

FEB 1993

# EQ

**THE  
RECORDING  
& SOUND  
MAGAZINE**

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- HOW TO FLY
- TECHNO ON STAGE

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- FOSTEX DCM100 & MIXTAB
- MEYER SIM SYSTEM II
- JLCOOPER MCS
- CUBASE AUDIO

\*\*\*\*\*3-DIGIT 502  
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# DYNAMIC RECORDING & PRODUCING DUOS

Jimmy Jam & Terry Lewis  
L.A. Reid & Babyface

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# EQ

PROJECT RECORDING  
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VOLUME 4, ISSUE 1  
FEBRUARY 1993



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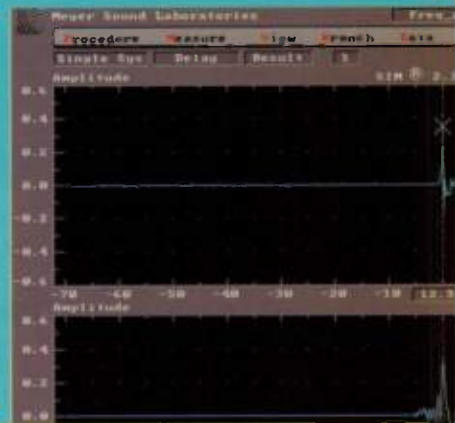
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On the cover: Jimmy Jam and Terry Lewis by Per Breihagen

When you set out to unearth some strange and startling sounds, start with a tape that's truly out of this world.

That's the philosophy of Mark Mangini who, as the head of Weddington Productions, created the sound effects for major science-fiction thrillers such as *Star Trek*, *Gremlins* and *Poltergeist*, just to name a few.

Mark now relies on Sony Pro DAT

Plus tape for recording and archiving his one-of-a-kind sounds and hauntingly beautiful melodies.

"The low error rate and consistent reliability of Sony Pro DAT Plus is critical in our search to capture and preserve the unusual sounds used in fantasy and horror films," says Mangini.

People like Mark put Sony's engineers in the right spirit to

continually expand the boundaries of our digital audio tape technology. The proof is found in our new Pro DAT Plus.

Ultra fine metal particles help deliver improved playback output in addition to a superior S/N ratio, while special binders and surface treatments help to achieve error free performance in any natural or supernatural environment.

You'll also discover a heat-resistant shell, anti-static lid and new

two-tape album case to protect your tapes from things that go bump in the night. And an erasure prevention tab to make sure you won't accidentally lose your "voices".

As Mark Mangini knows, a quality tape library is the lifeblood of any post sound company. He also knows that with new Sony Pro DAT Plus, life at Weddington Productions is a lot less scary.

# SONY'S NEW PRO DAT PLUS HAS EVERYONE HEARING GHOSTS.



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**NICHOLS & DIMING**

Last August 20, I, along with other representatives of Philips and Polygram, travelled to Nashville to give your columnist, Roger Nichols, a demonstration of the Philips DCC900, the first Digital Compact Cassette recorder/player. After the demonstration, Mr. Nichols indicated that the sound of DCC pleased him more than when he first heard it some 18 months before, and that he was impressed with DCC as a solid consumer product.

Imagine our surprise then at his glib column in the October '92 issue of EQ, "Here For The Gear," which we believe was filled with irresponsible misstatements, misrepresentations, and falsehoods.

First, we did *not* bring a production unit to demonstrate for him, as he stated. The DCC900 was not in final production at the time. We made it quite clear that the DCC900 deck in Nashville was a hand-built *preproduction* unit. This was to be understood when making critical judgements.

Second, his contention that "everyone in the room could tell every time which was the DCC and which was the CD" is not only not true, but impossible, for one simple reason: all we heard was the CD, which we tried to note at the time of the demonstration and which we did explain more fully a few days later.

Nichols's engineer connected the DCC900 via the deck's digital line out to a D/A switcher, along with a CD-R player. The DCC900 was placed in pause/record to generate a monitor

throughput of the CD signal, now theoretically encoded in PASC (Precision Adaptive Sub-band Coding, Philips's award-winning digital data encoding system). His engineer then switched between the CD signal and the pause/record DCC900 "PASC-encoded" CD-R monitor throughput for an A/B comparison.

However, the DCC900 has no monitor out. Sensing he wasn't hearing a true PASC/non-PASC comparison, we suggested to Mr. Nichols that he make a recording of a CD onto a blank DCC, and compare this PASC-encoded copy with the non-PASC original. He declined. A few days later, I offered to return to Masterfonics to conduct a correctly-wired demo using a special DCC900 featuring a PASC/non-PASC switch, designed specifically for the type of comparison Nichols seemed to have in mind. This offer was also declined.

Curiously, Mr. Nichols's published anti-DCC sentiments belie his current public utterances. The appearance of his column actually coincided with pro-DCC comments he made at the "Data Compression Techniques and Pitfalls" seminar last October 2 at the Audio Engineering Society's annual convention in San Francisco. At the seminar Mr. Nichols admitted he knew that the DCC900 doesn't have a "mode to make [an original signal] go through the [PASC] converters and stuff. So you actually have to record it and play it back." (These quotes are from the AES's audio tape of the symposium.)

Nichols added that "when Philips



To DCC or not to DCC? That is the question.

brought the DCC machine by Masterfonics for us to listen to, they had the CD and the DCC tape from the same source and we could compare those and do some recording and compare." This is faulty memory. The only comparisons done in his studio were from the CD using a CD or CD-R source of his choosing.

Nichols, in direct contradiction with his printed view, went on at AES to actually praise DCC and PASC: "Now it's pretty hard to tell the DCC or the MD and CD in any environment except a well-tuned studio environment...I think everyone should jump on the digital compression bandwagon and help support it and come up with new ideas to improve it...I think that data compression is here to stay...I'm going to be standing at the door when the store opens to buy my first DCC machine."

In his column, Mr. Nichols naively suggests that "both Sony and Philips could have come up with something that would have been an improvement over CD," but neither did so because of "all the investors in this equipment (i.e., the record labels)." Certainly, both Philips and Sony have profit motives and investments to protect, but it should be quite clear to even the most casual observer that both have always acted on the belief that invention is both progressive and profitable.

Nichols attacks not only the DCC format, but Philips itself. He cynically implies in his column that Philips' rationale for creating DCC was to perpetuate royalties on our patent on the original compact cassette. This is simply poor reporting. Philips collects no royalties whatsoever — and has never collected any royalties — on any analog compact cassette manufactured on its original compact cassette patent. In its successful attempt to establish a worldwide standard for the compact cassette, Philips did not enforce licensing. This calculated largess, however, resulted in a wide-ranging degree of quality. (To ensure strict quality compliance — and, obviously, to generate income — DCC will be licensed.)

Then we come to Mr. Nichols's less-than-scientific "survey," which is as meaningless as it is insulting to EQ's readers. Please know we never said we conducted "a survey and most

people preferred cassettes instead of CD." We simply cited Electronic Industries Association (EIA) figures to make the point that the audio cassette is the most popular format for prerecorded music in the world, and has been for many years.

His first question in the seemingly impromptu retail survey illustrates the lack of efficacy in the responses that follow. Perhaps 86 percent of his respondents own a CD player, but actual U.S. penetration of CD players

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is less than 40 percent according to the EIA.

Also illustrating Mr. Nichols's careless reporting are his contradictory results from questions #10 and #12. In the former, his analysis is that "nobody cared that they could play their old analog tapes on the new machine." Yet, in the latter response, "60 percent said they would prefer the DCC in the car if it would also play analog tapes." Both cannot be correct.

And concerning his question #13, how could consumers make an informed choice and determine relative size differences between a Mini-Disc and DCC portable when neither was available at the time to show or demonstrate? Did he use photos of prototypes? What were the research criteria?

Finally, and most irresponsibly, Mr. Nichols states that respondents told him that "ads said that DCC was completely compatible with their existing cassettes," and uses this exact wording to accuse Philips of purposely misleading the public.

Whether or not this language is "misleading semantics" is beside the point — such a claim by Philips simply does not exist. We defy Mr. Nichols to produce any Philips consumer DCC materials that make a claim for DCC being "completely compatible with...existing cassettes" — especially in the so-called "ads" he refers to as the source for his respondents' alleged misconceptions. In fact, the first consumer advertising for Philips DCC did not break until weeks after his "survey."

Philips has never claimed DCC is "completely compatible" with analog cassette technology, simply that analog cassettes can be played back in DCC decks. Nichols's inference that we are purposely trying to mislead consumers — semantically or otherwise — is potentially libelous. *EQ* should have caught this before printing.

We have no quarrel with Mr. Nichols for using his column's space as a bully pulpit to support the formats of his choice, but his October column, we believe, constitutes a bla-

tant and dangerous abuse of this privilege and, worst of all, a disservice to your readership. Particularly so when his statements at a recent industry forum seem to be in direct contrast to his *EQ* editorial.

*Mike Piehl*  
Audio Marketing Manager  
Philips Consumer Electronics

## DCC COUNTERPOINT

First of all, I am impressed with Ferraris, but would rather drive a Lamborghini. Just because I was impressed on first contact with the DCC doesn't mean it is the answer to every man's audio prayers. No matter how you look at it, DCC is better than cassette, but is by no means "CD equivalent."

In Nashville we first listened to a tape and CD, supplied by Philips, of the same program material. We listened to the CD and to the DCC. The CD was superior, but the DCC was very good. Everyone could tell the difference. We were originally told that

# HOW TO GET FROM HERE...





with the unit in E-E mode that PASC encode/decode was active. We listened to CDs directly and through the DCC. It was very close, but there was still a difference. When we found out from Philips toward the end of the listening session that in fact the audio signal was not being PASCed, we basically gave up. If you could hear a difference while just listening on input, then you could surely tell the difference with the PASC circuit engaged.

