting the different platforms.

Coactive Computing
415.802.1080

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Sound Forge is the full featured sound editor you've been waiting for. Since it's hard disk based, the size of your sound files aren't limited by the amount of memory in your computer, and Sound Forge supports sample rates from 2k to 60k, mono, stereo, 8 and 16-bit audio data. With Sound Forge's intuitive interface you will quickly master the art of digitized sound editing.

MULTIPLE WINDOW EDITING: Have as many as 40 edit windows with as little as 2 Meg of memory.

EDITING: Includes cut, copy, paste, mix, crop, crossfade, zoom, and undo.

EFFECTS: DC Offset, Echo, Pre-Echo, Distortion, Flip, Fade, Pan, Resample, Reverse, Volume, Normalize, Noise Gate, and more.

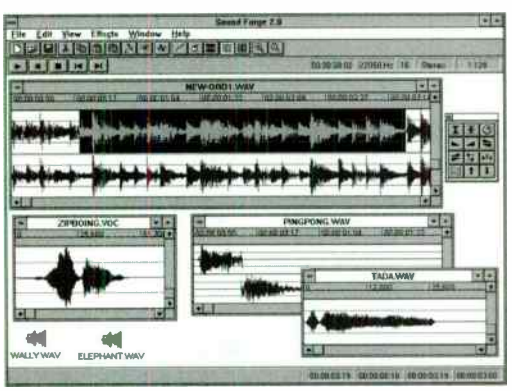
FILE SUPPORT: Microsoft WAV; Creative Labs, VOC, Macintosh AIFF and SND Resources; Amiga SVX, NeXT/Sun audio files, SampleVision; as well as raw data files.

COMPRESSION: Microsoft and Dialogic (VOX) ADPCM for 4:1 compression.

DRAG AND DROP EDITING: Drag sections from one window to another for fast mixing and pasting.

RECORDING: Check input levels and disk space; record to new or existing windows; displays drive space and data length.

PLAYING: Play full window, selected sections and single channels for definitive left/right previewing.



DIGITAL SOUND EDITING SOFTWARE FOR WINDOWS

PLAYBAR: Standard transport controls; displays size, rate, channels, and bits per sample; quickly change rate, convert between mono and stereo, 8 and 16 bit.

STATUS BAR: Displays cursor point, and selection start, end, and length; status values and timeline displayed in Sample Count, Time, SMPTE, Video Frames, or Measures and Beats.

TEXT EMBEDDING: Supports over 30 standard text fields in WAV files including copyright, date, artist, engineer, comments, and keywords.

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SONIC FOUNDRY

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MADISON, WI 53703
TELEPHONE : 608-256-3133
FAX: 608-256-7300

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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 a hold 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	1.0	9/93		Atari ST <		
CUBASE ATARI	3.0.2	9/93		Atari ST <		
CUBASE LITE MAC	1.0	9/93		Mac Plus<		
CUBASE 2.5 MAC	2.5	9/93		Mac Plus/Classic; 2MB RAM;sys 6.07		
CUBASE SCORE MAC	1.0	9/93		Mac Classic; 2MB RAM;sys 6.07		
CUBASE AUDIO MAC	1.2	9/93		Mac IIci ; 5MB RAM;sys 6.07;audio card		

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World Radio History

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 WAVEBCARD 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 MCI player 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	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 Crescent 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 sequencing 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 Howling Dog Systems 613.599.7927	1.1	5/93	$15, free if after 4/15/93	PC/clone, Windows 3.1, mouse, snd card or MIDI interface	Copy/move/delete groups of bars, smart MIDI thru, key transpose	
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	1.44	3/93	>1.3 n/c; <1.3 $29	Mac SE or II with Digidesign card; OMS	Four-channel audio w/ Audiomedia I &II, Sound Tools I & II, and 4- to 16-channel compat. w/ Pro Tools.	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 818.993.4091	1.0	5/93	$495 new	Mac II, LC, SE/30 and Classic I	Time Correction, Compression, Expansion, Pitch Shift and Harmonization 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	

EDITORIAL

continued from page 98-2

er that turns into a limitless downward expander. Companion unit "Ivana" replaced by newer, sleeker "Marla," but not without a fight.

■ *Siskelandebert*—A duo-mode processor: compressor/limiter (thumbs up) and expander/gate (thumbs down).

■ *Billgates*—Ridiculously expensive dynamic processor that exacts a toll on everything passing through it. Not for sale—you may only license it.

■ *Sculley (not the tape recorder guys)*—Expander that seems to greatly exceed specs but displays severe drop-out at end of envelope. Highly sensitive to spilled colas. Recently discontinued.

■ *Schwarzenneger*—Delay line with 100% feedback. Sound gets louder and uglier with each regeneration.

■ *Morrison*—a vocal stimulator, with critical circuitry in an easy-to-pull-down drawer. ■

World Radio History

Hardware Basics, Part 2

By Craig Anderton & Bob Moses

The new machine does have a soul, and the better you know it, the better you'll feel about making music with your high-tech gear.

Last issue, we checked out the microprocessor and some of its silicon friends. But in addition to crunching numbers and logic, the computer has to communicate with the outside world too. That brings us to peripheral ICs that handle its memory and input/output (I/O) functions.

Microprocessors (an Arithmetic Logic Unit [ALU] and a Control Unit) are designed to be generic. No single one could have all the kinds of inputs and outputs required by all the possible applications, so off-chip peripherals implement most special I/O functions. Because there are as many different types of peripherals as there are microprocessor applications, we'll discuss only the particular kinds of peripherals used in typical MIDI hardware.

Analog-to-Digital Converters (ADCs)

These peripherals measure analog voltages that come in from the real world (such as foot pedal position, bend wheel rotation, and so on) and translate the values into digital data that the computer can understand. But controllers are not the only source of voltages we send to a computer. The waveforms of different instruments and sounds—even something as complex as a symphony orchestra—are simply voltages that vary in a complex way over time. As a result, digital recording devices include ADCs to translate music into digits.

Digitizing the position of a potentiometer (a volume control) is one very common ADC application. Once you apply a voltage across a standard potentiometer, turning its knob varies the voltage that the pot puts out. Usually, turning the control fully clockwise produces the maximum voltage, and fully counterclockwise the minimum voltage. In between these two extremes, the pot outputs, or "picks off" different voltages. If these are sent to an ADC, it converts each one into a binary number which it sends to the microprocessor. The microprocessor therefore knows the pot's position by measuring the associated voltage.

Digital-to-Analog Converters (DACs)

The DAC's function is the complement of the ADC's: it converts a digital number into an analog voltage. For example, a synthesizer will digitally generate a waveform that travels through a DAC to become a voltage that's eventually converted to audio by an amp and speakers. The same goes for the data from a CD or other digital audio source.

UARTs

It's often necessary to send data generated by a microprocessor to some other device. For communicating MIDI data, the hardware/software link used is a Universal Asynchronous Receiver/Transmitter (UART).

A UART is basically an overachieving shift register—a device used by a computer to pass data from input to output. Shift registers work by moving data from one shift register to another, one bit at a time. As one shift register shifts data to another, both the source and destination shift registers use a synchronizing clock to know when to look for each bit as it shifts. Therefore, this type of serial interface requires two lines: one for the data, and one for the clock.

The UART however, doesn't need a clock synchronization line, which is why it's called an *asynchronous* receiver-transmitter. To provide synchronization, the receiver and transmitter must agree ahead of time on the rate at which they will send bits. To mark the beginning and end of a block of bits (a byte, for example), the data transmitter adds special bits to the data stream which the receiver decodes to determine when a block of bits starts and ends.

Most communications buses, such as RS-232 (used to tie computers into printers, modems, terminals, mice, etc.) and MIDI, use UARTs. Both ends of the interface know ahead of time how fast to transfer the bits, so once the receiver deciphers a valid block of bits from the encoded stream, it knows when to look for all future ones, thus providing synchronization.

All this adds up to a UART's ability to talk in either direction to another UART at a wide range of speeds, in many data formats, and without need for special synchronization. This ability makes the UART an essential part of any MIDI application.

LCDs

Liquid crystal displays (LCDs) provide our window on the microprocessor's world by carrying messages, displaying data, asking questions, and so on.

LCDs are made from a fluid composed of small crystal rods. Subjecting the fluid to an electric field rotates the crystals so the light does not reflect back, darkening the LCD. Applying the electric field selectively to different parts of the display lets us create letters, numbers, pictures and the elements we need to communicate with the processor.

Timers

A timer peripheral gives the microprocessor the ability to measure time.

World Radio History

Timers are usually based on an independent counter that runs at a given frequency. The microprocessor can read this counter whenever it wants to know what "time" it is. (Of course, this time is usually measured in thousandths or even millionths of a second. A second is eternity to a computer). Some timers provide sophisticated functions that allow the microprocessor to set up alarms, automatically set or reset I/O ports at pre-determined times, and other time-intensive chores.

Timers can also interrupt the microprocessor periodically if a function requires it (just like an alarm clock interrupts our sleep periodically—each morning—to get us out of bed and off to work). MIDI, for example, uses the timer in this way to remind the microprocessor to send MIDI clock messages.

Memory Peripherals

Perhaps the most variable aspect of all microprocessor applications is the amount and types of memory they use. Some applications need lots of RAM, others need lots of ROM. Some need lots of both, others need little of either. For this reason, the internal memory given to a microprocessor is usually pretty minimal. Instead, most of a computer's memory is added as a peripheral external to the processor—such as the RAM chips you can install in your computer to add memory.

Microcontrollers

A microcontroller is a single-chip computer comprised of a microprocessor, memory, I/O, and peripherals. Chip manufacturers offer such units because, despite the diversity of the applications that computer-based circuits perform, the hardware they use is generally very similar. The "microprocessor+UART+memory" combination, for example, is common to both musical instruments and automobile dashboard readouts.

Some people call the microcontroller a "microcomputer," but that's inaccurate.

One Last Byte

It's common knowledge that recording engineers and musicians generally don't take full advantage of their gear, and one of the primary reasons has to be intimi-

BASICS *continued on page 98-15*

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by REEF Digital Sound

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New!

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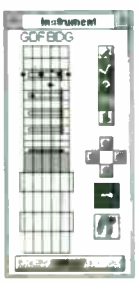
The ultimate in sequencing software.

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.

Create professional quality works faster than ever with Power Chords Pro. Its unique object oriented nature makes music a visual experience. Give your music the human touch with exciting Power Effects. Create up, down or alternating strums, drum rolls, arpeggiations etc. at the touch of a button. Powerful graphic editing of parts means no more MIDI data number crunching. Cut, copy, paste, transpose and re-orchestrate with a few mouse clicks.

The ability to pick and choose from imported parts, and to audition any chord, drum or music part at any time encourages creativity and experimentation. Flexibility and speed are at the heart of Power Chords Pro.

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Funds must be drawn in US dollars.

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upgrade from 1.1:	$ 60.00
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upgrade from 1.0:	$ 15.00
1000 Super Cool Drum Patterns - ready to import:	$ 49.95
Mr. Drumstix' Music Studio:	$ 69.95

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Software Directions

STUDIO SOFTWARE NEWS AND UPDATES

Music, audio and video software continues to come together; New hardware replaces the old and analog fades to digital.

PC Sound Cards are continuing their move toward higher quality. Both **Media Vision** and **Orchid Technology Inc.** are getting ready to release new cards with improved features.

Media Vision's **Pro AudioStudio 16XL** has replaced the Yamaha OPL-2 and -3 chipsets with a chip designed by synth-maker **Korg** that provides a 32-voice, wavetable-based synthesis offering 128 different timbres. The card also offers audio sampling rates up to 48 kHz and a SCSI port for CD-ROM drives. The $499 card also includes voice-recognition software, a text-to-speech synthesizer, rudimentary MIDI sequencer and other software.

Orchid Technology's **SoundWave 32** ($299) will feature DSP functionality developed by **Analog Devices Inc.** that will allow it to emulate various other synth architectures including the Roland MT-32. It also has a CD-ROM interface. **Media Vision:** 800.348. 7116; **Orchid Technology:** 510.683.0300.

The **Multimedia PC** (MPC) specification responsible for the boom in PC-based music and audio devices is about to undergo another enhancement. **MPC level 2** is designed to be backward compatible with level 1 and specifies a minimum of a 25MHz 486, 4MB RAM, 160MB hard drive, a 16-bit sampling schema on its sound card and some serious CD-ROM drive enhancements. The drive is specified to have a sustained 300 KB/sec transfer rate, average seek time of no more than 400 milliseconds and be compatible with the CD-ROM XA standard.

In light of this, and of the now-skyrocketing demand for CD-ROM drives, a number of manufacturers have announced "double-speed" drives that meet the new MPC/s spec. **Sony's CDU-7811** ($679.95) has a 300KB/sec transfer rate and an average access time of 290 ms. **Hitachi** Home Electronics of America Multimedia Systems Division is offering the **CDR-1900S** ($1995) with a 307 KB transfer rate and a 260 ms access time. **Wearnes Technology Corp.** introduced the **CDD-110** ($499) with a 307KB/sec transfer rate and a 380 ms access time. **Sony:** 800.352. 7669; **Wearnes:** 408.456.8838; **Hitachi:** 800.241.6558.

The **Symbolic Sound Corporation** is releasing version 2.0 of the **Kyma** system, an environment for manipulating and combining digital audio signals. Kyma integrates real-time processing of live input, real-time software synthesis, disk-based editing, algorithmic composition and control of MIDI devices in a single graphic environment. The hardware basis of Kyma is **Capybara**, a scalable architecture based on up to nine Motorola 56001 DSP chips. The Kyma software is a visual language that integrates DSP with higher-level compositional operations. Version 2.0 allows the system to work on the PC in Windows, and lets floppy disks be shared between PCs and Macintoshes. Kyma suports AIFF, WAV and IRCAM/Gross files, Opcode's Max, the Lime music notation program and more. **Symbolic Sound Corporation:** 800.972. 6273.

Twelve Tone Systems is escalating the Windows version of the Sequencer Features War that has raged in the Mac world to such great effect. **Cakewalk 2.0 for Windows** adds nearly 50 new features including 16 staves of staff notation, a custom TrueType font, a playlist for those who take their PC up on stage with them, editing durng playback, a 16-fader, 32-knob fader view, loop recording and more. **Twelve Tone Systems:** 617.926.2480.

OSC has announced that its **Deck II v2.1** software will provide all the audio production functions of the current version of **Deck 2.0** for the **Apple Macintosh AV series** computers without requiring any additional sound card. Deck II will offer four-track, CD-quality, direct-to-disk recording and visual waveform editing including a post production environment for **QuickTime** movies (see this issue's feature). The AV series machines, currently represented by the Macintosh **Quadra 840AV** and **Centris 60AV**, are based on the Apple Real Time Architecture (ARTA) that includes an **AT&T DSP3210** chip built onto the motherboard. This chip is designed to give the AV computers the native ability to produce the same kinds of audio functions now offered by the Motorola 56001 DSP chip used as the basis of most currently-available third-party 16-bit Mac NuBus sound cards. **OSC:** 415.826.1121.

The OSC software will also support **Spectral Innovations'** recently announced **NuMedia** ($1195), a Mac NuBus sound card that's also based upon the DSP3210, capable of producing 16-bit stereo audio at sample rates as high as 48 kHz. The NuMedia has both digital and analog stereo inputs and outputs as well as a stereo mic input. Digital I/Os are fiber-optic-based and claim a -96 dB signal-to-noise ratio; the analog I/Os claim a -80 dB s/n. The NuMedia will use Apple's new **Sound Manager 3.0** to

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link it to the Mac system and make its functions available to any application that supports the new Sound Mananger. The card features **Dolby Labs' AC-2** data compression technology that is designed to compress 16-bit stereo digital audio in real time at a ratio of 6 to 1 with no loss of audio quality. In combination with QuickTime's compression of 30-frames-per-second digital video, this technology promises to produce professional-quality audio/video presentations with a great savings in disk space.