About comparing the DCC in an environment other than a studio, I doubt if it will make any difference whether the music in the supermarket is coming from cassette, DCC, or CD. I do think that data compression is here to stay, whether we like it or not. I also said that work should be done using compression to increase the quality of the CD. I was at the door of Rabsons Stereo on 57th St. in New York when they got their Technics DCC machines. It was priced at \$1000, and the only tape they had was the GRP sampler. Within the first five minutes of program material, there were two

places where the tape would not play back without the familiar tearing sound of digital error correction failing. The salesman said that he thought the tape was always like that. I didn't know whether it was the fault of the tape or the deck, but I didn't want to spend \$1000 to find out.

If invention is both progressive and profitable, and royalties don't matter (I guess there was no reason for ABC Records to deduct for "extra license fees for cassette production" from the artists' royalties), then why was Nakamichi prohibited from producing its "double speed cassette"? Why was the EL-Cassette (the large version of the cassette with wider tape and higher speed) produced during the early '70s stopped for allegedly infringing on Philips patent if there were no royalties to pay?

I don't care about the EIA figures; all I care about are the people going into Tower Records. It doesn't take much to figure out that the people walking into a record store are there to buy recordings. Tower Records sells

more CDs than cassettes, so it seems reasonable to expect the survey to show that.

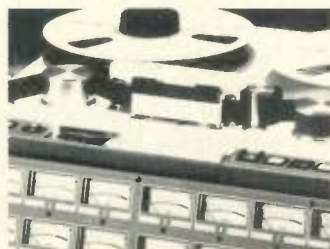
Nobody cared that they could play cassettes on a DCC machine. The first machines are home machines. Everybody has a cassette deck at home. If car players were the first versions out, then people would prefer the DCC, as stated — the questions were not mutually exclusive.

By "ads," I included all of the press in *Billboard*, *Entertainment Tonight*, and other media, where the compatibility was stressed.

Finally, I guess I have as much right to use my "bully pulpit" to support the format of my choice as you have to use all of your marketing expertise to wring those hard-earned dollars from the hands of unsuspecting consumers. Oh, and don't blame *EQ* for my column.

P.S. — On the other hand, I think the Philips CD-R system is the best thing since sliced bread. I hope that the next letter you send me is the result of your being unable to keep up

## ...TO HERE



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with the production demands caused by my blatant endorsement of CD-R as the wave of the future.

*Roger Nichols*

### VOICE OF THE PERSON

Re: Voice of the People — DAT Machines

Boy this is how ugly stories get started! As the seller and user of the first Panasonic SV-3500 in the U.S., and as one of a handful of factory-trained Panasonic DAT technicians, I must not let pass a few misconceptions about the letters of Messrs. Kreins and Bugg (December 1992).

The 37/3900 "clumsy case design"? Has he tried to clean a Sony? Working on a Panasonic is a dream compared to some units — and one who is inexperienced should not be inside a DAT with big swabs and such, anyway. To wish a 3900 to chase lock shows his apparent lack of technical knowledge. It was *not* a "left-out" function, and it requires a helluva lot of doing — as is evidenced by the price tag of timecode DAT machines and their synchronizers. On to Mr. Bugg — bemoaning the durability of a "consumer" deck: the heads, transport, and related control circuits are *identical* to the 37/3900. If his DA10 only "lasted a year," then a 37/3900 would not have lasted any longer in identical circumstances. And as far as his experience with Panasonic service goes, I would have to have more details to comment specifically, but typically their DAT service runs about two weeks. These are complicated machines with tight tolerances and we all want them right. I turn mine around in about that time frame.

*Klay Anderson*

*Klay Anderson Audio  
Salt Lake City, UT*

### KEEP THE TIP

In the article "Making the Most of Your Mics," which appeared in the December issue of *EQ*, reference was made to one of our products — Cramolin.

There are two issues that need to be addressed. First, although we still offer our Cramolin products, as of April 1992 we have been recommending our new product, DeoxIT. This new formula contains improved deox-

idizers, preservatives, conductivity enhancers, and no CFC's. DeoxIT is an effective solution for cleaning and protecting electrical connectors.

The second issue to address is the mention of Q-tips as a form of application. Q-tips should *not* be used as they tend to leave a lint residue that can impede electrical performance. We only recommend the use of foam swabs, lint-free cloths (cotton or polypropylene) to apply our product. In addition to spray and liquid, DeoxIT is available in a pen applicator and pretreated lint-free cloth wipes.

*Diane James*

*Caig Laboratories, Inc.*

### SOMETHING WE SAID?

Let me begin on a positive note. Up until the last couple of issues, I have been crazy about your magazine. I can't wait to get each issue and read it from cover to cover. It's full of great techy and recording tips. What's this kick, however, with articles on recording engineers for Hendrix and Madonna? Who cares. I want the how's and why's.

The real purpose in writing you today is to say that I'm disgusted with your latest junk about Madonna. I'm sending the article back because I don't want any half-naked photos of Madonna in my studio or the cover that shows some guy who looks like he just reached puberty. I thought you guys and your magazine were a little more professional. Why are you guys starting to sell sex. I think you are selling sex — especially when you use "and, of course, *Sex*" in your table of contents...like I'm supposed to start salivating or tear through pages. Well I'm not going to read a word and I won't have it in my studio. Have your article back.

I certainly hope this type of headlining won't continue but you'll return to real recording stuff. About two years ago I dropped a magazine that started with "M" and ended with "X" for you guys.

For the most part, *EQ* is great! "Please stay on track"...clean up your act.

*Steven K. Hornold*

*Lighthouse Recording*

[Editor's Note: Thanks for your readership and your comments, but Madonna is the most successful woman in

# Easyverb

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MICROVERB® III is the Easyverb. It's the easy to use, 'does what it's supposed to' preset digital processor that covers all the bases from classic reverbs to mirror image delays, with the rich, luscious sound that's only found in an Alesis reverb. Featuring 256 programs, it's a Microverb times 16. Think about *that* for a minute.

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### NO STINKIN' ESSES!

Here's a quick way to rid yourself of that annoying sibilance problem when recording a vocalist up close with a large capsule condenser mic: Try taping a pencil or pen vertically across the face of the windscreen. [The pencil should end up in the same plane as the vocalist's nose.] The idea here is that the body of the pencil will divide the air column at short wavelengths, producing a "shadow" of nonturbulent air behind it. This reduces or eliminates the energy that causes the mic diaphragm to flutter in the breeze. You'll still get a clean, high-fidelity "S," "T," "V," "F," etc., but without the hash.

Based on a conversation with:

*Andy Green*

*Mix Engineer*

*National Video Industries, NYC*

### PREVENTIONS/CURES

As the tip above illustrates, the best place to eliminate sibilance is before the microphone. If you're getting a good vocal sound except for a splatty "S" syndrome, try rotating the microphone 10 to 15 degrees to one side so that the airstream will be blowing slightly across the capsule instead of dead straight on into it. This lets the element respond to one set of mostly phase-coherent pressure variations instead of to two or more combining in odd ways.

Once sibilance has been recorded on tape (or produced on tape by overmodulation) the best way to get rid of it is with an outboard de-esser. If you just can't get your hands on one, you can try cleaning up the track by boosting the "air tones" at 14 kHz and above (use a high-quality shelving equalizer). Just make sure you don't make things worse by mixing the enhanced vocal too hot — thereby creating the problem all over again.

### BRAVE NEW SIBILANCE

If you're tracking a project that will be released on video or computer-based multimedia, extra care and attention should be paid to those sibilant sounds, for a whole lot of reasons.

Analog video formats — even current "broadcast quality" ones such as 1-inch/C-format and Beta-SP — are notoriously intolerant of overmodulation at high frequencies. (In general, don't count on that "sweet sound of analog tape crush" with video. You won't get it!) Up until a very few years ago, most manufacturers of TV sets paid little or no attention to audio quality. Some satellite uplink facilities and many cable companies still don't. That mix you labored over long and hard will probably be monitored for broadcast through a 2 x 3 inch salami-skin speaker mounted atop a far-away rack in a noisy video machine room. In mono. Unless you know for dead sure certain that you're narrowcasting to well-heeled audio enthusiasts with high wattage Dolby Surround™ playback systems, it's best to overdo your sibilance control (almost to the point of "I Lef My Har In An-fran-i-co").

All the above goes double when building audio for desktop multimedia applications; especially those running at slow sampling rates (anything below 32 kHz) and low-bit architectures (anything below 16-bit). Think of the physics of the situation: Even at 20-bit/48 kHz, the sibilant harmonics are right up there against the brick-wall filters at the front end of your A-to-D convertors. Then, of course, there are the limitations of the amp-speaker chain in most computers.

Even though you're mixing for the cutting edge future, check your sibilance factor on the crappiest old transistor radio speaker you own. Or make a cassette and play it on your pre-V-mailera phone answering machine. **EQ**

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# EQ&A

## TAKE IT WITH YOU?

**Q** *Is it possible to run Opcode's Vision and Galaxy programs on an Apple Powerbook? I've heard about minor problems in receiving dense MIDI data. Have these problems been solved? Which Powerbook should I use? I plan to use the Powerbook for live gigs and studio production.*

*Ralph Webster  
Rhythm Nation Productions  
Rotterdam, Holland*

**A** The Opcode MIDI System (OMS) 1.2 software allows Opcode's Vision and Galaxy MIDI programs to run on the Modem port only of Powerbooks 140, 145, and 170 (and on the newly announced Powerbooks that have Modem ports, as well). Since the Powerbook 100 does not have a Modem port, OMS 1.2 cannot fit this computer model. OMS will be released from Opcode in the near future as an update to the current version. Opcode users can contact Opcode Consumer Support at 415-856-3333 for details on getting the update.

*Paul de Benedictus  
Director of Marketing  
Opcode Systems, Inc.*

## O SOLO MIO

**Q** *Would you please explain when to use the autofade functions and the different solo modes on the Amek 2500 console?*

*Eugene Pereira  
Amsterdam, Holland*

**A** The Amek 2500 console featured VCA features and subgrouping, master status switching, and an unusual feature known as autofader. The autofader allowed for the stereo buss's master fader to fade up or down from whatever level was set from the fader, over a time period that was variable from 1 to 50 seconds. In theory, this would allow an engineer the luxury of automatically fading a cut in or out while he was simultaneously occupied with other mixing

tasks. It could also allow for predictably smooth and timed fades, so as to ensure a proper fit to required timings.

The engineer simply set the fade function (down or up) and desired duration, then hit Start to begin the fade in or out. Unfortunately, since there were no gain limits settable on the autofader, it would always fade down to infinity or up to clip (i.e., *very loud*) unless stopped by the release of the Start switch. It therefore required some care in usage. Nowadays, computerized automation systems can do a better job of performing autofade functions, and this feature is offered on a number of modestly priced systems, including Audio Kinetics' REFLEX, Amek's SuperTrue, and JMS' C-Mix.

The solo system on the M2500 offered the user a choice between a mono After Fade Listen (AFL) and a stereo Solo-In-Place or Check Solo. AFL does not affect the main mix output and the actual recording. It is a monitoring tool to isolate sounds when applying effects and EQ so that they may be treated individually without hearing the rest of the mix. It is extremely useful in verifying that extraneous signals are not being recorded along with the desired input. The signal is taken after the fader so that level relationships are maintained, and is presented as a mono signal on the center of the monitor speakers.

Solo-In-Place is actually a form of muting. It mutes all tracks that are not soloed — explaining the common alternative names such as "kill solo" or "destructive solo." Pressing an individual solo switch will mute every other input to the console (except aux returns), leaving the channel being soloed at the precise level at which it appears in the mix, and in its correct position in the stereo image. The exact contribution of each channel in the mix, at the presently set master mix level, can therefore be clarified.

On the M2500, there are solo switches in both the monitor and channel paths, although Check Solo is only available on the channel path solo switch. The basic modes are modified by several Master Status switches. When the console is in Record mode, Check Solo will only affect the monitor mix channels, muting all monitor mix channels except

the one selected. This gives a positional solo with phantom echo, but does not kill the signal to the tracks. In mixdown, Check Solo gives complete muting of *all* other input channels while retaining the full spectrum of effects that may be in the circuit. Auxiliary returns are not muted so that both signal and effects can be heard "In-Place."

The M2500 also allows for Solo Group in Check Solo Mode. A number of channels are assigned to a solo group by switches on the individual inputs. A Solo Group master switch on the M2500C module's Master Status section is activated. Then when any individual channel in the group is placed in Solo, the whole group will be heard in Check Solo mode. Thus, in mixdown, a whole drum kit or all vocals can be heard with panning effects, in isolation, at the touch of a single solo button. When the console is in Record Master Status, the solo group switches work in the same manner to create a positional monitor group solo.

Solo Group and Mute Groups are similar in operation. Therefore, flipping Master Status between Solo Group and Mute Group allows one to hear the selected channels, alternating with the complete mix minus the selected channels.

*Lewis Frisch  
U.S. Press Officer & Regional  
Sales Manager  
AMEK/TAC*

## OUT OF SYNC

**Q** *Yesterday, my sequenced parts were perfectly in tune with those musical parts recorded on tape. Today, the tape recorder and my keyboards are way out of tune with each other. What gives?*

*Natalie Bonnano  
Niagara Falls, Ont.*

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required a powerful automation system and a small footprint so that he could work alone. Also standard. He got what he wanted and I got what I wanted: a remarkable console for a reasonable price."

David Porter, President, MUSIC ANNEX, Inc. San Francisco, California  
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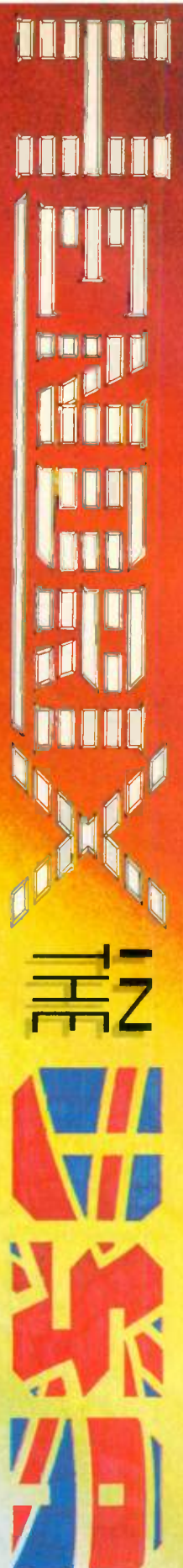
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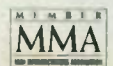
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Roger Maycock  
Product Specialist  
Fostex

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Q I purchased a QSC MX700 amplifier to use in my personal studio. I am very satisfied with my amplifier, but I have noticed that the fan is too loud for my application. Is there something that can be done to make the fan quieter?

Larry Johnson  
Boca Raton, FL

A The MX700 currently has a two-speed fan in its design, whereas earlier revisions have a brute-force one-speed fan. The two-speed fan was incorporated as an effort to meet more of our customers' needs. We recognize, however, that some may want the fan to be even quieter. So, you can have your local QSC-authorized service center, or the QSC Service Department, install a custom precision-balanced fan specified for low-level use in quiet environments. This fan is not recommended for MX700's that are used in wide open applications, as high-duty-cycle performance is needed. This special fan can be ordered from QSC's Service Department at 800-854-4079 or 800-772-2834.

Darrell Austin  
Service Manager  
QSC Audio

### ROLL OUT THE MIDI

Q I am involved in a project to convert old piano rolls and other similar musical media into MIDI-compatible data. I need to find manufacturers of generic, board-level MIDI circuitry (as opposed to complete assembled products) so that I can design my own interface. So far I know about Devtronix in Sacramento, CA, PAIA in Oklahoma City, OK, and JLC Cooper, none of which seems to



# General MIDI:

## *Enhancement Takes Studio Technology to the Consumer*

By David M. Rubin

It's undeniable, it's indisputable, it's unavoidable, it's inescapable: multimedia is now a reality.

The vaguely-defined but highly-hyped melange of graphics, text, and animation has suddenly captured the public's fancy and launched new expectations for high-quality desktop productions. Perhaps most important though, is the role of music in gluing together multimedia's various elements; important because the phenomenon has created new opportunities for composers, instrumentalists, and music producers alike. Many of the people and companies who develop computer-based business presentations, sales pitches, product demonstrations, training programs and other multimedia events have dis-

covered that MIDI sound modules provide an ideal way to generate direct-output soundtracks. And new additions to the MIDI Specification have helped overcome some of the nagging compatibility problems of the past.

For multimedia producers MIDI provides a relatively easy way to add high-fidelity music and sound effects to a presentation. Most application programs that play multimedia presentations can automatically trigger a MIDI file at a programmable time to generate music in real time, directly from a synthesizer or sound module. This eliminates problems of sound degradation and—particularly for self-running presentations not monitored by a human operator—tape synchronization. Compared to digital audio files, it also demands very little disk space.

The birth of MIDI in 1983 ushered in the era of universal interconnectivity for electronic musical devices. For the first time, anyone—even someone without a degree in electronic engineering—could create networks of keyboards, synthesizers, and sound modules to exchange musical performance messages among different brands of instruments.

But MIDI's new age of hardware compatibility hit a snag when synthesizers became joined at the hip with personal computers: sequencer programs did not provide the same level of universality in software that MIDI did in hardware. At first, sequences created on one computer platform were unreadable by another; worse, users could not exchange files between sequencer programs, even on the same computer. The *Standard MIDI File* format resolved this unfortunate situation, and virtually all of the current crop of MIDI composing, editing, and notation programs now import and export files stored in this generic format in addition to their own proprietary

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# Editorial

By **Tim Tully**

**T**his is the first appearance of *Studio Software Report* in *EQ*, and I wanted to take the opportunity to tell the readers of the magazine how glad we are to be here.

*SSR* is designed to cover a very specific niche. As the name indicates, *SSR* focuses on the recording studio—mostly the project studio—and the influence that software and computers have on that studio. And within this context, we try to give our readers something no one else does—a timely, news-like view of the dynamic nature of studio software.

The heart of *SSR* is the Version Updates feature. We know that a lot of studio owners buy a piece of software—or a hardware unit controlled by software—and don't spend the rest of their lives keeping up with new versions. Unfortunately, a lot of great improvements are made continually, both to computer applications, and to the ROM software controlling your hardware. Unless you spend a lot of time reading and making phone calls, you won't hear about updates to your software tools. And if you don't know the manufacturer has issued an update, you can't very well take advantage of it. So to help you get the best from your investments in studio gear, we publish the latest version numbers of all the studio-related software we can get hold of, what it's got, who to call, and what it costs to get it.

A lot of people don't realize how

much of an ongoing process the development of software is. No manufacturer—none that stays in business for very long, anyway—just builds a program, sells it and takes off for Acapulco. Most of the time, when a program hits the market and gets reviewed in the press, the developer already has a bunch of fixes and upgrades for it already in progress. As the first reports on the product from users and reviewers start coming back, the developer finds out real fast what needs to be changed. Ironically, the sooner this is done, the less likely it is to get a mention in magazines

who've already reviewed the product.

That's where our Software Directions column comes in. Software Directions reports on ongoing developments, upgrades, cross-platform ports, industry trends, and the important modifications that are being made—or should be made—to the gear you may already have. We don't review software here, but we will comment on the progress of beta versions, upgrades, directions and intentions of companies and products pertinent to the functioning of your studio.

Next Generation is simply a report on what's new in software-related studio geegaws: the new products you may want to buy to catch the next wave.

It's great to be a part of *EQ*; and we're looking forward to helping *EQ* readers remain the best-informed software users around. ■



**EQ • February 1993**

## STUDIO SOFTWARE REPORT

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## GENERAL MIDI

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file formats. Through the combination of MIDI hardware and the Standard MIDI File format it is now possible, for example, to compose music on a Yamaha synthesizer using a Passport sequencer and play the music back on an Opcode sequencer with a Kawai sound module.