The NuMedia card is bundled with **Passport Producer** v 1.2 and claims to support **Adobe Premier**, **GoldDisk Astound** and a to-be-announced version of **Opcode's Studio Vision**. Spectral Innovations: 408.955.0366.

Digidesign has done preliminary testing of some of its products designed for Apple's upcoming **NuBus-based Power PC** (due for release in 1994). This is the machine with which Apple eventually intends to replace the Macintosh. Digidesign sources report they are "extremely pleased with the results." Unofficial reports indicate some software and hardware ran "right out of the box." The testing was done on protoytpe machines. **Digidesign:** 415.688.0600.

Emagic is planning to release **Logic Audio for the Macintosh** in September. The audio version of the MIDI sequencer will have an ordinary list price of $699 and and introductory price of $399 for the Mac version and $499 for an Atari version that includes a MIDI interface with four ports and **Notator**. The program is based on new code written in an object oriented programming language. A PC version is planned for the near future. Emagic intends all cross-platform versions of its applications will be identical and upgrades will be issued simultaneously. **Emagic:** 215.647.3930.

Digital Performer 1.4 now includes all the features of **Performer 4.2**. This includes tempos to 100ths of a beat per minute and a host of maintenance fixes and cleanups. The new MIDI/audio amalgam is fully compatible with the Mac screen saver **After Dark** and all versions of the **Mac Powerbook**. A completely revised continuous sync feature has a very accurate lock and improved sound. In a departure from earlier versions of the program, the MIDI stream now slaves to the audio, and not the other way around. The previous arrangement limited the resolution of the sync to that of MIDI playback, which has certain limitations. The company also reported that **Composer's Mosaic 1.3**, now has custom key bindings, scalable notes, space insert, remove measure, enhanced selection techniques, MIDI click and more. New **Unisyn** profiles are available for the JV-80 and JV 880, Alesis D4 and Ensoniq DP/4. **Mark of the Unicorn:** 617 576-2760.

Applied Research & Technology (ART) is developing a disk based recorder that will operate like a regular multitrack tape deck. Like ART's user friendly effects units, the recorder will be designed for musicians, rather than computer experts. The base system will record eight tracks, expandable to at least 64 tracks. A user will be able to add a computer keyboard, mouse and monitor to turn the unit into a true workstation. Release is planned for early 1994 and the unit will be priced to compete with tape-based systems. **ART:** 716 436-2720.

Reef Digital Sound offers low-priced computer bundles designed as ready-to-go MIDI systems. The lowest-priced system ($699) includes Cakewalk (DOS) 4.0, a PC XT (286) Turbo clone with 1MB RAM, 12-inch b/w monitor, and MPU-401-compatible iterface. A $1999 system includes a 386 with 4MB RAM, 80MB hard disk, VGA monitor, Cakewalk Pro for Windows, Music Quest SMPTE sync MIDI interface and accessories. **Reef Digital Sound:** 805.

DIGITAL AUDIO

continued from page 98-5

feature makes Deck a very capable post production tool. For other situations, the well-written manual offers a number of good-to-excellent methods to sync to tape. (Continuous resync in record mode is available via various hardware.)

Perhaps Deck's most obvious edge is its native ability to function as a post production environment for QuickTime, the Macintosh digital video application.

You can import any QuickTime movie into Deck's fourth window and it will play in perfect sync with your Deck audio and Metro MIDI sequence. You can play the movie's source audio as one or two standard Deck tracks or, to conserve production tracks, via the Mac speaker for reference. While the software is not playing, clicking on any point in an audio track will immediately move the movie to that location. If your hard disk can handle the data, this gives you the ability to develop complete soundtracks for video on the Mac alone and makes Deck 2.0 a very powerful post production and multimedia application.

While Deck is primarily a hard disk recording program, it does offer some destructive signal processing features that give it a rudimentary utility as a sample editor. Its normalize, reverse and invert functions don't make Deck a genuine sample editor, but do expand its abilities in that direction.

That wraps up the basic digital recording software. Next issue, we'll cover such highly specialized applications as Time Bandit and Infinity, audio editors designed for sample editing and sound design as well as some applications that integrate digital audio with MIDI. ■

BASICS

continued from page 98-13

dation. Computer-based gear has a "black box" aura of mystery about it that can put musicians off. Particularly since computers can crash, they're feared as well as misunderstood. But knowledge is power, and once you understand concepts like the UART sending data down a MIDI cable to a microprocessor that interprets it, computer-based equipment starts to make a little more sense. ■

This article is adapted from the upcoming book, Digital Projects for Musicians. *Craig Anderton caresses words as* EQ's *West Coast Editor; Bob Moses (Senior Digital Audio Engineer, RANE Corporation) teaches microprocessors how to lead useful, productive lives.*

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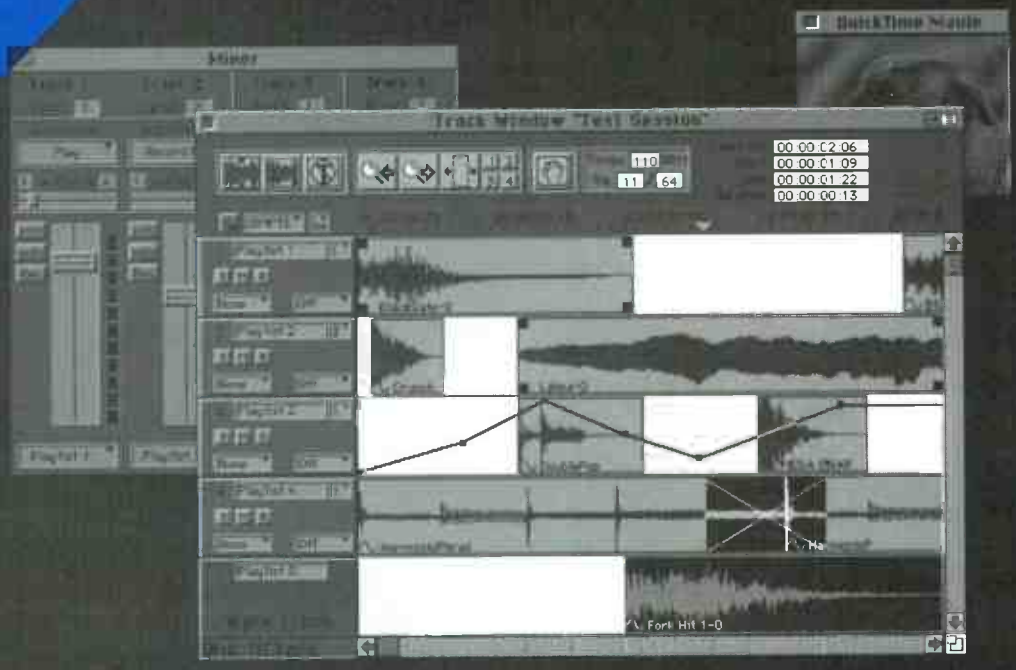

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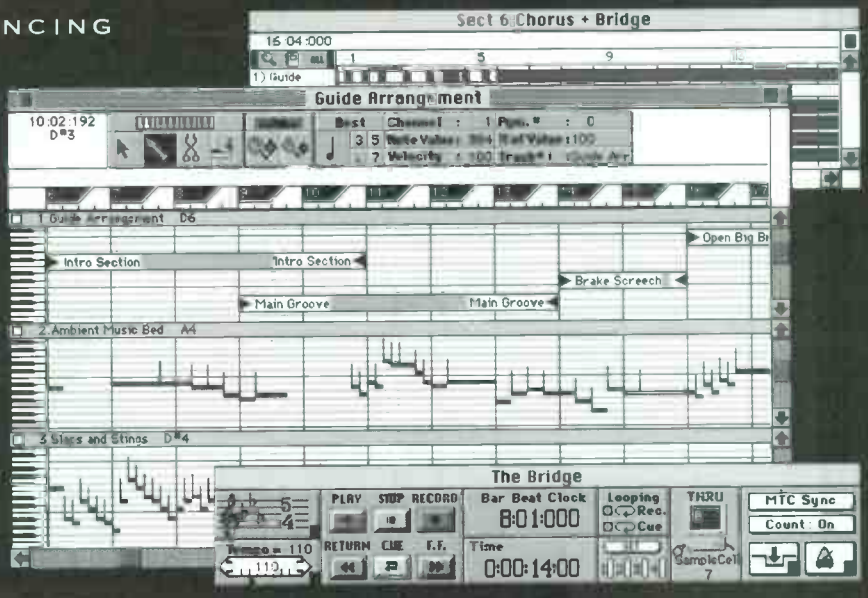

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BAG END ELF-1 INTEGRATOR

■SUBBASS FROM small loudspeakers? Tight-sounding subbass from small loudspeakers? Undistorted subbass from small loudspeakers? The answer to these questions has always been "No, not likely." Many compact loudspeakers do produce bass and even subbass, but always at a cost. Punchy, tight-sounding, undistorted subbass was always produced by very massive and very large loudspeakers. Now, we have Bag End Loudspeaker Systems saying it can produce better results from a small, relatively light loudspeaker using its new ELF-1 integrator. Is it finally possible?

The ELF-1 can produce a flat frequency response down to below 20 Hz in subwoofers of nearly any size. The unassuming look of the unit makes it even harder to believe the ELF will produce such awesome results, *but it does!* The basic idea behind the ELF process seems so obvious and yet it's completely at odds with conventional approaches to creating subbass.

Conventional subbass loudspeakers operate down to their frequency of resonance and then their output rapidly rolls off. The ELF-1 asks the loudspeaker to operate below its resonant frequency.

Because all but the most heavily damped devices tend to ring near their resonant frequency, coloring the sound noticeably, it is typical practice in the design of transducers to tune them to resonate outside of their operating band, as is the case in many midrange or high-frequency drivers and omnidirectional microphone capsules. Ron Wickersham and Ed Long, well-known innovators in the pro-audio industry, have patented a design that allows subwoofer systems to be tuned above their operating band. This has been named ELF, Extended Low Frequency. The result is a processor that allows loudspeakers in even very small cabinets to achieve a flat frequency response down to 8 Hz.

The basic approach is quite simple: build an integrator circuit that rolls off at 12 dB per octave above 8 Hz. A loudspeaker in an infinite-baffle enclosure (a sealed box) will have a flat response down to the resonant frequency of the system (driver and box combination). Below the resonant frequency, the loudspeaker's response will drop at a rate of 12 dB per octave. The ELF integrator response inversely matches this roll off. Put the two together and you have an amazingly flat response from 10 Hz to whatever frequency the loudspeaker/cabinet is tuned to, and above that frequency the roll off is 12 dB per octave (because the loudspeaker's natural response has become flat). This is so simple that you wish you had thought of it first, right?

The first thought any seasoned audio person

ROAD TEST

MANUFACTURER: Bag End Loudspeaker Systems, P.O. Box 488, Barrington, IL 60011. Tel: 708-382-4550.

APPLICATIONS: Audio applications where sound quality and cabinet size are the primary concerns in adding subbass loudspeaker systems.

SUMMARY: A very high-quality subbass crossover that uses an innovative idea in achieving subbass.

STRENGTHS: A laboratory-grade device capable of producing exceptional low-frequency output from subbass loudspeakers of nearly any size.

WEAKNESSES: Requires subwoofers in an infinite baffle enclosure that are optimized for long excursions.

PRICE: $2460 **EQ FREE LIT. #:** 142

BY WADE MCGREGOR

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Photo: Harrison Funk

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IN A BAND LAN

thinks is, "Yeah, but how long before the loudspeaker launches its cone into the room?" Well, the answer *should* be, "Until the first kick drum beat," but the ELF-1 also has protection circuitry, called ELF Concealment, that is set to the maximum excursion that the loudspeaker can handle over the long term. The concealment process merely reduces the level at the extreme low frequencies to this excursion limit.

The major difference between this approach and conventional high-pass filtering is that the ELF can do this dynamically, without affecting the rest of the frequency band and while still producing the absolute maximum output the loudspeaker is capable of at the lowest frequencies. This approach works very well and it is difficult to hear the ELF Concealment operating.

Although it may seem that the ELF-1 is designed specifically for sound reinforcement applications, it is just as suitable for recording studios, film dubbing, theaters, and home entertainment systems. The trade-off in using an ELF integrator instead of a conventional subwoofer system is that if you want more SPL, you need more loudspeakers — and any loudspeaker using the ELF will require a substantial amplifier. These are common requirements of subbass systems, anyway. It's just that with the ELF, the size of the box doesn't affect its low-frequency limit.

The ELF-1 integrator is a single rack-unit (1.75 inches high) device with a series of small switches on the front panel for setup and large, bright LED indicators for power-on/signal levels (these green LEDs are dimly lit, but increase in brightness with audio level), high-frequency output limiting (amber), and ELF Concealment (red). With the security cover in place the set-up switches are hidden from view, but the indicators remain visible, even at a considerable distance. The switches cover a wide range of system applications and capabilities, allowing the ELF-1 to fit into a range of loudspeaker systems produced by Bag End, and conceivably into other loudspeaker systems as well. ELF-1 integrators have been out on tour with Jimmy Buffet as part of the sound system provided by Sound Image, who use it with its proprietary Phase Loc Series 5 subwoofers.

The rear panel of the ELF-1 has conveniently printed instructions for interfacing the unit with both balanced and unbalanced audio equipment. All audio connectors are electronically balanced XLR-type, and an IEC-type power connector allows the unit to be removed from the rack for servicing without disturbing the wire harness. The 0.5 amp AC power fuse is also mounted on the rear panel. The ELF-1 is solidly constructed and should be capable of taking the abuse of life on-the-road.

The ELF-1 can easily fit into an existing loudspeaker system. For a passive-

THE BASIC IDEA BEHIND THE ELF PROCESS SEEMS SO OBVIOUS AND YET IT'S COMPLETELY AT ODDS WITH CONVENTIONAL APPROACHES TO CREATING SUBBASS.

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Hard Disk Recording Tips

by Digital Audio Labs

"I use The EdDitor™ whenever I need to assemble life-like sound effects."

"On one project a client needed a street scene with a little boy selling newspapers on the corner. We used an existing street noise sample, looped it a few times, and then mixed in some siren samples, a couple more automobile samples, and a very low volume subway sample. We had one sample left to mix in and that was the paperboy. So we brought in a 10-year-old brother of one of the clients to do the voice. We recorded the voice slightly off to the left in the stereo mix for all of the vocal part, except for when the paperboy offered a paper to someone walking down the street. For the last vocal part of the paperboy we recorded his voice almost extreme left (about 8 o'clock on the pan pot) as if he turned his head to the right (our angle of view as straight on facing the paperboy and on the opposite side of the street). The hardest part was trying to find the proper volume for the voice. But with The EdDitor's non-destructive editing, it only took seconds to undo the last mix, and try again at a different level. Soon we found the right level, and the result was very life-like. It sounded great!"

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crossover full-range loudspeaker system, simply add a power amplifier and low-frequency loudspeakers in an infinite-baffle type of enclosure (check with Bag End on the specific properties required in the subwoofers). The comprehensive functions of the front panel of the ELF-1 can provide protection limiting, stereo or mono operation of either system, and the low-frequency limit for both the subwoofer and the full-range loudspeaker. The switches control each output independently. Dual-channel or summed-mono operation can be selected for each set of outputs. The 12 dB/octave high-pass filtering of the HF output (to feed the full-range loudspeakers) is selectable between 50 Hz and 205 Hz in 5 Hz steps. Gain structure and limiting thresholds can be accurately adjusted with a series of switches that can fine tune the levels within 0.5 dB and provide output levels of +4 dBv or -6 dBv nominal. Polarity switches are also provided for each channel of both ELF and HF outputs, as well as mute switches to ease troubleshooting the system. There are also switches marked ELF Contour that allow the very low frequencies to be contoured to compensate for the response of subwoofer arrays in sound reinforcement systems.