Unfortunately, one problem still remained in this scenario. While the software will most likely re-create the performance perfectly, the music will still sound wrong. The problem, of course, is that MIDI instruments offer entirely different types and numbers of sounds and organize and implement those sounds in equally different ways. In other words, you may find that the lovely woodwind trio you composed in your studio ends up as a trio for kalimba, trumpet, and snare drum on someone else's system. This lack of predictability in sound output represents the missing link in the hardware/software compatibility chain. It makes it difficult for a multimedia producer to add a MIDI soundtrack to a presentation and feel confident that the final result will sound right on another setup. The solution to this problem is General MIDI.

General MIDI (GM) is a new subset added to the original MIDI Specification. It describes a number of characteristics that a MIDI instrument must possess to qualify as a GM-compatible device. For example, a General MIDI sound module must provide multitimbral capabilities with at least 24-note polyphony. It must respond to all 16 MIDI channels—reserving channel 10 for key-based percussion—and designate middle C as MIDI note number 60. GM-compatible instruments must also respond to a specific list of MIDI messages.

### CONTROLLERS:

- Modulation (#1)
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- Expression (#11)
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Coarse Tuning (#2).

### CHANNEL MESSAGES:

Channel Pressure (aftertouch)

Pitch Bend range of +/- 2 semitones.

The most significant component of the General MIDI standard, however, is the *Instrument Patch Map*, a list of 128 sounds along with their assigned program numbers. The sounds are grouped into sixteen categories, each containing eight related timbre names. The Instrument Patch Map offers an excellent sonic palette that's suitable for a wide range of applications. The sounds include a good selection of orchestral instruments, keyboards, vocal ensembles, synthesizer timbres, ethnic instruments, sound effects, and more. The drum sounds on channel 10 and their placement across the keyboard are specified in the *Percussion Key Map*. These two maps provide an important template of sounds that introduce a much-needed level of predictability into the reproduction of MIDI music files.

It's important to realize that General MIDI does not specify how the individual sounds are created nor does it indicate any standards for sound quality. It merely requires that a certain collection of sounds be present in a certain order. Individual manufacturers are free to use any synthesis method that they prefer. Additionally, sound modules need not limit their sounds to the GM list. Many manufacturers will choose to add a GM subset to a sound module's internal library. General MIDI is not intended to restrict the development of new sounds or synthesis methods, nor to homogenize the MIDI marketplace as some had initially feared. It is designed simply to promote a class of sound modules that can offer a pre-configured setup for reliable playback. This in turn makes it possible to create MIDI Files compatible with a number of devices, rather than being limited to specific instruments.

Because each brand of sound module produces its sounds through its own unique method of synthesis, GM instruments will not all sound the same when playing identical MIDI Files. Furthermore, manufacturers have some latitude in interpreting the required instrument sounds. An electric piano, for example,

can sound quite different on different General MIDI instruments. Nonetheless, the overall orchestration and the basic sound of a MIDI performance should not create any shocking surprises if a General MIDI File generates a performance on different brands of GM sound modules. For third-party developers and multimedia producers this provides the necessary common ground that will further enhance MIDI's usefulness for desktop presentations.

Many manufacturers have already released GM instruments, and there are some serious contenders here. In no particular order:

### Roland SC-55 (Sound Canvas)

The first GM-compatible sound module has rapidly established itself as an *ad hoc* industry standard. It employs Roland's GS format—a superset of the GM standard. This means that the SC-55 conforms to all of the requirements of the General MIDI standard, and provides additional features specific to Roland products.

The half-rackspace Sound Canvas uses PCM samples to create its 317 ROM-based instrument sounds. These include a GM sound set and ten different drum sets ranging from Jazz and Standard to Power and Electronic. The SC-55 also includes an MT-32 setup that mimics the instrument list of the popular but now obsolete MT-32 and its relatives, the CM-32L and CM-64. This allows the Sound Canvas to work with applications and games designed for these earlier sound modules.

Aside from its excellent sound quality and long list of instrument sounds, the SC-55 sports several noteworthy features. Primary among these is an excellent, 1 inch by 3 inch, backlit display that shows the current settings for reverb, chorus, MIDI channel, instrument name, and other data. A large part of the window displays sixteen bargraph-style VU meters with a selectable peak hold feature. The front panel provides a second MIDI In jack and a variety of buttons for setting parameters such as Level, Pan, Reverb, and Chorus. The rear panel includes two line-level inputs that mix with the SC-55's outputs.

**Roland SC-155** Following the success of the SC-55, Roland released a table-top version of the Sound Canvas

continued

called the SC-155. This module is almost identical to the SC-55 but adds some interesting features. Both use the same 3 MB of onboard sample data and offer sixteen-part multitimbral capability and 24-note polyphony. The SC-155 however, has nine slider controls (eight parts and one master control) that you can assign to volume, pan or other parameters. They both transmit and respond to MIDI data. The SC-155 will store instrument assignments and the corresponding level and pan settings in memory. If you're using a sequencer, you can send MIDI messages to the sliders to provide automated mixing capability. The SC-155 also offers a function that lets you create "music-minus-one" performances by muting an individual part in a sequence and temporarily replacing it with your live input.

**Roland SCC-1** For IBM/compatible users, Roland's Sound Canvas on a card boasts the features of the SC-55 but of course without the front panel buttons and display. Instead, the SCC-1 includes a 1-In, 1-Out, MPU-401-compatible MIDI interface that allows you to connect additional sound modules to your desktop system.

**Roland SC-7** Roland has recently introduced the SC-7—a new sound module specifically designed for multimedia, entertainment, and music education applications. It's built-in serial-to-MIDI interface allows you to connect it to any Macintosh or IBM-compatible computer without a MIDI interface. The unit provides the same 128 General MIDI sounds that the other Roland modules offer as well as six drum kits. It has 28-voice polyphony and sixteen-part multitimbral capability. Its built-in effects include reverb/delay and chorus. Inputs on the back panel allow merging of line-level sources with the SC-7's stereo output.

**Korg 03R/W** Korg recently entered the General MIDI arena with the 03R/W Synthesis Module. This 1U unit borrows many features from Korg's popular 01/W synthesizer, including the Advanced Integrated Synthesis System which draws on PCM sample data for its source material. The 03R/W's two tone generators can access 255 multisampled instrument sounds and 114 drum sounds. These serve as the starting point of a multistage synthesis process that

includes oscillators, digital filters, and amplifiers.

When the multisamples are assigned certain performance characteristics they are called *Programs*. The 03R/W provides 228 Programs divided into 100 RAM-based, user-programmable presets and 128 ROM-based General MIDI instruments (including one drum set). By mixing together Programs you can create *Combinations*. These can consist of layered Programs or Programs that "split" the keyboard range into sections. The 03R/W offers 16-part multitimbral capability and a maximum 32-voice polyphony. Its internal RAM area lets you store up to 100 Programs and 100 Combinations. Additionally, the front panel provides two card slots (PCM data and Program data) which allow you to expand your library of sounds by letting you edit and store an additional 200 Programs or Combinations.

One of the most impressive features offered by the 03R/W is its pair of on-board, dynamic, digital multi-effects processors with real-time control capabilities. They boast a surprising array of 47 effects including several reverbs, delays, choruses, and flangers along with an exciter, a parametric EQ and many other options. The sixteen tiny LEDs indicate MIDI activity. For serious editing Korg offers its optional RE1 remote editor which provides a larger display and a better user interface.

**Yamaha TG-100** Yamaha's first General MIDI sound module is a low-cost sample playback unit with sixteen-part multitimbral capability and 28-note maximum polyphony. It offers 200 ROM-based sounds (192 instrument sounds and eight drum kits) and 64 user-programmable voices in RAM. Of particular note, the back panel sports a dedicated To Host connection that lets you connect the module directly to your computer without a MIDI interface. The TG-100 also includes the usual MIDI In, Out, and Thru ports so it can act as a MIDI interface itself or function in the traditional way attaching to a standard MIDI interface. As with some of Roland's sound modules, the TG-100 provides an audio input jack so you can mix stereo, line-level sources with the unit's own sounds. Yamaha's implementation of this feature goes beyond Roland's however, with the addition of

an input volume control and an LED to indicate signal peaks. Its other features include a small one-line LCD display and an onboard reverb effect.

**Yamaha T-3** Yamaha's newest General MIDI sound module is intended specifically for desktop presentations. It is internally similar to the TG-100, but externally is designed to blend with the style and characteristic platinum color of most computer systems.

**Kawai GMega** Kawai has just released a General MIDI sound module and it boasts some impressive features. This half-rackspace sample-based instrument uses 16-bit, 44.1 kHz PCM waveforms stored in 6 MB of internal memory. It offers 256 instruments and 256 percussion sounds in ROM and a RAM bank of 256 user-defined sounds (128 instruments + 128 percussion). There are seven drum kits to choose from along with six reverb types and 55 temperament settings. As if this isn't enough the GMega also provides 32-voice maximum polyphony and 32-part (16+16) multitimbral capability. The back panel includes ports for MIDI In A, In B, Out (Thru A), and Thru B. There is also a serial interface port that allows you to connect the GMega directly to a Macintosh computer without a MIDI interface. ■

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*David M. Rubin produces music for film, video and multimedia in Los Angeles. He is the author of The Audible Macintosh, and is co-authoring The Audible PC, a comprehensive coverage of sound for Multimedia Windows.*

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*MacUser Magazine*

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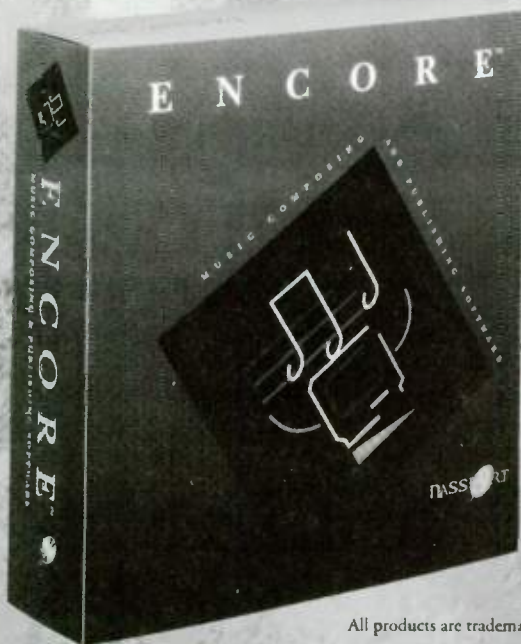
*EQ Magazine*

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# The Next Generation

LATEST PRODUCTS



ILLUSTRATIONS BY LINDA BLECK

Sequencers, digital audio recorders and General MIDI synths for multimedia highlight early offerings of 1993.