The switches are very well thoughtout, allowing the ELF-1 to interface with a wide range of audio systems accurately and repeatedly. A chart for documentation of switch positions is provided in the manual to allow an ELF-1 to be used in different applications without having to test each one after the initial set up. Simply reset the switches as documented, and the system should be exactly as it was the last time this configuration was required. The switching all occurs in the audio side-chain, so it can be done while the system is operating without its causing awful noises.

The results produced by the ELF-1 are potentially earth-shattering (literally, if anyone ever puts together enough drivers and really turns them up), and so useful that every audio system from the smallest project studio to the largest sound reinforcement system could benefit from the device. The construction and audio performance of the unit are excellent and the range of control over both the ELF output and the HF output is comprehensive enough to handle all but the most bizarre sound systems. Bag End has obviously optimized its own subbass drivers to handle the excursion and power-handling requirements of the ELF, but the unit's design is such that it can handle a wide range of loudspeaker and amplifier combinations.

I don't know how I will be able to live without the ELF-1 and those great-sounding little subwoofers (S18E-C) from Bag End. My studio monitors are flat down to 40 Hz, but now that I've heard them with another two octaves added on below, they sound thin without it. The late Richard Heyser referred to this as an effect of the Catastrophe Theory, and sending the ELF-1 back is definitely going to be a catastrophe!

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CIRCLE 62 ON FREE INFO CARD

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ART FXR Elite Signal Processor

EQ LAB REPORT

MANUFACTURER: ART, 215 Tremont St., Rochester, NY 14608. Tel: 716-436-2720.

APPLICATION: Low-priced time-based signal processing for project and home studios.

SUMMARY: Although the price necessitates some compromises, the FXR Elite is an overachiever that offers some novel features.

STRENGTHS: Relatively simple operation. Low cost. Discrete stereo effects with some presets. Sound quality and versatility better than expected for the price.

WEAKNESSES: Glitches when switching presets. Limited, albeit effective, editing options. No "direct dialing" for preset numbers.

PRICE: $299 **EQ FREE LIT. #:** 143

SIGNAL PROCESSING has become so sophisticated and cost-effective that it takes a lot to turn the jaded heads of musicians and project studio owners. The FXR Elite seems like a fairly standard processor until you look at the price, $299, which is definitely not standard. How much can one reasonably expect from a budget signal processor? Perhaps more significantly, what kind of corners have to be cut to reach that price point? Let's patch it in and see what happens.

FACTS AND SPECS

The FXR Elite offers 255 semiprogrammable presets, organized as fifteen banks of 16 presets and one bank of 15 presets. Different banks have different effects algorithms, ranging from reverb banks to banks with completely different effects for each stereo channel — you can actually process two instruments simultaneously, such as vocals through reverb in one channel, and guitar through chorus/delay in the other. All algorithms are based on some combination of reverb, flange/chorus, delay, gated reverb, and/or panner.

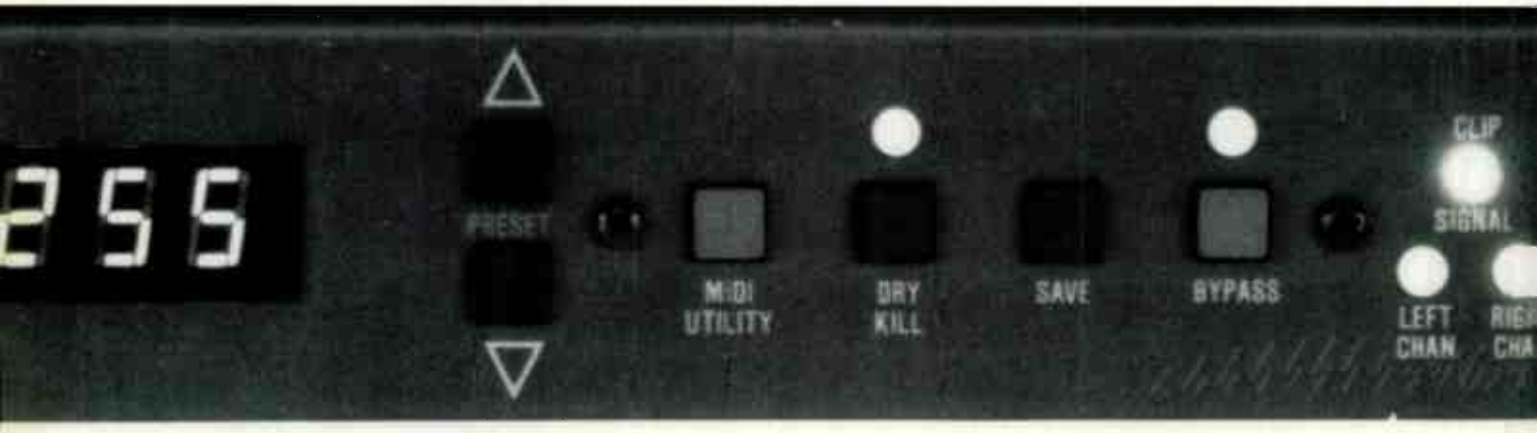
ART takes a middle road between full-blown programmability and preset-only operation by providing two programmable parameters (A and B) for most presets. These are controllable via front panel knobs and/or MIDI continuous controller commands; there's also a dedicated mix (balance) control knob. For reverb, the variable parameters are reverb level and high-frequency decay rate. Delay offers delay time and regeneration; flange/chorus provides sweep and regeneration; and so on. Multiple effects have two selected parameters.

The "dry kill" parameter, storable with each preset, determines whether or not the output signal contains any of the dry signal. A "global dry kill" option is not a code name for some James Bond operation, but instead turns off the dry signal for all presets so that you don't have to program each one individually. This is extremely helpful for situations where the FXR sits in an effects aux send/return loop, since you generally don't want a straight signal. Bypass is also available if you want to eliminate the processed sound.

With some of the more complex algorithms the lack of parameter control can be a bit limiting, but with simpler presets, two parameters and mix is pretty much what you need. Furthermore, you can save any edits you make, which are retained in battery-backed RAM. All memory contents can be saved and loaded as system exclusive data.

IN YOUR (INTER)FACE

Regarding interfacing, there are unbalanced line-in and -out 1/4-inch phone jacks for both channels, bypass footswitch, MIDI in and out, and a jack for the AC adapter wall wart. Input and output controls set the levels, with individual channel activity LEDs showing the presence of signals



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(a separate master LED indicates clipping).

MIDI capabilities are a little better than you might expect. In addition to the usual omni/poly mode and channel choice, you can assign individual controller numbers to the A and B programmable parameters, mix, dry kill, and bypass functions. You can change presets with program changes and access any of the 255 programs (not just the usual 128 provided for by MIDI) with either the FXR's program translation table option, or the recently adopted MIDI Bank Select protocol.

CONSTRUCTION ZONE

The construction is quite good — TL074 low-noise op amps for the audio, a Z80 to run herd on the digital stuff, ART's custom ASIC, 74HC series TTL chips, and click-stop rotary encoders instead of regular pots. The unit sent for review, however, gave a slight clunking sound when shaken, caused by one end of the circuit board being held in place only by spacers that push against the top and bottom of the chassis — no screws and spacers. ART has since informed me that this is being fixed, although even the way it is, the circuit board doesn't seem to move enough to place any stress on the traces or connections.

OPINIONS

Despite being limited to three 7-segment LEDs, the FXR user interface is easy to get to know, largely because there are three editing knobs instead of a single knob that does triple duty. The one drawback: MIDI controller numbers are shown in hexadecimal. Granted this is a set-and-forget kind of thing, and the manual does give a painless hex-to-decimal translation table, but still normal human beings simply don't think in hex (and even though I sometimes do think in hex, it just adds one more layer to the music-making process).

Speaking of the manual, it deserves special mention. Over the years ART has gone from having some of the ugliest manuals in the business to producing one that is concisely written, friendly, and well illustrated. Although marred by some inconsistencies between the printed description and what you actually find in the unit (for example, some of the parameters listed as being affected by the A knob are affected by the B knob), ART is moving in the right direction with its documentation.

Now let's talk sound. When first placed "under the microscope," I was aware of the FXR's noise level and a somewhat "thick" (as opposed to "airy") quality on the reverbs. This didn't really surprise me, given the price tag, but what did surprise me was how the unit came alive when put in the proper audio perspective — mixed at normal levels, and with a little parameter tweaking. Although the sound lacks the detail of something like a high-end Lexicon, the FXR Elite is way ahead of most built-in keyboard effects and can even hold its own against some relatively expensive units. In fact, there's a certain "aggressive" quality to a few effects that I could not obtain with costlier devices.

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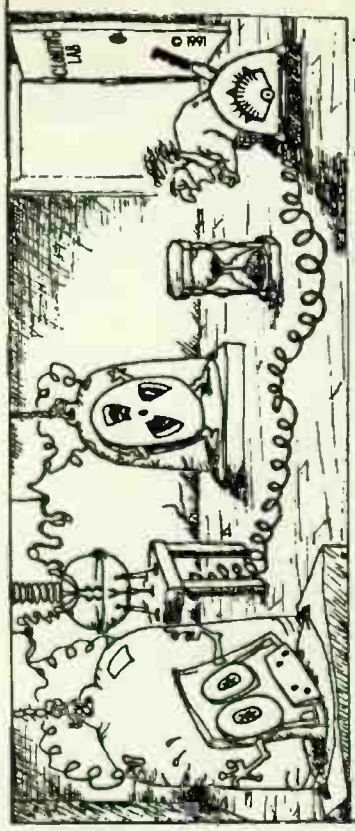

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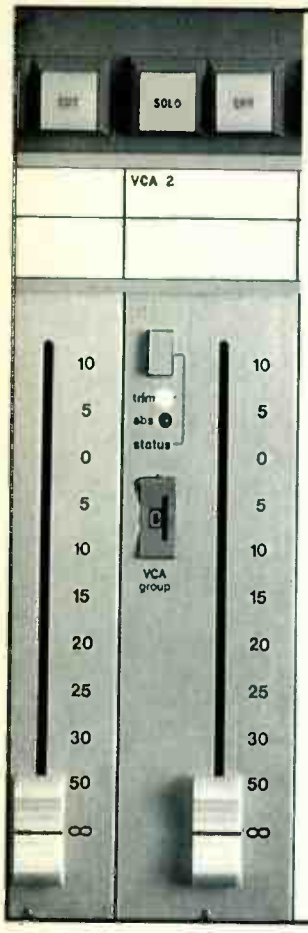

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(It's not always the cleanest box that gets chosen for a mix, but the one that makes the coolest noises — and the FXR Elite can make some cool noises.)

Most low-cost processors exhibit glitching when changing presets, and the FXR Elite is no exception. The problem is exacerbated since there are only up/down buttons to select among the 255 presets, so you generally end up getting a bunch of glitches as you home in on the preset you want. MIDI parameters behave as expected when placed under MIDI control: sweeping time-related functions causes very obvious glitching, sweeping level- or filter-related functions do not. Regarding noise, although some of the presets are a little noisy unless you set the levels just right, ART says they are addressing this issue.

What's the target market? If your project studio is crying out for a digital reverb but your budget complains, this may be the perfect solution because of its price/performance ratio. The coup de grace is being able to have presets with two separate effects, which means the FXR can do double duty while recording tracks (some of the chorus/delay presets are perfect for following a good tube fuzz), as well as perform stereo processing of final mixes.

The FXR can also work well as a "second reverb" for studios that do a lot of virtual tracking and always seem to run out of processing power. This box could be just the ticket for providing that one extra reverb sound you need to make a track really stand out without blowing your budget. (If $300 is still too much, a non-programmable "FXR" version is also available for $219.)

Of course, the whole topic of reverb is exceptionally subjective, and the FXR is a good case in point: I was skeptical at first, but was won over when I actually started using it, comparing it to other reverbs, and putting it through its paces. My overall impression of the FXR Elite is that it's an overachiever. If you're expecting a $2000 sound you'll probably be disappointed, but if you're expecting a $300 sound, you'll be very pleasantly surprised. —*Craig Anderton*

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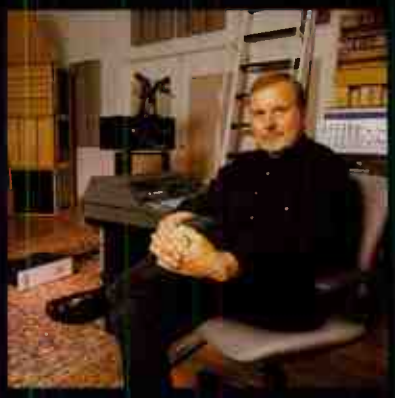

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MTU MicroSound DAW

EQ LAB REPORT

MANUFACTURER: MicroTechnology Unlimited, 6900 Six Forks Rd, Raleigh, NC, 27615. Tel: 919-870-0344.

APPLICATION: Record, edit, and mix in the digital domain. Especially well suited for video and film postproduction.

SUMMARY: Digital audio workstation featuring Floating Tracks™ system that gives the user incredible freedom. No fear of running out of tracks. Accepts SMPTE, Black Burst, and MIDI timecode with optional cards. Editing and sequencing music, dialog, and effects are a breeze.

STRENGTHS: Excellent sonic quality. Audio and Digital I/O cards are heavily shielded, delivering a noise floor of -100 dB. Easy-to-use software is updated regularly. System did not crash once.

WEAKNESSES: Signal Processing (EQ, Time/Pitch shifting, etc.) software has not yet been ported over from DOS to Windows. No graphic interface for panning.

PRICES: MicroTools (DOS-based noise removal and EQ, filtering, Time/Pitch shifting, Sample Rate conversion software): $200; DSP card, 2-channel balanced I/O with AES/SPDIF in 2RU case: $4895; MicroSync board. $1500; SMPTE/MIDI board: $250; Turnkey Workstations 486-33/50-based Tower case or Rack Mount $6595 to $9895

EQ FREE LIT. #: 144

THE MICROSOUND Digital Audio Workstation from MicroTechnology Unlimited (MTU) is not just another entry by some new company jumping on the DAW bandwagon. MTU has been manipulating digital audio since 1977, with nearly 500 systems in this country. An alternative to dedicated multitrack systems, its MicroEditor software allows up to 50 stereo "tracks" to be digitally mixed.

The MicroSound Workstation is a hard-disk-based editing and mixing system. It requires an IBM PC or compatible with a 33 MHz 386/486 microprocessor, plus a very large SCSI hard drive. (Audio files consume 10 MB per stereo minute at a 44.1 kHz sampling rate.) Both the drive and its controller must have an access time that does not exceed 18 ms for reliable 48 kHz operation. The hardware consists of a plug-in DSP card and an external analog and digital I/O interface box. Optional SMPTE/MIDI and "MicroSync" plug-ins are also available. Windows-driven software makes it easy to get started. The Windows environment for the IBM PC and its clones has made that platform a viable contender, especially in this market, where the Apple Macintosh dominates.

MTU supplied *EQ* with a review version that included computer, color monitor and interface unit. All were black, including the keyboard and mouse. You don't have to buy MTU's computer, but if you do, it's mounted in a 5 RU case, making almost any installation easier. The Professional I/O box is in a 2 RU case.

DEFINING THE SYSTEM

The MicroSound Workstation is not dedicated to a fixed number of tracks. In fact, MicroTechnology considers the term "tracks" to be limiting. Audio imported into MicroEditor becomes a sound file when stored on the hard drive. A sound file, used partially or in its entirety, is called a "segment." Any modifications to the segment do not alter the sound file. This is nondestructive editing.

The open architecture means there are no track assignments. You simply place segments as you need them with almost no regard to the number. Up to 2900 stereo segments can be imported into a mix, with up to 50 stereo segments overlapped in a mix. MicroEditor does this out-of-the-box with no additional software. The optional MicroSync card makes it equivalent to a bank of mag-film machines, saving a considerable amount of space and time in the process.

IN AND OUT

There are stereo inputs and outputs, with 4-track optional. Each can be independently configured as either analog or digital, AES or SPDIF. From a multitrack "head" this may seem limiting, but it is fine for sequencing an album, creating a commercial spot, or audio-for-video postproduction where,

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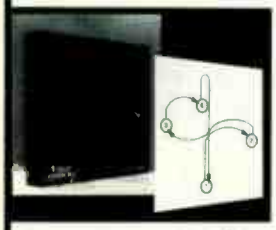

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for example, all pieces are imported one or two segments at a time.

FINDING A NICHE

I had several weeks to make friends with the MicroSound Workstation. (It didn't take more than a couple of evenings to get the hang of MicroEditor.) In that time, I completed six projects — each requiring a different approach to reach the final product.

The house session: Create a rhythm track by looping a drum break, adding numerous sound bites to punch up the mix and overdub bass guitar.

Theater piece #1: Import a DAT mix, add and/or modify the placement and length of various sound effects.

Theater piece #2: Import several sound sources, overlapping dialog, sound effects, and music.

Music segment edit: Cross-fade edit the intro and everything between the first and last chorus to create a condensed version.

Album sequencing: Combine butt-splice and cross-fade edits to create a natural transition between songs.

Multitrack mix: Download 15 tracks from analog and mix entirely within the system.

MicroEditor is a production tool especially well suited for commercials and postproduction. The mix computation time varies from nothing to a few seconds or a few minutes depending upon the number of segments and overlaps, and the size of the Mix Window. The 15-track mix took about fifteen minutes to compute. More on that later.

Commercial and postproduction style audio are not as demanding as my multitrack mix test. I went to the trouble of downloading 15 tracks, one at a time, to push the system. Hey, I wanted to hear a digital mix!

You may not have the time or patience to mix as I did, but, with the MicroSync card, you can import selected tracks from multitrack for editing, comping (combining the best parts of individual tracks), and repositioning. Afterward you can either slave MicroEditor or fly the parts back to multitrack. This is a job MicroEditor is happy to do.

MA-MA-MY FIFTEEN TRACK MIX

I first combined the kick, snare, and stereo overhead tracks to a stereo submix. No further submixing was done. Next, bass, lead vocal, background vocals, bells, synth, and three guitar tracks were added. All but the guitars were mono tracks brought in as stereo, so they could be panned. The guitar tracks consisted of a pair of comp tracks and one mono track. Each time I added a part, it increased the mix computation time. It took between four and five minutes at first and up to about fourteen minutes toward the end. Maybe that's not your idea of a good time, but it really is quite a technological accomplishment. Modifications to the mix don't take as long as importing/mixing a five-minute piece. For example, raising the guitar level in the chorus section would take under a minute.

Mixing with MicroEditor is the ultimate automation. OK, so it takes longer than it does with tape and there's no EQ — that's life in this price range. If price were no object and technology no obstacle, any desirable feature would be a nonfattening, cholesterol-free piece of cake. The lack of EQ is a form of discipline, if you will. No EQ is better than cheesy EQ. It forces you to work with the balances. Besides, there's always outboard. MicroEditor is fast, and you are never locked into only one approach. I created a precise automated pan in under five minutes, the first time.

The sound quality is excellent, which is to say that it is completely transparent. All that crap about digital not being warm is just that. The top octave may not be consistent on some pieces of gear, but that's more likely the gear than the system. The top was as clean and uncolored as it went in. Noise was never a concern here. MicroSound outperforms most consoles in this area. The average analog console, all faders down and muted, is not this quiet.

THE MANUAL

I left MicroSound in the box for a few days while I perused the manual — definitely not my typical behavior. Once out of the box, I toured the tuto-

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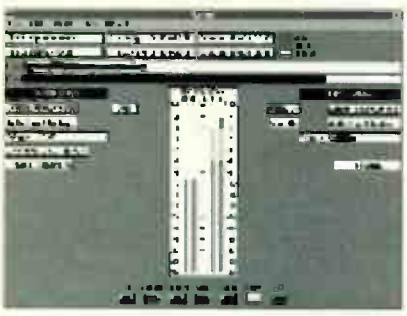

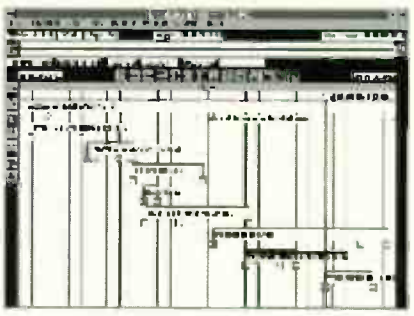

From left to right: Figures 1, 2, and 3

rial, molested the mouse, and harassed the help screens. Three manuals came my way during the course of this review. The third one fulfilled my biggest request: larger screen captures of the Record, Segment, and Mix screens. The manual is in English and contains lots of helpful information. On occasion, screen captures were a few steps ahead of the text. When I brought this to MTU's attention, the response was, "Yes, we're working on it!" My interviews with MTU users showed me the company is responsive to feedback.

OPERATING SYSTEM

A mouse or trackball can be used to pull down menus and select commands. All commands have a key letter underlined so that they can be accessed directly when used in conjunction with the "alt" key.

There are three windows: Record, Segment, and Mix. (See figs. 1, 2 & 3, respectively.) Audio is imported via the Record Window by opening a new sound file, choosing a name, and "pressing" the "record" button. The function levers across the bottom of the screen emulate the keyboard style cassette decks of yore: <, Enable, Record, Stop, Pause, Play, and >. A Setup feature enables the incoming signal to be monitored both by ear and by the bar graph display.

If the analog inputs are selected, choose the sample rate that your final

continued on page 124

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Ensoniq ASR-10 Sampler

EQ LAB REPORT

MANUFACTURER: Ensoniq Corp., 155 Great Valley Parkway, P.O. Box 3035, Malvern, PA 19355. Tel: 215-647-3930; 800-553-5151.

APPLICATION: Applications for sampling and effects processing, both in the studio and on the road.

SUMMARY: A 31-voice sampling workstation that includes extensive features for processing, combining, and resampling sounds.

STRENGTHS: Good sound quality. Tons of digital processing options and a built-in sequencer. Sounds can be stacked on a key or range of keys up to eight layers deep.

WEAKNESS: Ensoniq's not alone in this, but I wish it had implemented Peavey's SMIDI high-speed sample dump protocol (just to help get this new standard off the ground).

PRICE: $2695; with SCSI port (SP-4): $249.95 installed; with digital I/O ports (DI-10): $399 installed **EQ FREE LIT. #:** 145

WHEN ENSONIQ sent me the ASR-10 (Advanced Sampling Recorder) rack module to check out, I thought I was receiving a box that dealt with the usual tasks of sampling and triggering sounds, period. When I started to read what the unit could do and checked it out, however, I found out that Ensoniq has included a number of features that go beyond the basic functions of most samplers.

THE BASICS

The standard ASR-10 keyboard and rack module are shipped with 2 MB of memory that's expandable (by a factory authorized dealer) to 4, 10 or 16 MB using standard, off-the-shelf Mac SIMMs. When loaded to its full 16 MB complement, up to 4.5 minutes of sound can be sampled at 29.76 kHz (2.3 minutes of stereo) and 3 minutes at 44.1 kHz (1.5 minutes of stereo). Both versions have stereo inputs and two main output jacks; however, the rack version comes standard with a set of six additional AUX outputs, which can be added to the keyboard version via an optional expander. A high-density floppy drive comes standard on both versions, while a SCSI port comes standard with the rack and can be optionally added to the keyboard version.

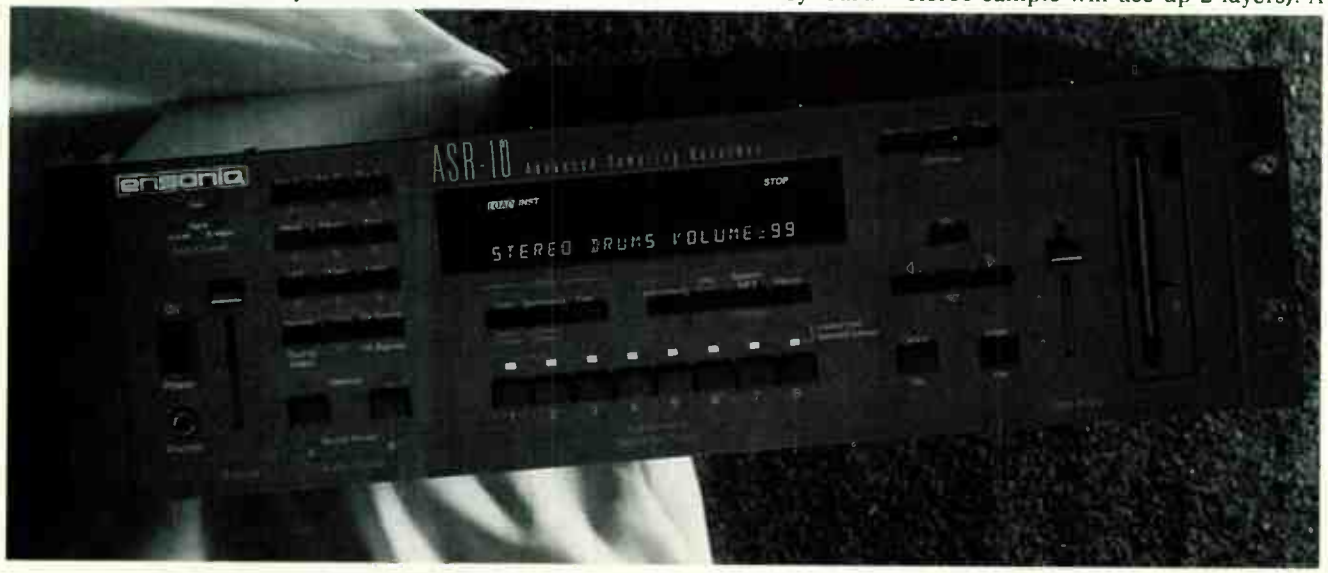
Those of you familiar with Ensoniq's EPS samplers will be happy to know that samplefile data is almost completely interchangeable between the two (effects are not necessarily backward compatible) and that the ASR-10's general operating structure is similar to the EPS; it just has a lot more memory, options and all-around capabilities. One caveat: remember that the ASR has a much larger memory, so larger samples may not fit on an EPS sampler.

VOICE STRUCTURE

The ASR-10's 31 voice architecture is divided into three basic parameters: wavesamples, layers, and instruments.

A "wavesample" is a mono or stereo sampled sound that can be mapped across an entire keyboard or split into sections. Up to 127 different samples can be mapped across the keyboard.

In addition, up to eight sample "layers" can be assigned to each key (a stereo sample will use up 2 layers). A



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layer can be assigned to a key range in a number of ways. For starters, different sounds can be mixed together and/or detuned to create a rich, layered stack. They can also be programmed to trigger and cross-fade at various velocity levels to create the more realistic nuances of an instrument or for making wild tonal effects that change with velocity. A front panel "Patch Select" function lets you automatically call up four different preprogrammed layer combinations so that you can easily change nuances during a performance or switch between layers that contain a completely different set of sounds.

In Ensoniq speak, an overall bank of sounds that can be up to 127 individual samples wide and up to eight layers deep is known as an "instrument." To rant for a second, the term "instrument" is one of the biggest and most limiting misnomers I've heard in a long time. The very name seems to imply that an instrument can only play a single voice or sound at a time, which just isn't the case. The terms "setup" or "bank" would be a lot more descriptive of a memory block that can be 127 samples wide and eight layers deep. Each instrument can have tons of sounds, and when you stop to consider that this box can load up to eight simultaneous "instruments," you can begin to see that there's some potential power here.

OTHER FEATURES

In addition to its basic sampling capabilities, the ASR-10 also includes a full-featured 16-track sequencer that'll let you build up a song in the standard, continuous track fashion or by creating a series of sequenced blocks (chunks) that can be arranged into any number of potential grooves.

Another asset that can't be overlooked is the ASR-10's onboard effects processor. In fact, it uses the same 24-bit internal processor that's used in Ensoniq's highly-acclaimed DP/4 multieffects box. Any of 50 fully editable effects settings can be used to process samples as they're being played, or this digital processing block can be used as a tool for processing an already-recorded sample and then saving the re-sampled sound directly to disk.

DID SOMEBODY SAY RE-SAMPLING?

A unique feature that really cooks on this instrument is its re-sampling capabilities. In a nutshell, this process lets you record a sample, then reprocess it at a later time, or re-record any number of sounds that have been mixed at the sampler's output into a single, composite sample — all in the digital domain.

One basic application that's used by most samplers uses re-sampling to internally change the sampling rate of a recorded sound. Since sounds can only be sampled into the ASR-10 at either 44.1 kHz or 29.76 kHz, a useful trick for saving both disk and RAM memory space is to downwardly re-sample a sound to its lowest possible rate without sacrificing much or any of its overall tonal quality. For example, if you re-sampled a thick kick drum that doesn't have many overtones from 29 kHz downward to 11 kHz, the sample's bandwidth would be reduced to 5 kHz. Since this particular kick didn't have many overtones above 5 kHz to begin with, it wouldn't lose any of its overtone punch. Plus, the lower rate would take up about a third of its original memory, thus making more elbow room for more samples.

Since the ASR-10's processor is directly tied into the digital effects loop, you can recall a previously recorded sample from disk or CD-ROM, process and re-sample the sound any way you'd like, audition it, and then save the results to disk. Because it's all in the digital domain, you can get as subtle or as wild as you want by reprocessing it ad infinitum; and since the sample itself has been reprocessed, the effects processor is now freed up to again process your performance in real time.

While we're on the subject, when you're not using the ASR-10 as a sampler, you can, by placing the box into the record-ready monitor mode, assign an effects preset to the output and use the device as an extra, high-quality effects processor. A very cool bonus!

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Re-sampling can also be a very powerful production and memory saving tool in that it can let us sample any number of sounds into the box and then, by using the internal mixer and sequencer, internally re-sample the combined output mix into a single, stereo sample. The samples that we used to build up the mix can be saved to disk (if you want to) and then dumped from memory to free up space for more samples.

Another basic tip for maximizing your memory potential on the ASR-10 and certain other samplers is to create your own setup banks so that they include just the sounds you want to use on the road or in the studio. Many factory "instrument" setups can include a ton of sounds that you don't need or would never want, and use up valuable disk space while they just sit there. On the ASR-10, all you need to do is load up one or more factory instrument setups, create a new one, and transfer just the sounds that you want to your own personal bank. By saving the new bank to disk, you could reduce the size of a fully loaded instrument bank to one that would use a lot less memory and/or would contain only sounds that you need. This trick can be especially effective if you rely exclusively upon floppies to store your samples.

MY TWO CENTS

I'm still waiting for someone to build an intuitive sampler; one that uses basic tape-type transport commands to simplify the record and edit functions. That being said, once you get the hang of it, the ASR-10 is relatively straightforward to use. Both in the studio and on the road, you'd be hard pressed to find a single device that can jump through more hoops than this one.

Ensoniq's new 2.0 operating system for the ASR-10 sampling workstations, which is due this fall, adds two tracks of digital audio recording to their MIDI sequencing capabilities. Recording can be made to RAM or SCSI drive, with punch in/out, mix, panning, and bounce-down all possible. Recording can be dry, through the onboard effects proceesor, and via analog or digital (S/PDIF) inputs. —*David Miles Huber*

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Samson MPL 2242 Mixer

EQ LAB REPORT

MANUFACTURER: Samson Technologies Corporation, 262 Duffy Ave,, Hicksville, NY 11801. Tel: 516-932-3810.

APPLICATIONS: Project studio recording, live sound mixing, and keyboard submixing in a small, convenient package.

SUMMARY: A project studio, A/V production, or keyboard mixer with good audio performance, lots of inputs.

STRENGTHS: Twenty-two inputs, 4-band equalization, in-place-solo, and sub-groups that fit into just 9 units of your rack.

WEAKNESSES: Faders are too small for exacting mixing duties, pots have a slightly scratchy feel and metering/headphone monitoring is limited.