## Session 8 XL (\$5995)

Digidesign is announcing the February 1993 release of an 8-track digital recording system for the IBM Windows environment. Session 8 XL is designed specifically for project studio music recording, and consists of two Digidesign 4x4 Audio Interfaces, the I/O devices used with the Macintosh Pro Tools™ system, to offer eight balanced, +4 XLR inputs and outputs, as well as AES/EBU and S/PDIF digital

sends and returns, fader grouping, six parametric EQs, unlimited digital track bouncing, panning, solo and mutes and highly accurate monitor meters for each track. The audio editing window lets the musician visually cut, splice, paste, trim, move, copy and repeat any part of the music with little effort, and without altering the original recorded data. The system is intended for project studio musicians who need inexpensive multi-tracking that uses their existing gear and meets pro standards. The system requires a 386 SX/25 MHz computer (486 SX/25 highly recommended) with 4 MB of RAM and three expansion slots and a large external SCSI hard disk with an 18 ms or

entire MIDI studio, including any combination of synths, their patches and banks. Unisyn's database functions let the user tag sounds with multiple keywords and can find sounds and families of sounds quickly and move them among the various locations. To provide an integrated environment, Unisyn shares patch list names with Performer and Digital Performer, so the user can adjust sounds while a sequence plays.

**Mark of the Unicorn**  
617.576.2760

## Digital Audio Workstation for the Atari Falcon 030 (\$1594)

Singular Solutions of Pasadena, CA and D2D Systems of Cambridge, England have announced the first professional level digital audio system for the new Atari Falcon 030 computer.

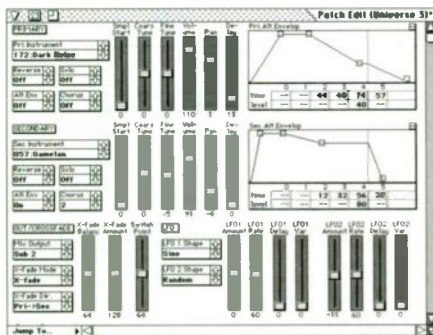
The system is comprised of the A/D64x Audio Interface and the D2D EDIT software. The A/D64x offers two channels of 16-bit, delta-sigma sampling at rates of 32, 44.1 and 48 kHz, A/D conversion with 64 times oversampling, and a three-stage linear phase digital anti-aliasing filter. It has both balanced and unbalanced inputs, AES/EBU and S/PDIF ins and outs, and an integrated low-noise microphone preamp with 48-volt phantom power. The A/D64x consists of an all-CMOS, low power design, six isolated power supplies and Allen-Bradley conductive plastic, low noise pots for extremely high-performance and transparent audio. The D2D is

the first digital audio editor to use the extensive audio features of the Falcon 030. It provides direct to disk recording, non-destructive editing, MIDI timecode-driven cue sheet, punch-in recording, and on-the-fly marker creation.

**Singular Solutions**  
818.792.9567

## Cubase Audio for Windows (\$999)

Steinberg will release a Windows version of its successful MIDI sequencer/digital audio recorder for the Atari and Macintosh in April 1993 for the PC and compatibles. Cubase Audio for Windows is nearly identical to its cross-platform cousins. Its sequencer has a resolution of 384 ppqn, offers three different editing windows, including a drum window and a standard notation window. It is designed as a real time program that lets the user perform almost any function while a sequence is playing without compromising timing. For overall editing, the arrange window provides fast ways to move and delete tracks and portions of tracks via click and drag mouse techniques. Cubase also offers very sophisticated quantizing features, including those that let you quantize to sections of already recorded music that has any kind of rhythmic feel whatsoever. This allows the user to impart a particular feel to any piece of music. The program's logical editor has extensive, boolean-style parameters for editing in a "logical" fashion. Its audio side, designed to use



Unisyn Patch Edit Window

I/O. The system uses two PC expansion cards, including one with a Motorola 56001 digital signal processing chip that supports eight tracks of CD-quality digital audio on a single SCSI hard disk, and offers up to six bands of parametric equalization. The software uses an internal mix window where the outputs are used as effects sends, and an external mix window, for connection to an external mixer. The third window offers non-destructive audio editing. The mix windows include such features as eight track faders, a master fader, cue mix, effects

faster access time. A less fully-implemented version is also offered at \$3995. Session 8 XL for the Macintosh will be released in February 1993.

**Digidesign**  
415.688.0600

## Unisyn

Unisyn for the Macintosh is an expandable universal editor/Librarian that currently supports over 100 MIDI synthesizers and devices with integrated editing, librarian and database functions that store and manage sounds and configurations. It can memorize and restore the settings of an

the signal processing built into the new Yamaha CBXD5 Digital Audio System, records CD-quality digital audio, locked to the MIDI sequence, and lets the user edit non-destructively in numerous ways.

**Steinberg Jones**  
818.993.4091

### Musicator GS (\$299)

**M**usicator GS is a new MIDI sequencer designed for Windows 3.1 and optimized for synthesizers using Roland's GS standard. It's designed to be both an editable, printable notation program and a MIDI sequencer. It offers impressive editing features for both MIDI data and notation, and has a resolution that's programmable up to 480 ppqn. It records on a total of 16 tracks ("parts"). It includes a number of features, including a very useful on-screen mixer, that take advantage of various functions of GS modules. It uses four different windows—the Notation, Overview, Pitch Bender, and Piano Roll views. The Drum Setup window lets you assign a drum instrument name to any note; determine what note on the staff will represent the various drums; select one of four note symbols for each instrument; choose one of 32 beam groups and select whether the note stem goes up or down. Notes in the standard notation window are edited by various click and drag techniques that allow the user to change beaming, flip stems, add grace notes, change enharmonic spellings; and set note spacing globally or for individual notes. MIDI controllers can be drawn and edited in controller windows. An on-screen mixer not only offers volume faders, but knobs that control the rate, depth and delay of vibrato, set the cutoff point and resonance of a GS instrument's low pass filter, and set the attack, decay and release stages of the synth's amplitude envelope.

**Thinkware**  
415.255.2091

### Yamaha TG100 General MIDI Tone Generator (\$449)

**Y**amaha's new TG100 is a half-rack-sized synthesizer module designed especially for personal-computer-based multimedia. It has 192 instrument voices and ten drum kits, all produced by Yamaha's Advanced Wave Memory synthesis, which uses digitally sampled waveforms, modulated by the module's extensive "analog-style" signal processing. The unit has 28-voice polyphony, 16-part multi-timbrality, and a built-in digital reverb. To maximize the TG100 for multimedia compatibility to personal computers, the unit has a "To Host" connection that allows it to be connected directly to IBM, Macintosh, Atari or Amiga computer without an intermediate MIDI interface. Its sounds are organized according to the General MIDI patch map to provide portability among various applications and compatibility with any MIDI sequence composed as a "General MIDI Score" with no editing of the score needed. The unit has already been endorsed by the Wordperfect Corporation, who is using it to demonstrate its new multimedia authoring program for Windows 3.1.

**Yamaha Corporation**  
714.522.9011

### Project Manager for DMC1000 (free to DMC1000 owners)

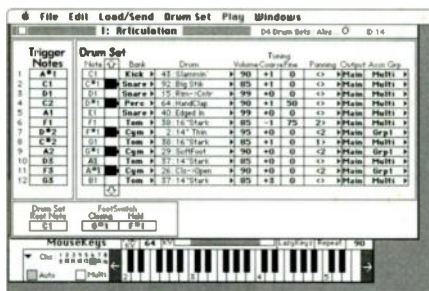
**Y**amaha's Professional Digital Department has introduced The Project Manager, a software package designed to allow the user to control the Yamaha DMC1000 Digital Mixing Console from a Macintosh. The software, while not a replacement for the tactile control surface of the DCM1000, offers the advantages of a larger display and easier access to information. It uses a Macintosh MIDI interface and two MIDI cables, and connects to any model Mac that has at least 4 MB of RAM. It requires Project Manager 1.0 or higher, Yamaha DCM1000 system

software 1.3 and Opcode Systems' Maxplay 2.2 or higher. The software includes a comprehensive effects editor/librarian, eight additional fader groups, eight additional linking sets, project management files that can be stored on a Mac storage device, and a Macintosh screen that shows all the console's parameters at the same time.

**Yamaha Professional Digital**  
714.522.9375

### Editor Update Set #2 for Galaxy Plus Editors (\$399.95; \$99 for Current Users)

**S**et #2 of new editor modules for Galaxy Plus Editors includes modules for the Kurzweil K2000, E-mu Pro-



*Alesis D4 Patch Edit Window*

cedure, Alesis D4 and Roland U-220. Galaxy Plus Editors is a universal Librarian for over 160 MIDI devices, integrated with editors for over 65 devices. The new set of editors is fully-featured, and has the look, feel and functionality of Galaxy's earlier editors, and claims superior user interface and more functions than other editors.

**Opcode Systems, Inc.**  
415.856.3333

### SMPTe Slave Driver (\$1295)

**D**igidesign has announced a superior solution, based on hardware, for synchronizing their Macintosh-based digital audio recorders to SMPTE. Current schemes involve sending SMPTE from a tape deck to a SMPTE-to-MIDI Time Code converter, and sending the MTC to the digital audio card. The audio card's DSP converts its own sample rate to match the speed of the in-

coming time code.