PRICE: $1129 **EQ FREE LIT. #:** 146

THE MIXING CONSOLE has traditionally been the center of a recording facility. With the increasing popularity of computer-based production, sampling, and synthesis, however, many of the tasks that used to be done on the mixer are now accomplished before the sound leaves these devices. This changes the role of the mixer from central processing to merely providing mic preamps and a way to finally combine the computer-controlled sources. Not everyone can afford to do this in the digital domain, so they must find an analog mixer with good mic preamps and stereo line inputs. This mixer also must be small enough to leave room in the studio for all the processors and sound modules, and have an audio path that won't tarnish those pristine digital sources.

The Samson MPL 2242 compact mixer handles up to ten electronically balanced microphone or line-level sources and six unbalanced stereo line-level sources. These 22 inputs can then be assigned to either of two stereo groups that are then combined to a stereo output. There are also six auxiliary send busses for adding effects or creating a monitor mix for the artists. Four stereo effects returns are also provided, bringing the total inputs up to 30. Add four-band (fixed frequency) equalization, in-place-solo, and balanced main-outputs in a table-top mixer that can be rack-mounted in just under nine rack units (15 1/2 inches, 395 mm), and you have a comprehensive mixer — one well suited to small-scale production work.

The 2242 differs from many of the mixers in its price range, providing stereo inputs, balanced mono line inputs, four-band equalization on all channels, and four groups with faders feeding a stereo main output with a rotary level control.

The 2242 has approximately 90 dB of gain from mic input to main output (everything to the max), more than many low-cost mixers. The silk-screened input trim legend (+4) is misleading, because when using the same level settings, signals connected to a mono input will be 10 dB higher in level when moved to a stereo input. Most users will ignore these markings anyway, simply turning the knob until the level is high enough. In other respects, the mixer is clearly marked and well laid out, so even casual users will have no problem getting a signal from one end to the other. They are assisted by the 2242's well-engineered gain structure and all-too-obvious nominal fader position.

What's so obvious about the nominal fader position? The fader wants to stop there every time it passes by! Like the original Mackie Designs CR1604, the 2242 uses 45 mm (short-throw) faders, with a detent midway through their travel. This could be convenient for using it as a keyboard submixer, for example, where the faders tend to either be

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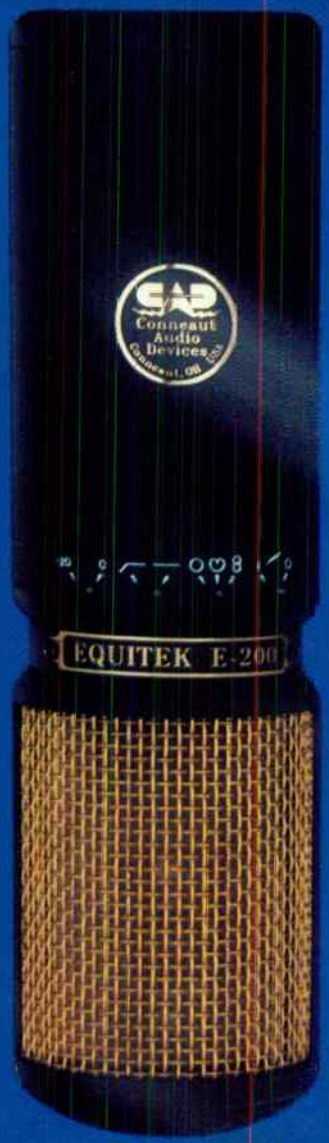

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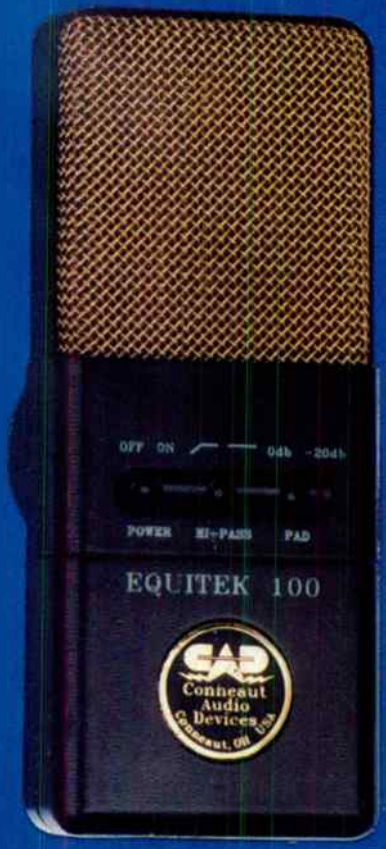

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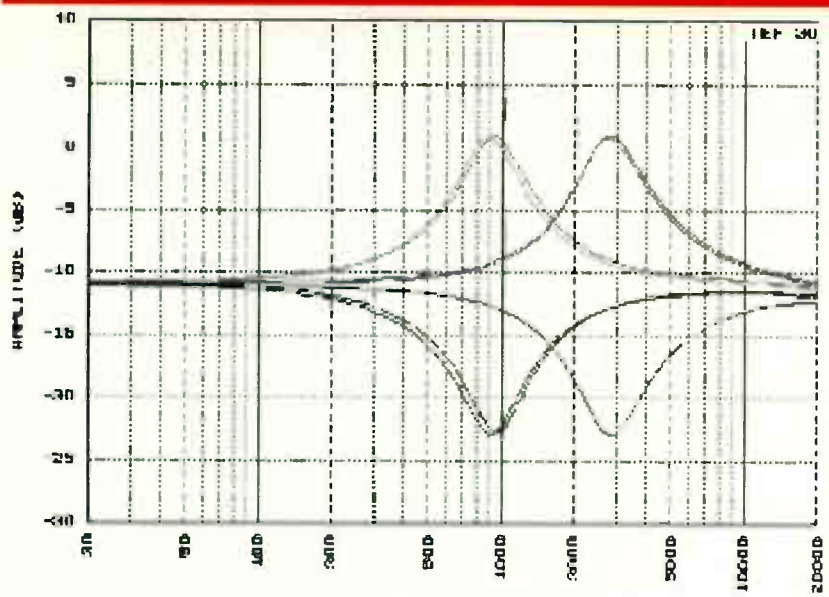

Figure 1

down or at unity, but for dynamic mixing? This approach puts the nominal fader position halfway from the top, giving those of us who expect to create subtle dynamic effects and the occasional slow fade-out very little to work with. The faders have reasonable resolution in the area of the detent, but almost become switches at the bottom of their travel, where they jump nearly 30 dB in a single step. Attenuation is approximately 90 dB at the bottom of the fader — very good performance that argues for the lack of mute switches. Many applications, including keyboard submixing, do not require the faders to be capable of long, slow fade-outs and the detent is very handy for returning a channel to normal volume without even looking at the fader.

Equalization is available on all inputs except the effects returns. The EQ controls on the mono input channels make a low-level, staticlike sound when adjusted. I have found that this same noise occurs on some other mixers in this price range, as well. This noise does not happen when adjusting EQ on the stereo channels. The stereo inputs have the same EQ as the mono inputs and the stereo tracking is very good, typically +/-0.5 dB, +/-50 Hz between left and right channels (see fig. 1). That is much closer than anyone but the most patient operator could achieve by trying to match the EQ of two mono inputs.

The frequencies are well chosen: midrange EQ controls of +/-12 dB at 800 Hz (measured to be closer to 900 Hz) and 2.5 kHz (measured to be closer to 3 kHz). These create very low-Q bell-shaped changes in the frequency response that can dramatically affect the source and are best suited to making broad tonal changes rather than to fixing problem resonances or feedback modes. The other two bands are shelving filters that provide +/-15 dB at 80 Hz and 12 kHz. These also have the power to make radical changes in the sound when desired. Without the ability to tune the center frequency, low-Q filters are much more useful to general music production tasks, and a very little EQ will go a long way in changing the tone of the sound source. Channel inserts are available on the ten mono inputs for inserting more comprehensive outboard parametric equalization (or dynamic processing, etc.).

There are no direct outputs from the input channels, but a few minutes with a soldering iron can fix that. Just build a 1/4-inch, 3-conductor phone plug that has a jumper between the tip and ring terminals and connect those and the sleeve of the plug to a two-conductor phone plug (or RCA connector) and you can use the insert send for a direct output without interrupting the signal path through the mixer. Now you can directly feed microphones to the multitrack and still create control room and studio monitor mixes when tracking.

There are six auxiliary busses on the 2242. Aux 1 is permanently prefader while the others are postfader sends from each input. The stereo inputs feed the aux busses as stereo pairs (left to Aux 1, 3 and 5, right to Aux 2, 4, and 6), which can complicate the use of Aux 1 in some situations because it is prefader and pre-EQ. The controls for Aux 3 and 4 are switched to Aux 5 and 6, a space-saving approach common to many mixers. This is handy for those effect-heavy productions, but can also be used as a form of aux send mute. It won't be any help if you need to create six auxiliary mixes that may include any and all inputs, but hey, think of it as two spare send busses.

The group assignment switches are equally exclusive, pan (or balance on the stereo inputs) between group 1 and 2 or between group 3 and 4. The groups always feed the balanced Main Mix output as stereo pairs. The Stereo Auxiliary Returns (effects returns) feed only the Main Mix output and include a left/right balance control. This allows the group outputs to feed a 4-track tape recorder, and during overdubs a monitor mix is handled by the effects returns.

The group and auxiliary outputs are unbalanced and like all the connectors except the XLR-type mic inputs and IEC power connector, are 1/4-inch phone jacks. The connector panel can easily swing from a tabletop position to the back side of the mixer for rack-mounted applications. The input level trim pots are on the front of the mixer and remain accessible in both positions. The rear panel of the 2242 is also where the internal power supply is mounted and on the unit I had for review, this panel became too hot to touch after a few hours of operation. Although I am concerned with the long-term reliability of any equipment that runs this hot, I did not have any problems during my evaluation of the 2242. If you are using the 2242 on a table top, attach larger feet for better ventilation!

The two seven-segment LED meters indicate levels of either of the two groups or of whatever sources have a PFL/Solo button depressed. These are rudimentary, but quite sufficient in most production situations

continued on page 137

World Radio History

LET'S GET SMALL

continued from page 36

It also expands the creative logistics of the recording session. For example, I'm also working with Kyle Vincent, with whom I've just completed an album for MCA and who has an ADAT at home. We've been working on tracks here at the studio and he takes a stereo mix home, and he can either lay down ideas or final takes. People are often most creative in their own environment and, until now, you would hear the most fantastic performances that were, unfortunately, recorded on little multitrack cassette machines with below standard audio results. With ADAT, it's full digital quality, so if an artist gets it right at home, it can go on the final record.

Whatever a studio's particular goals and needs may be, the ADAT can be configured to accommodate them — with the clean sound, and ease-of-use of digital technology. Sure, it's small. So what? EQ

Steve Levine has produced Culture Club, Ziggy Marley, Beach Boys, and many popular artists, as well as several film tracks.

TOM DOWD

continued from page 78

days: about 25 feet wide and 35 feet deep, with an 18-foot ceiling. The serenity made the miking easy: we weren't building gobos and isolating people and putting them in booths — they watched and listened to one another as they played.

During the 1970s, coming out of Derek and The Dominos, there were five or six more Eric Clapton albums, plus we did Lulu, Dusty Springfield, Herbie Mann, Eddie Money, Lynyrd Skynyrd, and Rod Stewart. Skynyrd and Stewart spilled into the '80s. There were a couple more Eric Clapton albums, I got the Allman Brothers back together again, and the Lynyrd Skynyrd band together for their tenth anniversary and reunion. I'm currently producing a singer named Merritt Morgan. I only do two, or at most three, albums a year nowadays.

I got involved in the reissues of the Clapton stuff on Polygram, where they did not just take the old master tapes and remaster them, but actually got the 16-track tapes and remixed them. And I did the same thing with the Allman Brothers with regard to the Fillmore albums, just last year.

Unfortunately, it is not always a happy experience. I don't hesitate to say that I wish the people at MCA had shown more respect for the artist when they reissued the Lynyrd Skynyrd material because without consulting me, they had the audacity to double and triple the lead vocals with effects and so forth. If you're going to preserve something in the interest of tradition and posterity, you don't change the colors.

Then again, preservation can only go so far. Every now and then I kid with Leiber & Stoller and say, "Who the hell would have thought when we were making these records back then that they would become Muzak?" You don't even have to go back that far. I recently ran into Dickie Betts and said, "Hey Dickie, I just heard 'Melissa' on an elevator!" EQ

AU NATURAL

continued from page 40

hypercardioid capsule. It's also quiet and has a high output. The 4051 is transformerless, its balanced output is directly coupled and the mic works with any remote phantom or simplex power source that supplies 48 volts DC.

I have to credit Paul for getting me the sounds I'm after. I mix and do the actual recording of vocals and guitars, etc., but it's Paul who finds the ways to get the right sounds. He started experimenting with the 40 Series around the beginning of this year and we're learning new things about them all the time. They're the right mics when we're looking for natural sounds in certain applications such as vocals and acoustic instruments. We look for clarity and sustainability of the cymbals from the overheads. With the 4051's, we don't use any compression. They sound very natural on the rest of the kit as well.

I've heard producers searching for the perfect words to define a particular sound. But my style is a lot simpler. You use the right mic, the right room ambience, and the right engineer. And you dive right in and figure it out as it goes along.

Hey, Tony (Bongiovi). If you're reading this article, thanks for teaching me a lesson I'll never forget. EQ

Ed Stasium has produced, engineered and/or mixed Mick Jagger, the Ramones, and the Smithereens, to name a few.

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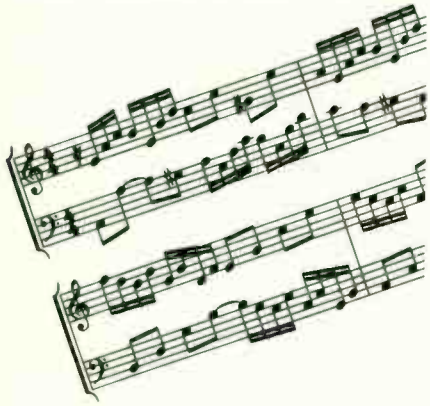

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MTU MICROSOUND

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product requires. For example, a CD's sample rate is 44.1 kHz. Sample rates are available in fifteen steps from 48 kHz down to 8 kHz. This includes the 37.8 kHz and 18.9 kHz sample rates required for CD-I and 11.025 kHz and 22.05 kHz for multimedia. In order for segments to exist together in the Mix Window, the sample rate and the number of channels, mono or stereo, must be the same. When the digital port is selected, the sample rate is determined by the incoming data. At present, there is a monitoring glitch that occurs when importing digital audio because the input is clocked to the incoming signal while the output D/A is internally clocked.

THE NEXT STEP: A NEW MIX

When the Record Window is closed the Mix Window opens. At this time it is best to initiate a new mix by giving it a name. A sound file is imported into the Mix Window via the Create Segment command. The Segment Window opens. Here it's possible to view the waveform and zoom all the way down to the sample if necessary. You can place marker flags for editing, level shifts, or mutes. Butt-splice editing is done in the Segment Window. Both butt-splice and cross-fade editing is done in the Mix Window. The fade slope is linear, with both the start and the end point set manually by selecting a beginning or end-of-fade marker with a mouse, then dragging it to the desired location. A cross-fade can be asymmetrically linear, that is, a one-second fade-out could overlap a one-minute fade-in.

Sound files can be displayed in two forms via the Segment/Waveform view icon. If the sound file is under 2 MB (11 seconds), the waveform will appear. If it is longer, a dotted line will appear across either the Segment or Mix Window. Segments are also displayed as a box that frames the segment name.

Backing up is more complicated than going forward because you must either turn your head around or look in the mirror. Either way is uncomfortable becaaaauuuuussse....

Backing up is cool because MicroEditor will upload to DAT at the fastest rate, 48 kHz, even if the sound files were recorded at an 8 kHz sampling rate. This expedites the long and painful process that plagues all nonlinear systems.