The SMPTE Slave Driver is especially useful in situations where the incoming time code varies enough to overload the the DSP and compromise audio performance. (variations as small as 3% can cause this.) The SMPTE Slave Driver takes over the job of calculating sample rates, and allows the digital audio card to synchronize to any external linear time code, without having to use any of the system's DSP power to perform sync. The SMPTE Slave Driver is a highly accurate SMPTE reader that can lock directly to the sample rate clock of any Digidesign Professional System, via a cable to the system's "superclock" connection. The SMPTE Slave Driver also has a clock specially-designed by Apogee to eliminate the jitter found in many systems. It tracks incoming time code smoothly and accurately, regardless of its changes.

Taking advantage of the extraordinarily constant timing of the digital audio card's clock, the SMPTE Slave Driver can use the clock's time to either generate Linear Time Code or convert SMPTE to MIDI Time Code to function as an unusually stable master sync source. The Slave Driver has a programmable "varispeed" function, unique in random-access digital recording, for changing its playback speed by a percentage—like an analog tape deck—by parts per million, or by semitones, to create truly accurate key changes.

**Digidesign, Inc.**  
415.688.0600

### Office Manager 2.5 (\$99)

**W**hite Crow Software, Inc. has released a new version of the office management software for the Mac that it originally developed for a recording

*continued on page 18-15*

# Version Updates

## LATEST SOFTWARE AND FIRMWARE VERSIONS

**M**inimize 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 versions of each one, and why and how to get ahold of it. Not every entry is as complete as we'd like, but we attempt to give you the most salient information available.

Manufacturers can have their products listed in the Version

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

PRODUCT	V.	R.D.	\$	REQ.	FIXES/FEATURES	REVIEWS
<b>ALCHEMY</b> Passport Designs 415.726.0280	2.6	9/92	\$99	Mac Plus, big hard drive	Supports Protocols and RasterOps Media Time, new fit functions	
<b>AUDIOMEDIA</b> Digidesign 415.688.0600	x.x	11/92	n/c	Mac II	Program discontinued. Users can upgrade to Sound Designer II	
<b>BEYOND</b> Dr. T's Music Software 617.455.1454	2.1			MacII		
<b>CADENZA FOR WINDOWS</b> Big Noise Software 904.730.0754	1.1	5/92	\$10 or n/c <60 days from purchase		Small fixes	EM 6/92; HSR 8/92
<b>CADENZA FOR DOS</b> Big Noise Software 904.730.0754	2.5g	4/92	\$10 or n/c <60 days from purchase		Small fixes	EM 5/90
<b>CAKEWALK PRO/WINDOWS</b> Twelve Tone Systems 800.234.1171	1.02	7/92	n/c	PC/clone, Windows 3.0+, MIDI interface	Fix VGA display, edit controller fill	
<b>CAKEWALK FOR DOS</b> Twelve Tone Systems 800.234.1171	4.01	1/91				
<b>CAKEWALK PRO FOR DOS</b> Twelve Tone Systems 800.234.1171	4.0	1/91				
<b>CAKEWALK ALIVE FOR DOS</b> Twelve Tone Systems 800.234.1171	4.01	1/91				
<b>CUBASE ATARI</b> Steinberg-Jones 818.993.4091	3.01	1/93	\$100	Atari TT & ST/ Mega (1 Mbyte/ Monochrome only)	64 track sequence	
<b>CUBASE AUDIO/MAC</b> Steinberg-Jones 818.993.4091	1.1	1/93	\$795 new	Mac II SE30, 2M RAM Large Hard Disk	Pro Sequencer/hard disk recorder	
<b>CUBASE MACINTOSH</b> Steinberg-Jones	2.5	1/93	\$60	Mac Plus, 2M RAM	384 ppqn; 8 mixer maps; MIDI mixer; 29.97 SMPTE sync	

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



PRODUCT	V.	R.D.	\$	REQ.	FIXES/FEATURES	REVIEWS
<b>CUBASE WINDOWS</b> Steinberg-Jones	1.01	1/93	\$60	P/Clone; Windows 3.1	GS mapping	
<b>CUBEAT</b> Steinberg-Jones	2.0	4/92	\$27.50	Atari ST/Mega	Scaled down Cubase sequencer	
<b>CUE</b> Opcode Systems	3.01	12/90	>3.0 n/c, <3.0 \$50	Mac Plus		
<b>DECK</b> Digidesign 415.688.0600	1.04		n/c	Mac II, IIX, IICX, IICI, IISI or IIFX	Works with all Digidesign hardware	
<b>DIGISYSTEM INIT</b> Digidesign	2.3	12/92	n/c	Mac IIs and Quadras*		
<b>DIGITAL PERFORMER</b> Mark of the Unicorn 617.576.2760 Fax: 617.576.3609	1.2	1/93	n/c	Mac II, 5M RAM Digital Waveboard or Digidesign hard disk system	Complete new Manual; all performer 4.02 features; Humanize, Scale tempo; custom consoles; 4chnls on Digital Waveboard; 2 chnls of Audiomed II	
<b>DIGITAL WAVEBOARD</b> 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	
<b>DM-80 (ROM)</b> RolandCorpUS 213.685.5141	1.10	4/92		DM-80 8- and 4-track hard disk recorder	DM-80 operating system firmware	
<b>ENCORE/MAC/WINDOWS</b> Passport Designs 415.726.0280	2.6	1/93	\$99 >prev	Mac Plus/PC Windows 3.1	Proprietary True Type Font, "Anastasia"	
<b>EPS 16+ (ROM)</b> Ensoniq 215.647.3930	1.3	7/92		EPS 16+	Intelligent backup & restore, SCSI improvements	
<b>EZ VISION</b> Opcode Systems 415.369.8131	1.01			OMS	Entry-level MIDI sequencer	
<b>GALAXY</b> Opcode Systems 415.369.8131	1.2.2	1/93	\$15 or n/c	Mac Plus; OMS		
<b>GALAXY PLUS EDITORS</b> Opcode Systems	1.2.2	1/93	\$99	Mac Plus; OMS	Set#2 Editors: K2000, E-mu Procuision, Alesis D4, Roland U-220	
<b>JAZZ IMPROVISATION SOFTWARE</b> MiBAC Music Software 507.645.5851	1.5.8	5/92		Mac, multifimbral 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
<b>K2000</b> Kurzweil 310.926.3200	2.0	7/92	\$150	K2000	Editing features, MIDI	
<b>KCS</b> Dr. T's Music Software 617.455.1454	3.5	10/91		Amiga		
<b>KCS LEVEL II</b> Dr. T's Music Software		3/89		Mac		
<b>KCS OMEGA</b> Dr. T's Music Software	4.0			Atari		
<b>MACPROTEUS FRONT PANEL</b> Digidesign	1.0f2	12/92		Mac II, IIX, IICX, IISI, IICI or IIFX		
<b>MASTER TRACKS PRO 5</b> Passport Designs 415.726.0280	5.02	9/92	>prev: \$99	Mac Plus	Auto mixer, SMPTE insert, enhanced Step Editor, transpose map, velocity editor	
<b>MASTER TRACKS PRO FOR WINDOWS</b> Passport Designs	4.6	1/92	>prev: \$99	IBM AT, PS2/clone, MPC, Windows 3.0, DOS 3.1Microsoft	Issues commands to Start, Stop MCIplayer to play WAV. Audio in Windows	
<b>MASTERLIST</b> Digidesign	2.3	12/92				

VERSIONS continued on page 18-10

PRODUCT	V.	R.D.	\$	REQ.	FIXES/FEATURES	REVIEWS
<b>MASTERSCORE II</b> Steinberg-Jones 818.993.4091	1.0	4/92	\$434 new	Atari ST/Mega	Notation software	
<b>MAX</b> Opcode Systems 415.369.8131	2.5	1/93		MAC II	Flexible MIDI Programming	
<b>MIDISCOPE</b> Kurzweil Music Systems 213.926.3200	1.5		n/c	Mac	MIDI data analysis	
<b>MIDIMIXR 7s CNSLE MAC/PC</b> 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	
<b>MIDI TIME PIECE DA</b> Mark of the Unicorn 617.576.2760	1.2	1/93	n/c	Mac	Set up MIDI Time Piece	
<b>MIDI TIME PIECE ROM</b> Mark of the Unicorn 617.576.2760	1.0d	1/93	n/c	Mac		
<b>MIMIX</b> Steinberg-Jones	1.06	4/92	\$5,995 new	Atari ST/Mega	Mixing automation	
<b>MOD FACTORY</b> Creacent Engineering 201.746.9417	1.0	3/92	\$250 new	Eventide H3000 Ultra-harmonizer	New H3000 functions: gain-ducked delay and reverb, envelope-controlled filter, audio-rate LFOs	
<b>MOSAIC</b> Mark of the Unicorn 617.576.2760 Fax: 617.576.3609	1.1	1/93	\$195 for Composer owners	Mac II 2.5M RAM (Sys6) or 3M RAM (Sys 7) hard drive, ATM	Prints notation on ImageWriter,PostScript or QuickDraw printers	
<b>MUSIC TIME MAC</b> Passport Designs 415.726.0280	1.0	9/92		IBM AT, PS2/clone, MPC, Windows 3.0, DOS 3.1Mcrsft mouse	Auto mixer, SMPTE insert, enhanced Step Editor, transpose map, velocity editor	
<b>MUSICATOR GS/ WINDOWS THINKWARE</b> 415.255.2091	1.0	12/92	n/c	Mac II	various feature enhancements	
<b>OFFICE MANAGER</b> White Crow Inc. 800.424.0310	2.5	12/92	n/c	Mac II	various feature enhancements	
<b>OBJECT MOVER</b> Kurzweil Music Systems 213.926.3200	2.0			Mac	K1000/1200 series librarian	
<b>OMS</b> Opcode Systems	1.2	1/93	n/c	Mac IIs, quadras	Fixes problems with Powerbook modem port	EM 3/92
<b>PERFORMER</b> Mark of the Unicorn 617.576.2760 Fax: 617.576.3609	4.02	1/93	n/c	Mac Plus 4M RAM hard drive	partial solo; solo button in all edit wdws popu[ menus for track switching	
<b>PRO TOOLS SETUP</b> Digidesign 415.688.0600	1.2	4/92	n/c	Mac IIs, Quadra		
<b>PRODECK</b> Digidesign	1.15	12/92	n/c	Mac IIs, Quadra, Pro Tools Card	16 channel support, post spotting, 1.0 bug fixes	
<b>PROEDIT</b> Digidesign	1.15	12/92	n/c	Mac IIs, Quadra, Pro Tools Card	16 channel support, post spotting, 1.0 bug fixes	
<b>Q-SHEET A/V</b> Digidesign	2.01			Mac Plus, SE1, SE/30, IIs		
<b>QUICKTOPIX</b> Optical Media International 408.376.3511	1.0	3/92	\$8,500 (w/ hardware) new	Philips CDD-521 CD Recorder, Mac, PC or UNIX	CD premastering software produces CD of any format on desktop. Red Book, CD-ROM, CD-ROM XA, CD-I. Photo CD and CD-Write Once.	