Slaving to SMPTE works with but one glitch. Not unlike importing digitally, there are some funny swishy sounds when you are getting levels in Setup mode. Once entering Record, everything is OK. Everything I tried to sync worked fine.

Live overdub and an effect send/return are features that are possible from the Mix Window. Both the overdub and return signals are recorded into a default sound file for that mix and can then be mixed along with the other segments. This is a great concept. I like the idea that there is enough real estate to save an effect as a sound file. At the moment, unfortunately, both overdubs and effects require more brain power than a dedicated multitrack and mixer. You can't, for example, hear the overdub while it happens, but you can hear the mix. Or, you can't hear the mix when using the effect send. By the time this review hits the stands, though, the four channel I/O should be available. This and some software tweaks should greatly improve the Overdub and Effect Send/Return features.

Signal processing is possible outside of MicroEditor, via DOS-based MicroTools. While I do speak DOS, I did not try MicroTools. I don't believe most users will be interested in non-Windows applications. The Mac's success in our industry is due primarily to its being so user-friendly. PC clones are a cost-effective alternative, but cost alone will not generate users. While more PCs than Macs may have been sold (in the business world), it is the Windows-driven applications that are closing the gap between the PC and the Mac.

Currently, the software is up to version 2.1, and MTU has versions 2.2 and 2.3 planned for late '93 and early '94, respectively. Version 2.4, scheduled for mid-'94 will have a multistage equalizer. Plans include an on-screen fader, with increment/decrement arrows, that can also be accessed via MIDI, for the tactile factor. Mono and stereo sound files can exist together in the Mix Window via an on-the-fly copy feature that creates two from one (without using more disk space) and links both channels to allow panning. MicroEditor's software includes flags that can be used in conjunction with a compact disc writer to create a standard CD. All of this plus time compression and pitch change are in the wings. *—Eddie Ciletti*

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CIRCLE 73 ON FREE INFO CARD

Phoning In Your Part

The latest on on-line services for musicians and audio professionals

BY J.D. SHARP

An entire world of knowledge and information is just a phone call away if you're equipped with a modem and a personal computer. Telecommunicating has become commonplace and big business, with advertising for large-scale on-line networks seen in prime time. But what, if anything, do these services have to enhance the productivity of musicians and audio professionals? We've plugged in our modem and have embarked upon a tour of the world of on-line services, seen from the musician's angle.

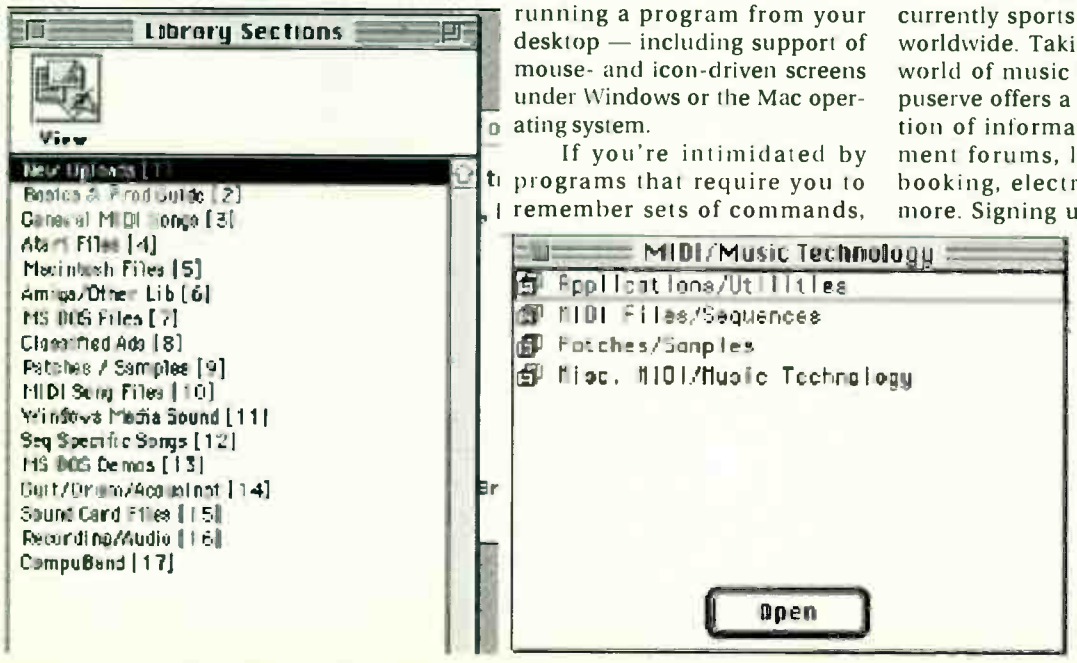
Before we get to the specifics of several services, it's helpful to ponder the good and bad of telecommunicating. The positive side is that the potential range of contacts is expanded to include much of the civilized world. If you're trying to solve a thorny problem, and your local music store and technician have struck out, chances are that somewhere amidst the multiple gigabytes of Special Interest Groups (SIGs) and message boards, the answer to your dilemma has already been posted. Another plus is that you often can find the latest maintenance upgrade of your favorite program available on line, without having to mail away for a disk. The bad part is finding it. Another thorny issue is cost; none of the big-time and even medium-time services are free, and connection costs start accumulating; before you know it you can burn dozens of dollars worth of connect time and still not be enlightened. There's quite a bit of shared knowledge and expertise out there, but it's not all organized in one place.

One of the major differences between services is the "front end" they provide. A few years ago this concept didn't even exist; all bulletin board services (BBS's) had a "text" interface, with command lines that accepted, in most cases, a single-key input that equated to an action. And many BBS's continue with this interface today. But the high rollers in the telecommunication business have designed user-friendly software that makes accessing their boards more or less identical to running a program from your desktop — including support of mouse- and icon-driven screens under Windows or the Mac operating system.

If you're intimidated by programs that require you to remember sets of commands, you may prefer a graphical interface. Two of the boards we visited provide this software, while two are, for want of a better term, "text driven." Of course, if you're capable of wading through most synthesizer interfaces you can probably handle anything that the services dish out in your sleep.

Another difference is in the speed of communication. Modems these days range in baud rate from 1200 bps (fairly retarded) to 57,600 bps (moderately fast). Any speed above 9600 bps is accomplished with data compression. Unless you're on an extremely tight budget, there's no reason to settle for less than a high-speed modem (or fax/modem) capable of data compression (the buzz words are V.42 bis or MNP5) that can operate up to 57.6k bps. Most services (with one notable exception) support baud rates up to 9600 baud, and if you plan to download (that is, get files from the bulletin board) or upload (send stuff to it) very often, you'll end up saving a bundle by going to high speed, even with the bulletin board charging more for high-speed access (they all do).

In the graphical interface department are Compuserve (a.k.a. CIS, or to cynics, CI$) and America OnLine (AOL). Compuserve is the grandaddy of commercial on-line services, and currently sports millions of members worldwide. Taking a look outside the world of music for a moment, Compuserve offers a comprehensive selection of information sources, investment forums, lifestyle SIGs, travel booking, electronic shopping, and more. Signing up is pretty easy; you



You can't beat the online services for up to the minute information on the latest happenings in the music world. Left: Compuserve's MIDI Forum; right: America OnLine's MIDI/Music Tech.

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can find their introductory package at the local software/computer store, and it includes a usage credit and free one-month membership that offsets its cost of $25.

An icon-driven program (Information Manager) is offered for both Windows and Mac, and there's a menu-driven DOS front end that's basically comparable in function if not quite as pretty. Free trial memberships are often included with either software packages or modems; these involve actually signing up (your credit card number, please...) and then if you decide to cancel you have to explicitly tell them so (this is pretty standard for the industry).

Compuserve's MIDI forum is pretty impressive. It provides support in a big way for Mac and IBM computers, but also includes an active Atari file area and even some useful stuff for Amiga. A massive number of General MIDI song files are available for downloading; these are, of course, highly variable in their quality — and there are copyright issues that nobody seems to want to address, but nonetheless the range of compositions is awe-inspiring. Multimedia types will appreciate the extensive Windows Media Sound library — with Sound Blaster and similar files — for days. Classified Ads are handy for trying to hawk equipment to a national (and international) audience. There are scads of patches and samples in the Patches/Samples library. Many of the libraries on Compuserve go all the way back to 1985; this service never forgets a thing, and this can be a mighty good thing if you own a "vintage" synth like a DX-7, Casio CZ, Ensoniq ESQ-1, and the like — you'll find a remarkable level of support. Another library contains sequences for specific MIDI setups (not GM). There's quite a bit of "demoware," a great way to try out a new program without having to commit to buying it. One of the most intriguing forums is CompuBand, which as far as I could tell is an ongoing composition forum

GETTING CONNECTED

Here are the addresses and phone numbers for the online services mentioned in the article:

America OnLine: 8619 Westwood Center Dr., Vienna, VA 22182. Tel: 800-829-6364.

Compuserve: 5000 Arlington Centre Blvd., PO Box 20212, Colombus, OH 43220. Tel: 800-848-8990.

PAN: PO Box 162, Skippack, PA 19474. Tel: 215-584-0300; fax: 215-584-1038. Internet: pan@pan.com.

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where musical works are being created and modified in group format. Now you really *can* phone in your part!

When you get sick of downloading files there are always the message boards to turn to. You can read or rap about virtually every issue of interest in the areas of music production and performance. There are also three MIDI Vendor forums where you can go one-on-one with the support staff of many software and hardware companies and download product-specific software demos and sound files. If your interest runs to discussions over what's hot and what's not in recorded music, turn to the Music and Arts forum and telecommunicate your eyeballs out; most every musical style is discussed in depth.

Compuserve's greatest competition on the national front seems to be coming from the fast-growing America OnLine service. It's a bit less intimidating than CIS for several reasons. First, there's just one price for all services; you pay about $9 a month to be a member, but this includes five hours of connect time. Additional time is charged at just under $5/hr. The software available for AOL is arguably the best around. When running from a Mac, it's basically indistinguishable from a Mac application (Compuserve jumps in and out of the graphical interface, and you often find yourself in "terminal emulation" mode, i.e., text interface). The interaction with the software is virtually seamless, down to the point where updates are automatically downloaded to you at log-on time, at AOL's expense. Word has it that the Windows interface is similarly spiffy. Although not as comprehensive as Compuserve, there is a remarkable amount of stuff on AOL. The PC and Mac world are more segregated, with separate areas for each.

There is one network dedicated exclusively to the music business called PAN (Performing Artists Network). There are over 3000 members, which isn't huge, but you can count on every one of them being involved in some aspect of the music business. There's an extensive Availability System, which includes tour services, venues, booking agents, concert promoters, video production services, session and tour players, studios, and more. Audio Net covers home recording, arena reinforcement, studios, product reports, and news. SIGs exist for quite a few manufacturers, while other manufacturers (and many of their staff members) can be found dispensing advice and trading shots.

The PAN's MIDI section is extensive, loaded with samples and patches, and even offers a guitar synth section. Atari computers are supported along with the obligatory Mac and PC areas. The classifieds cover job opportunities, services and items for sale. An entire section is devoted to Business Networks, which is where record promotion, radio, publishing, tour production, and the like, come in.

PAN also offers a gateway to Internet. This is a worldwide "network of networks"; it ties together and offers access between business, university, and private computer BBS services around the world. Needless to say, within this web of interconnected computers are many areas of potential interest; the main problem is finding your way around, which is an art form, since the Internet interface is a series of seemingly incomprehensible shorthand commands. Like anything else it becomes second nature with experience.

PAN offers local access via Tymnet, Telenet, and Internet: Communication and membership charges vary according to what kind of deal you're getting; unsponsored membership is $225, but special offers show up all the time when you get new software and synth packages.

Another interesting service is the WELL (the Whole Earth 'Lectronic Link). As its name implies, the WELL was started as a sort of electronic extension of the Whole Earth Catalog. It offers over 200 public conferences, with more being added all the time. The MIDI is peppered with discussions that are fascinating and wide ranging.

The WELL lets you maintain and edit a list of conferences you regularly visit; then all you have to type is "s" to see new messages and "n" to go to your next conference. The WELL, like PAN, offers Internet access (AOL and CIS only allow sending/receiving mail from Internet addresses). It also provides a gateway to USENET, which is a worldwide system of discussions called "newsgroups."

This brief look at the world of online services for musicians and audio professionals demonstrates that there are numerous benefits to being hooked up. It's time to start telecommunicating. Send your comments to: BananaDan@aol.com! EQ

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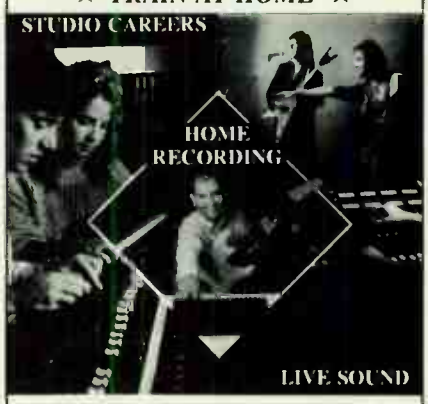

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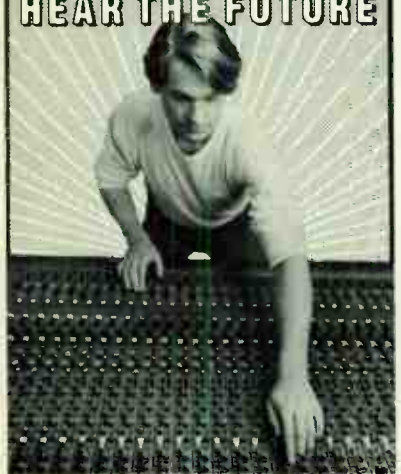

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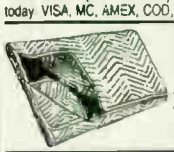

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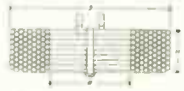
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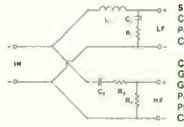
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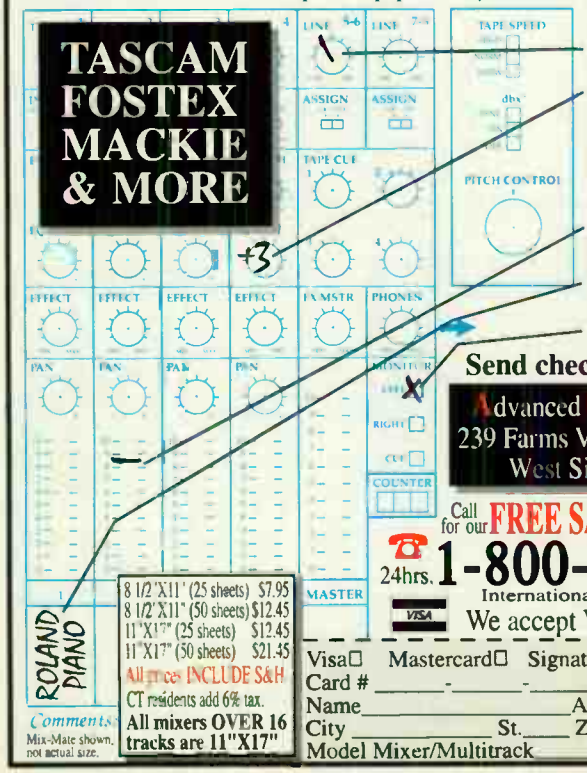

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SAMSON MIXER

continued from page 122

where a tape recorder (with more comprehensive metering) is being fed. There is no provision for metering or monitoring the Main Mix output and the Aux Send busses. The groups are monitored prefader, but the meters read the postfader levels. Again, not a problem in many project studios, but definitely a requirement for many sound-reinforcement applications.

In-place-solo is offered as an effective means of listening to signals within the context of their equalization, balance, panning, and effects.