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

PRODUCT	V.	R.D.	\$	REQ.	FIXES/FEATURES	REVIEWS
<b>S-770, S750 (ROM)</b> RolandCorpUS 213.685.5141	2.13	2/92		Roland S-770 and S-750 samplers		
<b>S1100 (ROM)</b> Akai 817.336.5114	2.0	5/92	\$650	S1100 sampler	Combines RAM & hard disk (incl magneto-optical) sampling, varispeed play, pan, fade, more.	
<b>SAMPLECELL EDITOR</b> Digidesign 415.688.0600	1.30	1/92	n/c	Mac IIs, Quadra, SampleCell Nubus Card	Direct drivers for Studio Vision, Digital Performer	
<b>SOUND ACCESS</b> Digidesign 415.688.0600	1.10		n/c			
<b>SOUND DESIGNER II</b> Digidesign	2.5	12/92	>2.xx: n/c <1.xx: \$195	Mac IIs, Quadra	New time compression/expansion, pitch shifting	
<b>SOUND DESIGNER IIPT</b> Digidesign	2.5	12/92	\$995 for Pro Tools	Mac IIs; Quadra	New time compression/expansion, pitch shifting	
<b>SOUND DESIGNER IISC</b> Digidesign	2.10	1/92	n/c	Mac IIs; Quadra	Stereo sample editing software for SampleCell	
<b>SOUND EDIT PRO</b> 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	
<b>SOUND STAGE</b> Turtle Beach Systems 717.843.6916	2.0	1/93	n/c	PC w/ Windows 3.1	feature fixes, larger buffers	
<b>STUDIO 3 DA</b> Opcode Systems 415.369.8131	1.01	9/89	n/c	Studio 3 Interface		
<b>STUDIO 5/OMS SETUP</b> Opcode Systems	1.1.3	1/92	n/c	Studio 5 Interface	More OMS device names	
<b>STUDIO VISION</b> Opcode Systems 415.369.8131	1.43	9/91	>1.3 n/c; <1.3 \$29	Mac SE or II with Digidesign card; OMS	New Control Bar with new control buttons, new manual, lock markers to bar, beat or SMPTE, editing during playback, relock free-time sequences.	Kybd 1/91; EM 2/91
<b>TIGER CUB</b> Dr. T's Music Software 617.455.1454	1.1	10/91		Amiga		
<b>TIGER</b> Dr. T's Music Software	1.21	2/91		Atari		
<b>TIMEBANDIT</b> Steinberg-Jones 818.993.4091 Fax: 818.701.7452	1.0	4/92	\$495. new	Mac II, LC, SE/30 and Classic I	Time Correction, Compression, Expansion, Pitch Shift and Harmonisation effects for Sound Designer II files	
<b>TIMECODE READER (ROM)</b> EnterTec Inc. 804.353.7133	1.1		\$179	PC/Clone DOS, Windows 3.x	Captures SMPTE to Clipboard	
<b>TRACKCHART</b> Opcode Systems	1.03	4/92	n/c	Mac Plus	Sys 7 compat., 32 bit clean	
<b>TURBOSYNTH</b> Digidesign 415.688.0600	2.00			Mac Plus, SE, SE/30, II, Iix, Ilcx or Ilci	Sound creation and editing system for samplers	
<b>VISION</b> Opcode Systems 415.369.8131	1.43	9/91	>1.3 n/c; <1.3 \$29	Mac Plus	New Control Bar with new control buttons, new manual, lock markers to bar, beat or SMPTE, editing during playback, relock free-time sequences.	
<b>WAVE FOR WINDOWS</b> Turtlw Beach Systems	1/93	2.0	\$39	PC/clone Windows 3.1	DSP reverb, delay, pitch shift	
<b>X-OR</b> Dr. T's Music Software	2.1A			Mac, PC/clone	See below	
<b>X-OR</b> Dr. T's Music Software	1.12			Atari	See below	

# Tips and Techniques

By Craig Anderton

A Macintosh is a very flexible thing—it all depends on how you dress it up. Try these Maccessories to enhance your basic Mac.

One of the things I've always liked about computers is that they re-define themselves every time you put in a new piece of software or add a new board. Sometimes it seems there's no limit to the tricks you can make your computer do, and the Macintosh is well endowed with accessories that range from the merely useful to the seemingly miraculous.

But first, a warning: any time you customize your computer, you're introducing a change that can have far-reaching results (conflicts with INITs—or extensions as they're called in System 7—are just one example). The idea is to add only the accessories you really need. Sure, there are utilities that let you customize your scroll bars or use Miss September as your start-up screen, but why bother? Remember the corollary to Murphy's Law: "Every element you add is one more element that can go wrong."

So, before you start adding, do some subtraction. Throw out those cute sounds that happen when the disk ejects, the fonts and desk accessories you never use, and maybe even the screen-saver (surely you can turn down the brightness control if you're going be away from your computer for more than 15 minutes). After slimming down, you're ready to build back up.

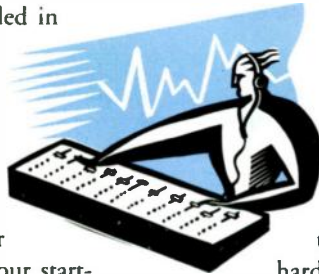
## The Easy Stuff

Some tips simply involve making better use of features that are already present.

**1** *The Scrapbook desk accessory* is a great place to store information such as MIDI Time Piece or Studio 5 cable routings, optimum sample rates and fre-

quencies for various notes (important if you're into sampling), synth initialization instructions, SCSI bus assignments, etc. By sizing any other windows that are open, you can have the scrapbook "reference" page visible at all times.

**2** *Do you use a special program* to turn system extensions on and off? You can tell the Mac to ignore all your INITs by restarting the computer while holding down the Shift key. This is a valuable repair technique if you install an INIT that causes the Mac to freeze on start-up.



**3** *For most applications*, turn on the RAM cache, found in System 7's Memory Control Panel, and in System 6's Control Panel (one exception: hard disk recording and RAM caches sometimes don't get along).

Set it to at least 128K, but remember that the larger the cache, the less overall RAM is available; and you do reach a point of diminishing returns.

## Useful Utilities

**4** *SCSI Probe* checks over the SCSI bus to see what devices are on the bus, and their ID numbers. It lets you mount devices that the computer failed to recognize for one reason or another. I use SCSI Probe to make my Mac aware of the existence of a Syquest drive, which the computer sometimes refuses to acknowledge. Some of the famous "SCSI hell" problems that people encounter are simply cases of the Mac not recognizing the SCSI device; SCSI Probe solves that.

**5** *MIDIScope*, available for free from the PAN on-line bulletin board service

or from user groups, is a MIDI diagnostic program that shows what types of messages are being received by the computer. It's quite sophisticated and extremely useful. Laurie Spiegel's MIDI Terminal (shareware) is a less intimidating program that is easy to use and very helpful for quick debugging.

**6** *Macromakers such as QuicKeys are invaluable.* It takes a little time to create a set of QuicKeys, but the results are worth it. For example, I develop a set of QuicKeys for each sequencer I use so that the same keys control the same functions in every program. You can assign complex functions, such as "quantize all notes that land within 20 clocks of the beat to 16ths but with 85% strength," to a single key. For sample editing, individual keys can trigger functions such as normalize, fade in, fade out, etc.

**7** *Hard disk fragmentation* (where files become split into several pieces, each residing on a different section of the hard disk) slows disk operations. This is a particular problem with hard disk recording; ideally, there should be large amounts of contiguous hard disk memory, not pieces of file scattered all over the disk.

Several programs can defragment files, and some have the option to "optimize" file storage by grouping files together to open up large contiguous spaces. These are best for hard disk recording applications. I use the Symantec Utilities program for the Mac, and it works just fine as long as I deinstall copy protected software first.

**8** *Have an emergency floppy* (or set of floppies) sitting around with your operating system, disk backup program (for reconstructing the data you backed up), and disk diagnostic routines. Think: What is the least I would need to get up and running if my hard disk crashed?

**9** *CursorWrap is a wonderful public domain INIT* that is as old as the hills but seems to get along well with the rest of my system (System 6). This utility

sends the cursor to the other side of the screen when you push it off one edge—for example, if the cursor is all the way over to the right, continuing to move it right wraps it around to the left side of the screen. This can be a real time-saver with sequencer programs on big-screen monitors.

### Hot & Heavy Hardware

There are plenty of hardware options that will perk up your computer; here are some of my favorites.

**10** *Surge protector.* This is inexpensive insurance against certain types of power problems. Though the odds of getting zaps bad enough to destroy your computer are remote, the consequences of being unlucky justify the cost of a surge protector.

**11** *Removable cartridge mass storage.* You have several choices. In music and audio circles, the 44-Meg Syquest is almost a de facto standard for transferring large files between locations, but magneto-optical disks are far cooler if you can afford their somewhat higher initial price tag.

**12** *Fax modem.* Faxes are great for tech support and product inquiries. If you've been put off by the high cost of fax machines, send-only fax modems and software now cost under \$100. (Send/receive modems cost more, and you might not want your computer on 24 hours a day to receive faxes; consider using a local fax service as your return fax number.)