The 2242 differs from many of the mixers in its price range, providing stereo inputs, balanced mono line inputs, four-band equalization on all channels, and four groups with faders feeding a stereo main output with a rotary level control.

This function mutes all inputs and their auxiliary sends, except the prefade Aux 1 send, allowing the operator to use this function in the control room without disrupting the artist's headphone mix in the studio.

The Samson MPL 2242 provides some very useful features in a low-cost mixer, and with 22 inputs and 12 separate outputs is flexible enough to suit a wide range of applications. The internal construction is simple and neat, utilizing hybrids and thru-plated epoxy double-sided PCBs. The controls are laid out in a clear, logical pattern that should make the operation of this very compact mixer easy even for the novice audio practitioner, but include features (such as in-place-solo) that also allow for more sophisticated users.

—Wade McGregor

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Bitsmanship 101

If 16-bit D/A conversion is better than 14-bit, and 20-bit is better than 16-bit, where does 1-bit conversion fit in?

BY LEN FELDMAN

In the early days of digital audio and CDs, 14-bit D/A converters were used simply because they were easier and cheaper to make. This, despite the fact that CDs carried 16-bit data. With 14-bit D/A converters, the two "least significant bits" of digital data coming off a CD were simply rounded off, or truncated. After awhile, manufacturers became able to make reasonably priced 16-bit D/A converters. But as so often happens in our industry, if 16-bit D/A conversion is better than 14-bit, then 18-bit must surely be better than 16-bit, and 20-bit...well, you get the idea. Before long the industry was engaged in what can best be described as a "bit war."

Then some time in 1989, there appeared a system of D/A conversion that actually used only 1-bit! Perhaps the first company to suggest the use of a 1 bit D/A converter was Philips, which published a definitive paper on the subject some years ago. The Philips version is called Bit Stream, but other manufacturers have given other names to similar processes — for example, "MASH" (by Panasonic and Technics). A rigorous explanation of the 1-bit process would require more space than is allotted to this column. What I can provide, though, is an overview of how the system differs from conventional D/A conversion methods currently used by many manufacturers, and of why it will provide better performance than those other systems.

In conventional multibit D/A conversion techniques, an analog current value is directly generated from a multibit binary sample value. These techniques rely heavily on the accuracies of circuit elements that are primarily analog. Some of the methods utilized to reach such high accuracies involve laser trimming of components, segmentation of divider networks, Dynamic Element Matching (a Philips patent), and simply adjusting the MSB currents by means of external trimpots. Any external adjustments that have to be performed on each and every device tend to deteriorate owing to aging and variations in temperature. Theoretically, any D/A converter having more than a single bit to work with is prone to nonlinearity.

The new technique developed by Philips performs most of the conversion process in the digital domain and avoids inaccuracies in the analog domain. The conversion itself is performed on a 1-bit high-speed data stream that minimizes nonlinearities caused by component mismatch. In the Bit Stream D/A conversion process, the 16-bit binary samples are converted into a high-speed (e.g., 11 MHz) 1-bit data stream that is then converted into an analog signal using a 1-bit D/A converter. Using the digital domain to transform the weighting on bits in a binary sample into the 1-bit data stream eliminates the major source of nonlinearity in D/A conversion.

Linearity in Bit Stream conversion does not rely on matched elements. There are only "+" and "-" full-scale reference points. Intermediate points are determined by time averaging rather than by amplitude averaging or approximations. There are only two ways in which any nonlinearity can be generated in the Bit Stream system. The first way occurs at very low signal levels and is caused by idling patterns from the noise-shaping circuits that form a part of the system. It can be minimized by the use of dither (random noise) signals added during the processing. The second source of nonlinearity is at high signal levels and can be caused by the analog signal processing components after the D/A conversion process is completed. Careful design and choice of analog components and circuits can reduce those nonlinearities.

Distortion at low listening levels in conventional, multibit D/A converters is caused by the Most Significant Bit change around zero signal level, resulting in glitches and matching errors. In the 1-bit converter there is no MSB change around zero level because zero is represented by an equal number of positive and negative full-scale pulses. For small signal levels, the ratio of positive and negative pulses is simply changed. The system, when analyzed in this way, may be thought of as a form of pulse-density modulation. Equal numbers of positive and negative pulses in the bit stream correspond to zero analog output. A predominance of positive-going pulses represents the positive portion of an alternating analog voltage signal while a predominance of negative-going high-frequency pulses denotes the negative portion of an alternating voltage. With this type of bit stream, low-order analog filtering at the output of the 1-bit D/A converter converts the high-frequency bit stream into an analog waveform that is almost an exact replica of the original recorded analog waveform.

If all of this seems a bit too technical, perhaps I can explain the difference between multibit and 1-bit D/A converters using a simple analogy of water buckets. In a 16-bit D/A system, think of a line of 16 water buckets. The

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first bucket is a tiny one, holding no more than a thimbleful of water. The next bucket holds twice as much, the next one after that four times as much as the first one, and so on, until the largest bucket, at the end of the line, holds 65,536 times as much as the first, tiniest bucket. In the digital-to-analog conversion process, each sample value determines how many buckets need to be filled.

The problem with the multibucket arrangement is the fact that it's pretty hard to build the largest bucket so that it will hold exactly 65,536 times as much water as the smallest bucket. Even a small error in the larger buckets' capacities will result in significant errors in the recovered waveform's shape and amplitude. Now, suppose that we only used the single, tiniest bucket to achieve the required sample values. To be sure, the guy filling the bucket and dumping its contents into the "summing" barrel would have to run like crazy to keep up with the 44,100 sampling rate, but if he could do that (by using a high basic "clock" frequency of many megahertz, as described earlier), the advantages are there. Even if the highest amplitude sample needs to be represented, it will be exactly 65,536 times as great as the smallest sample, because the tiniest (single unit) bucket was filled exactly 65,536 times; there's no chance of an error in the quantity of water poured into the "summing barrel."

The benefits of the 1-bit D/A conversion system, while significant both from the standpoint of accuracy and from the standpoint of cost (no one has to trim those multibit ladder-type converters at the end of the production line), are accompanied by at least one problem. The 1-bit approach results in considerably more quantization noise than would be the case with earlier forms of D/A converters. To solve this problem, a technique called noise shaping is used. In noise shaping, the total noise energy is not altered; it is simply shifted out of the audio spectrum so that it becomes inaudible. Therefore in reading about 1-bit D/A converter systems you are likely to run into such terms as second-order noise shaping, third-order noise shaping, and so on. Since the industry can't play games with bit counts anymore, it comes as no surprise that it has to play one-upmanship with noise shaping!

Speaking of bit counts, next time I'll tell you how the latest CDs can be made to sound as though they use 20-bit digital systems, even though they're still limited to 16-bit samples. EQ

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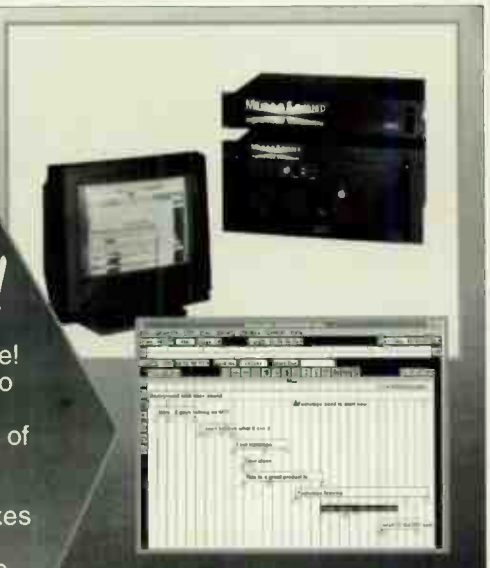

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A Touch of Glass

Glass can be the trickiest break in a wall and a troublesome reflective surface within the studio

BY JOHN STORYK

To understand glass and its effect on sound transmission, you need an understanding of Sound Transmission Class (STC) — the transmission rating calculated in accordance with ASTM classification E413. Remember: STC is a single-number indicator of sound transmission. It is helpful to review detailed octave-based transmission information to get the true picture of wall and glass transmission properties. In general, the higher the STC number, the better the total transmission performance of a particular type of glass.

Like doors, glass transmission specifications need never exceed the static boundary transmission loss criteria. Increasing glass specifications (thickness and/or type) can cause per-square-foot prices to sky rocket!

FIGURE 1

Glass Type and Thickness	Average Sound Transmission Loss 125-4000 Hz.	Loudness Reduction Compared to 1/4" Float Glass	STC Rating*
SS float	23.5 db	—	26
DS float	24.1 db	—	29
1/4" float	26.5 db	—	29
5/16" float	28.8 db	15%	29
3/8" float	29.7 db	20%	30
1/2" float	31.5 db	29%	33
5/8" float	34.5 db	42%	30
3/4" float	34.6 db	43%	33
7/8" float	35.4 db	46%	32
1" insulating glass	30.7 db	23%	31

Figure 1. Float/Plate glass table showing thicknesses and corresponding STC values.

Two major types of glass that can be used in studio construction: plate/float, which is typical glass with thickness ranging from 1/8-inch to 1-inch; and laminated, which is several layers of glass sandwiching an interior layer, or layers, of plastic. The plastic layer in this type of glass is typically very thin, e.g., .045 inches.

The reduction of noise produced by any barrier is proportional to its mass (weight per square foot), total boundary area, limpness, and airtightness (thoroughness of construction at penetrations). This statement applies to walls, doors, and *glass openings!* As glass thickness increases, mass will increase. At a certain point, however, there will no more increase in transmission loss due to increased limpness (acoustic decoupling). Actually, thicker glass will become stiffer (less limp). Lamination of glass increases limpness.

Studio walls vary in their rated STC values and octave band TL values. A typical single-partition gypsum board/stud wall will have an STC in the mid-'30s — depending upon exact stud width, insulation, and so on. Ideally, one would want to match this wall with a similar STC rating for the glass opening. Figures 1 and 2 show typical ratings for plate glass and for laminated glass. Thinner laminated glass will equal a considerably thicker plate/float glass equivalent, although cost and availability usually rule supreme. Most studios end up using the less expensive and more available plate/float glass.

Speaking of cost, typical pricing (material only) looks like this:

5/8-inch plate/float glass — $10/sq. ft.

2 1/4-inch laminate glass — $25-30/sq. ft.

As the glass opening gets larger, the extra thickness is more desirable, since it will vibrate less in a control room window wall. This has become less important with the popularity and acceptance of "nonconnected" main monitor assembly construction (i.e., detached concrete front control room walls).

Most studios walls consist of more than one layer of stud construction (or equivalent masonry), thus multipane window construction is necessary. In theory, the typical "room-within-room" studio/control wall should require three separate window lites and frames. This is recommended when the glass size is large since glass thicknesses are always slightly different. Experience and economy show us that combining two of the three partitions will give us nearly the required STC — especially when the window sizes are relatively small (e.g., 20-30 sq. ft.). See fig. 3. Keeping an air space between frames as well as the use of some sort of acoustic decoupling

Laminated Glass

FIGURE 2

Approx. Total Glass Thickness	Construction (.045" plastic interlayer	Average Sound Transmission Loss 124-4000 Hz.	Loudness Reduction Compared to 1/4" Float Glass	STC Rating*
1/2"	2 plies, 1/8" float	30.2 db	23%	33
1/2"	2 plies, 1/4" float	33.6 db	39%	36
1/2"	1 ply, 3/8" 1 ply 1/8"	35.7 db	47%	36
5/8"	4 plies, 1/8" float	36.3 db	49%	38
3/4"	2 plies, 3/8" float	38.9 db	58%	38
3/4"	3 plies, 1/4" float	38.7 db	57%	39
1"	6 plies, 1/8" float	39.8 db	60%	41

Figure 2. Laminated glass table showing thicknesses and corresponding STC values.

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material such as industrial 1/4-inch felt is important.

GLASS IN DOORS

Simply consider doors to be moving sound barriers. If the door selected is thick enough, we recommend multiple layers of plate/float glass or one thick (3/4-inch) layer. In thinner sound barrier doors (prefabricated metal doors, for example), the use of laminated glass is more desirable. Figure 4 shows a typical wood studio door with a two-glass-pane installation.

INSTALLATION & DETAILING

After the exact thickness and type of glass to be used are determined, careful attention must be paid to the mounting technique. The last condition of a successful glass boundary installation is its "airtightness," so the mounting of the glass is crucial!

In nonacoustic installations, glazing shims are often used with glazing compound. This is not satisfactory in the studio environment. A continuous "airtight" or "near airtight" seal is necessary. The most common detail calls for a U-shaped neoprene seal around the three sides of the glass seat, as shown in fig. 3. The glass should depress the neoprene by no more than 50 percent. Most studio glass sizes will require a medium density neoprene of between 3/16-inch and 1/4-inch thickness. Any thinner, and the compressed seal will simply not do the job. Studio glass will work just as well in wood frames and stops as in metal frames and stops. Usually building codes as well as certain aesthetic considerations will determine whether a project is constructed in wood or metal. If metal is used (typically hollow metal frames), be sure to fill the frames solid with grout or an equivalent such as dense spray foam. Metal does have the advantage of not shrinking or warping. A good kiln-dried hardwood will accomplish the same thing. Removable stops, "airtight" seals, and frame separations are still required — wood or metal!

GLASS & INTERNAL ROOM ACOUSTICS

After choosing the correct glass type, thickness, and construction detail, the final design consideration involves the actual placement or (in some instances) nonplacement of glass. This quickly becomes a lesson in ray room acoustic analysis as well as in reverberation vs. specular and diffuse reflection.

In general, glass will not become a liability for internal room acoustics. If you don't need it, try and avoid it.

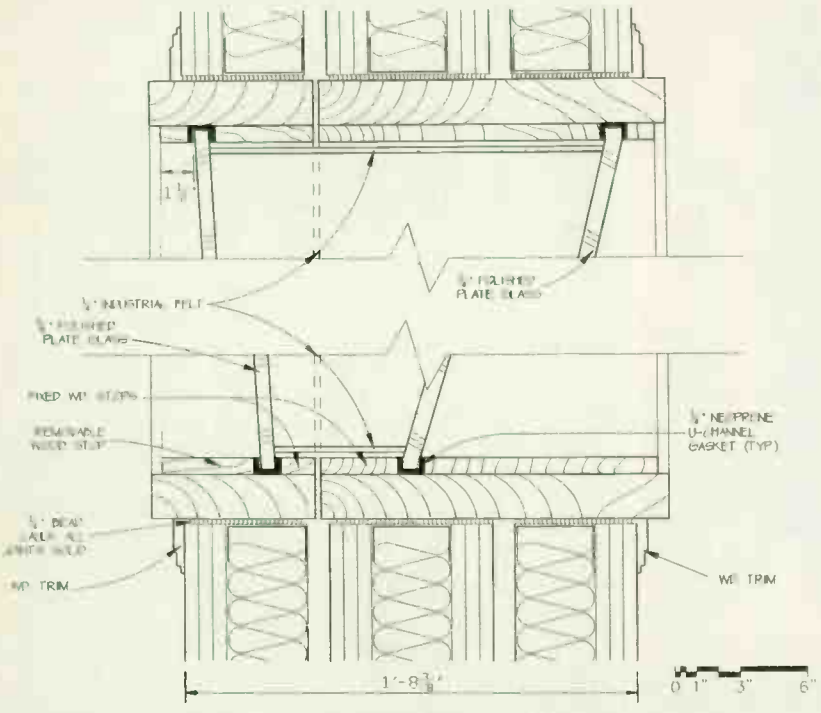

Figure 3. Typical three-wall/two-glass studio/control construction for relatively small window openings. (Note the combining of the two control room side walls into one window frame.)

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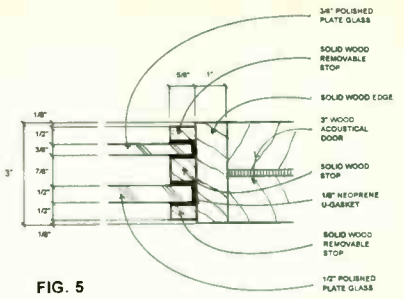

FIG. 5

Figure 4. Wood studio door with double gloss window instollotion.

Glass is virtually a 100 percent nonabsorptive surface at almost all frequencies The typical large front control room glass can become quite dangerous if it is placed in a modern 500+ sq. ft. control room with a diffuse or semi-diffuse rear wall. Secondary reflections (typically 25-50 ms out from direct sound) from this surface must be controlled. This can usually be accomplished by tilting the glass downwards into some sort of mid/high frequency absorption surface, such as a plush couch or rear console absorber. This can also be accomplished in plan with splayed pieces of glass. As the total glazing area gets larger, it can be more cost effective and acoustically desirable to facet the glass configuration in both planes. As the vertical dimension of the glass grows larger, glass thickness needs to increase, as do the glass pitch angles.

TIPS OF THE MONTH

1. How many times have you seen multilayered studio glass with dirty layers! The trick is to use surgical gloves when installing and to always have an extra person to clean the inside pane prior to sealing. All other construction should be stopped that morning, as well.

2. When attempting to install the typical U-shaped neoprene gasket around larger size glass units, it is often easier to simply cut strips of neoprene of the desired thickness from a flat sheet and create the U-channel by pre-gluing the strips on the glass. There is no difference in construction integrity if this is done correctly and it can often be considerably less expensive and easier to accomplish than trying to find odd-size gaskets.

3. Carefully evaluate if and where you need studio glass. On the side of the control room, it can provide similar or superior sight lines while allowing the reflective glass surface to become an asset in the room acoustics. EQ

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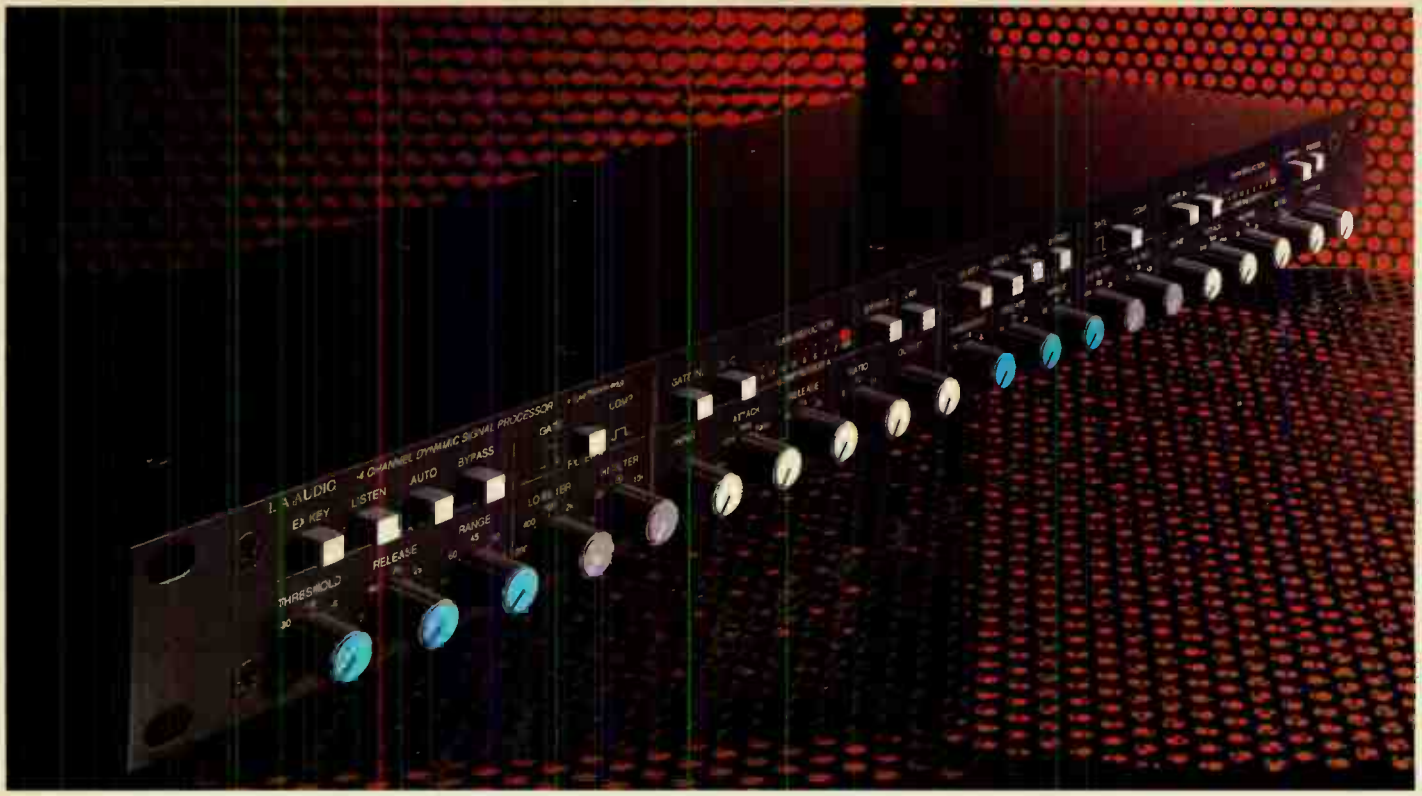

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ACROSS THE BOARD

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added another 3.40 ms. Our calculator told us that the fills were going to be 3.40 + 2.48 - .06 = 5.82 ms behind where they should be. By zooming in on Pro Tools, I could see that the reference snare was behind the mix snare by exactly 5.82 ms. I slipped the fill tracks earlier so that everything lined up perfectly. It is great how sometimes things work out as they are supposed to.

Now to mix everything together. In Pro Tools, you can assign everything to the same digital output and mix them together. I played the 4-channel file and set the proper level for the fills. It sounded great. For you detail mongers out there, no level change was made to the original mix and the fill tracks were digital black between fills. The resulting output was a clone of the master mix except where the fills were digitally added in.

To check the clone status of our results, I performed two tests. First, I locked up the two versions of the mix and fed them to the SIM machine. It said they were perfect except where the fills came in. Second, I made two files in Sound Tools. One file was the original master mix, and the other was the new mix with fills. I digitally inverted the phase of the entire original file. I then digitally summed it with the new composite file. When I played back the resultant file, all that was left was the drum fills. Everything else completely canceled out. Satisfied?

The new mix plus fills was copied digitally to a DAT tape and sent to the mastering facility to edit into the album master. From now on, all of the Donald Fagen CDs will have the version with the added snare drum fills.

So try this next time you are faced with a situation where you need to remix because you forgot something in the mix. When the artist asks you how long it will take, tell him five, maybe ten minutes, tops. EQ

WE INTERRUPT THIS COLUMN

No sooner has Roger finished his roadwork with Steely Dan (see Band in a Van this issue), than he's announced that he's planning a little road tour all his own. He's hitting the lecture circuit this winter with his pockets filled with notes about recording, records and miscellaneou s tidbits that he can't fit into his EQ column.

Who knows, maybe he'll even be handing out discount subscriptions to this magazine or unexpurgated news and notes from backstage with Donald and Walter. Or maybe, just maybe, he'll give you some hints to clean up your project studio act.

Hey...Roger's always got something to say. And now you can book him to say it to your local gang of tweaks and gear sluts.

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World Radio History

One Little Snare...

Kamakiriad is finished! Or is it?

BY ROGER NICHOLS

If you have already purchased Donald Fagen's *Kamakiriad* album, you may have a collector's item. It turns out that in the mix of "Counter Moon," the snare drum fills were turned down so low that you need a microscope to hear them. (I'll let you ponder that last sentence.)

Donald called me up and said that when they press the next round of CDs, he wanted the drum fills up where you could hear them. (The nerve of some people!) The catch was that he didn't want to go into the studio and remix the song because, other than the missing fills, it was perfect.

The drum fills were recorded on the Sony 48-track digital machine in stereo at 48 kHz. They needed some reverb added to them and then to be mixed into the existing mix, which was at 44.1 kHz.

If you kept notes from one of my earlier scribblings, you will recall that when we mixed, I printed the mix to a Fostex D-20B timecode DAT machine while simultaneously transferring SMPTE from the Sony 48-track "just in case" we needed to lock the mix up with the original multitrack. I guess this would be that "case."

To the non-Gear Slut, it would be simply a matter of synchronizing both machines, patching the analog outs into a mixing console, adding some reverb to the drum fills, record the results onto another DAT machine, and edit it into the album master. But that would have only taken an hour to do and therefore goes against the grain of my very existence. And besides, running the original mix through anything would have made it a generation down from what we want our public to expect from us.

Okay, follow along closely. Since both the 48-track at 48 kHz and the DAT machine at 44.1 kHz were referenced to video sync during the mix, both sample rates had a common denominator. Therefore, 3 minutes 24.003 seconds is in exactly the same place on both tapes. If I lock them up the same way for this drum-fill fix, they will achieve sample accurate lock even though they are at different sample rates.

One other little twist to our story. The original tape was 48-track digital, but I was at Walter's studio in Maui and he only had a pair of the new Sony 3324-S 24-track digital machines. I checked the 48-track tape and found that the drum fills we needed were on the first 24 tracks. Now we were about to find out how compatible the 24-track and 48-track Sony machines really were. We put the tape on the 24-track machine and it played back perfectly — timecode track and all.

Let the syncing begin. The machines locked and released to video sync for the common clock. The drum fills were in the right place, but to make absolutely sure, I substituted the regular snare for the fill track to see if it matched up with the snare already on the mix. I panned the whole mix to the left and the snare-only track from the 48-track to the right. I recorded the results into Digidesign Sound Tools and zoomed in to the sample level to make sure that everything lined up. It was perfect through the whole song. I then copied part of the regular snare into the fill tracks at the beginning and end of the tune for later reference. Now we could get down to business.

Remember, the quest here was to stay digital and be able to prove afterwards that nothing was changed in the original mix except where the fills were added. I ran the AES digital output from the Sony multitrack into the "B" input of the Roland SRC sample rate converter. I fed the digital output of the DAT machine into the Digital Domain FCN-1 box so that I could have multiple outputs from the DAT machine. One output was fed to the "A" input of the Roland SRC while the other was fed to the digital input of the 4-channel version of Digidesign Pro Tools. The timecode from the Sony multitrack was also fed to Pro Tools so that everything would have the same reference. Okay, catch your breath for a second and we will continue.

Reverb comes next. The digital output of the Roland SRC is now 44.1 kHz referenced to the sample clock of the DAT machine containing the master mix. This converted signal was fed into the digital input of a Lexicon 300 reverb. A slight amount of ambience was added to the drum fills so that they match the sound of the snare on the master mix. The digital output of the Lexicon 300 was then ready to be fed to Pro Tools.

I had to make two passes to get everything into Pro Tools because the 4-channel version will only let two of the channels come in digitally. (Remember, "It's always something!") This is why I put the snare reference on the front and back of the fill tracks.

Also remember that the master DAT mix had gone through only the FCN-1 box on its way to Pro Tools, which added a .06 ms delay. The stereo drum fills had gone through the Roland SRC, which added a 2.48 ms delay, and the Lexicon 300, which

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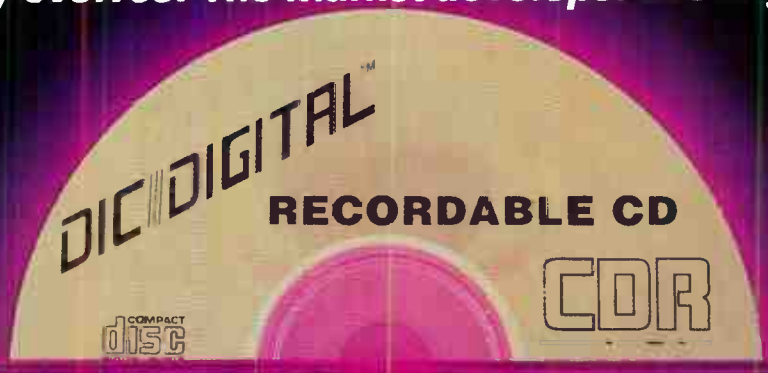

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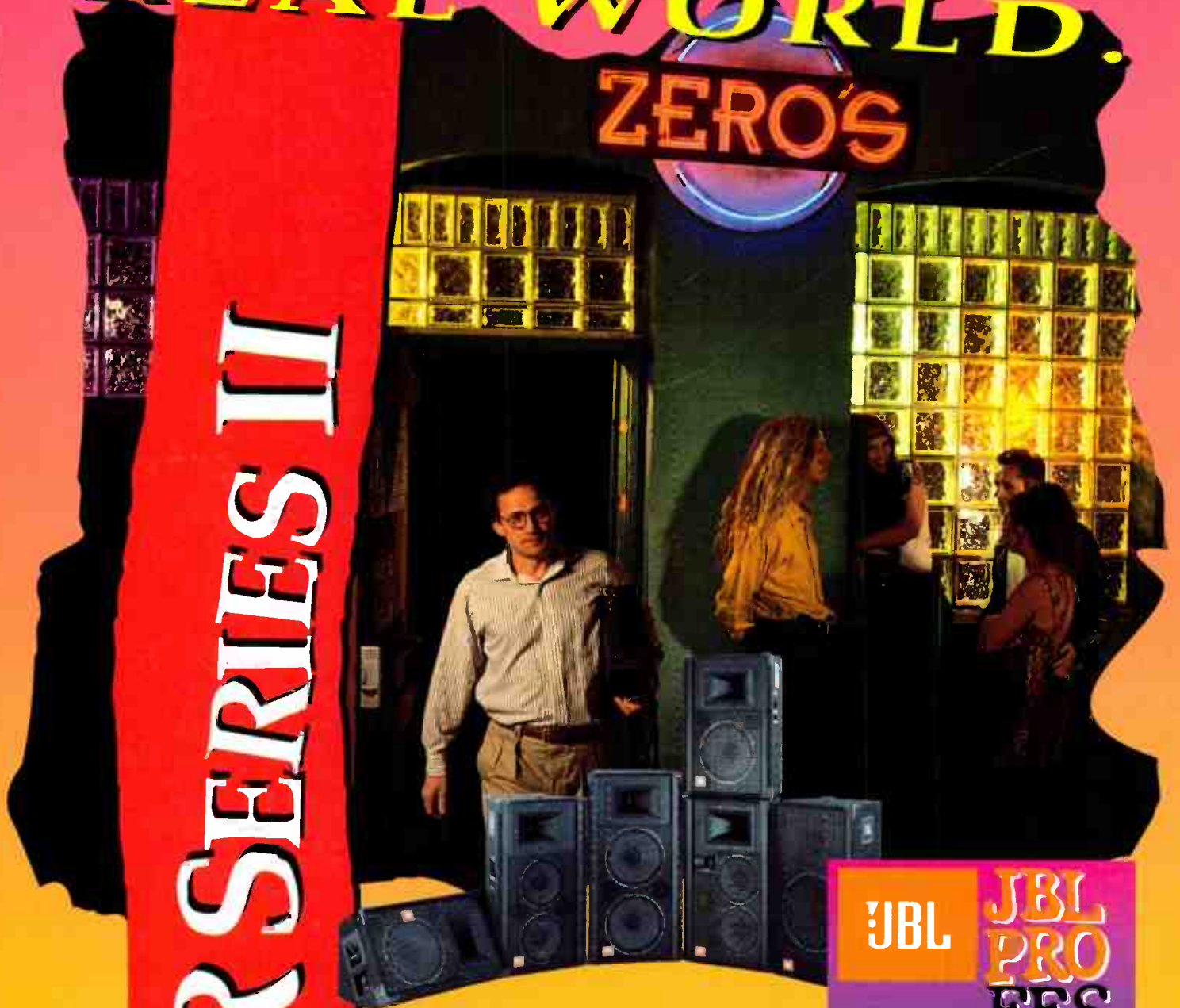

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