**13** *CD-ROM.* A CD player is a necessity in today's studio, so pay a few dollars more and get one that's also a CD-ROM for your computer. Lots of good samples (stored as audio or digital data) are available on CD, and programs such as Opcode's AudioShop can turn your CD-ROM into a programmable audio CD player. ■

*Got any devilishly clever tips for using your studio software? Let us know. We'll print the best ones and maybe spring a colleague from MIDI hell. Send tips to the editorial address on the masthead, and we'll send you \$5.00 for any tip we print.*

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# Software Directions

PRODUCT NEWS AND UPDATES

Old grooves on new media, and Doris gets her oats.

One of the knottier problems created by technology concerns the practice of sampling notes, grooves and passages from records, then using them in production. As is its wont, the technology that makes this possible has evolved much more rapidly than have solutions to the legal—not to mention the moral and ethical—aspects of the situation. While there have been court decisions rewarding the original sampled artist, such redress is typically available only to those with the wallets of record companies behind them. Unsigned (or more typically, no-longer-signed) musicians have to suffer in silence as their performances help others make a bundle. Of perhaps lesser, though real, concern is the limits put on the advancement of the art of musical sampling by legal constraints: Paul McCartney gets his royalties, but the struggling rapper can't always use what he likes.

A recent release has taken a new approach to create a win/win situation and what may be a model for the future. **WC Music Research** is releasing a package of drum grooves newly recorded by **Clyde Stubblefield**, the drummer who laid down the grooves for the legendary James Brown Band. The package, distributed by **East-West Sound Warehouse**, contains a CD, meticulously recorded and edited, as well as a floppy disk of WC's DNA groove templates, derived from the performances, that can quantize any Cubase sequence according to Stubblefield's grooves. Both digital audio recordings of the performances, and their MIDI equivalents, are available to anyone, unencumbered either by other instruments or legal con-

cerns. While this sort of product has been offered before, this is the first time a major, original creator has put his work into it, and is getting compensated up front (and in this case, being rightfully returned to the international spotlight for the first time in years). **East-West Sound Warehouse**: 213.848.8436; (in Britain, **Zero-G** 44.287.0681).



■ **Digital Audio Labs** is working on a Windows 3.1 version of their low-cost digital audio editing software, **The EdDitor**. The new software will use the company's existing hardware—**The CardD**—and will have a number of features absent the DOS version. The new software will support both 8- and 16-bit Windows' WAVE format soundfiles, offer cut and paste editing, a sound catalog that allows the user to create a list of files to play sequentially—triggered by MIDI, if desired—have five clipboards, a reverse function, Bass and Treble EQ commands with programmable cutoff points, gain change, normalize, and other features. **Digital Audio Labs**: 612.473.7626.

■ Following the demise of C-Lab, the company that brought us the highly-regarded MIDI programs, Notator SL, Creator SL, Unitor 2 and Export, a group of C-Lab personnel has formed a new company called **Emagic**. The enterprise is dedicated to "great products" and "great support, without precondition and free of compromise." The new company is completely restructured, with attention paid to all aspects, from development to management and sales.

In addition to marketing their existing software, Emagic is developing **Notator Logic**, a notation sequencer,

said to be "fourth generation in concept and performance," to act as its flagship product. Notator Logic will be initially developed for the Mac, then for the Atari and PC. The personnel is impressive and these products deserve good marketing. Emagic is even environmentally aware, and will package its products in all-polystyrol containers, free of "cardboard, various foils, laminates, metals and poisonous glues," and which can be re-used by distributors and eventually recycled into new containers. Ensoniq Corporation has announced it will be the exclusive U.S. distributor for Emagic products. **Ensoniq**: 215.647.3930.

■ Speaking of recycling, **Isomedia**, Optical Data Storage Specialists, has instituted a "Recycle Your SyQuest and Other Media" program. If you have four or more **SyQuest** cartridges (44 or 88 MB) that you use for permanent storage (such as those banks and banks of samples you've collected over the years), you can send them to Isomedia and the company will transfer the data on them to an essentially crash-less CD-ROM. Each optical disc can hold up to 640 MB of data and the process costs only \$269. Isomedia will do the same for permanent files stored on DAT, Exabyte tape, 150/250 MB tape cartridge, 9-track tape 1600 bpi or any size SCSI/IDE hard disk. If you can't bear to be without your SyQuests for even the few days this takes, for another \$100 Isomedia will overnight ship you a backup tape drive compatible with your system. They give you two days to copy your files to the tape and ship it back to them. Three days later, you'll receive a CD-ROM containing all the data you transferred. While the price of CD-ROM writers is getting lower all the time, this deal still beats shelling out the \$7000-\$10,000 it costs to buy your own mechanism. **Isomedia**: 800.468.3939.

■ If you are interested in rolling your own optical media, there are a couple of options. **JVC** introduced the Personal Archiver, a relatively affordable (\$9,950) and simple in-house CD-ROM production system. It produces output formatted to ISO-9660 or Hi-Sierra CD-ROM standards on a write-once CD-ROM. The system—hardware

and software—works on any 386 IBM/compatible PC with at least 1 MB of RAM, and asks only that the user load the files to be archived onto a hard disk and enter a single DOS command. The Personal Archiver bundle includes a 680 MB SCSI hard disk, the JVC Write Once drive, the premastering software and a SCSI interface card. **JVC:** 714.965.2610.

■ For those interested in producing audio CDs, the wait will be a little longer, though not much. **Digidesign** has announced its intention to develop a full-featured, cost-effective, direct-to-CD recorder. The machine will not produce CD-ROMs, but only audio CDs. It's intended for studios that want to give clients something better than just an analog cassette for evaluating a session, for stamping one's own "boutique label" CDs or creating reference discs for mastering. It is not intended for mass production of discs, but is a "one-off" machine designed for very limited runs. It is slated to appear on the market in mid-1993. While the price of the unit hasn't been set, the company is promising to make it "an exceptional value." **Digidesign:** 415.688.0600.

■ The Comdex computer trade show has traditionally been a haven for the nerdiest of the IBM PC nerds. But at this past December's convention, a rare lot of the techno-dweebs wore earrings and MIDI-plug bolo ties. The Comdex "multimedia" section was enormously expanded, occupying one entire hotel showroom—Bally's—and had an uncannily-familiar resemblance to a NAMM show. Roland, Kurzweil, Turtle Beach, Passport, Voyetra, Twelve Tone and Steinberg were just a few of the names from the music industry jumping on the Windows/multimedia bandwagon along with a slew of the more mainstream companies like Microsoft, Creative Labs and the like.

One of the most populous trends at Comdex was the implementation of more and better sound-generating software and hardware for IBM PCs, exemplified by **Turtle Beach Systems**. The Turtles were one of the first music industry stalwarts to push into this arena, and they're more bullish than

ever, seeing quality audio reaching the PC masses in the near future. Their MultiSound card, (newly re-priced at \$599) for example, offers 16-bit digital audio and a General MIDI-compatible synthesizer built around the E-mu Proteus chip set. Turtle Beach President Roy Smith told me that, "from our experience in the music market, we were able to develop a good technology to compete strongly in the PC multimedia market. We're making products that appeal to the mass PC market which is beginning to care about MIDI and audio. If you want evidence that this is happening, notice that a version of **Cakewalk** is being bundled with every IBM PS/1 computer sold." While Smith's multimedia-oriented sample editing program, **Wave for Windows**, is selling for an affordable \$149, his company is far from ignoring the professional market. Turtle Beach will soon release a 2.0 version of **SoundStage**, its professional digital audio editing software for the **56k** system. The new version offers SMPTE chase lock, zone editor enhancements and a new lower price of \$1295. The free upgrade is expected to be available by this NAMM show. **Turtle Beach Systems:** 717.843.6916.

■ The original release of **Cubase Audio for the Macintosh** had a window that displayed a sequence in standard notation. Unfortunately, the program could not print the notation. Steinberg/Jones has released version 1.1 of the program that includes this feature, making it the first sequencer/digital audio program to do so. According to Steinberg/Jones, the program will generate publication-quality notation on any PostScript laser or lino printer. All registered owners of Cubase audio will receive the score-printing update free. **Steinberg /Jones:** 818.993.4091.

■ **Passport** will preview version 3.0 of its notation program **Encore** for the Mac and Windows at the NAMM Show. It will also show an upcoming version of **Master Tracks Pro 5 for Windows** that includes a notation window. **Passport:** 415.726.0280.

■ Look for **Digidesign** to release a **Sample Cell II** card in early 1993. It

will hold up to 32 MB of RAM and have 32-voice polyphony. The new version has filters, lacking in the original. No hardware upgrade for owners of the original will be available. **Digidesign:** 415.688.0600.

■ **Opcode** has released version 1.2 of its **Opcode MIDI System (OMS)** that fixes all problems OMS-compatible programs were experiencing with the Macintosh Powerbook's modem port. In related developments, both Steinberg and Digidesign have signed up with Opcode for OMS compatibility. This means their sequencers (**Cubase** and the MIDI sequencer in **ProTools**) will have direct access to the Opcode **Studio 5, 4 and 3** MIDI interfaces, creating smoother operation, the abilities to use virtual instruments and controllers, and access all the MIDI processing capabilities of the New Studio 5 and Studio 4. OMS compatibility also gives the sequencers a connection to **Galaxy** that will let the user open Galaxy while a sequence is playing, and edit a patch in the synth or load a new one while hearing the sound play. Opcode has also begun shipping the highly-anticipated, 8-in, 10-out **Studio 4** (\$495), the less expensive version of the **Studio 5**. The 4 has all the processing of the 5, when used with a Mac. **Studio Vision 1.4** shipped in October, and **Max 2.5** is also shipping, but as of press time, details of the new version were not available. **Opcode Systems:** 415.856.3333.

## NEXT GENERATION

*continued from page 18-7*

studio. The program is an integrated business application for processing client and vendor communications, specifically designed for the one-person office. It integrates an address file, letter processor, to-do list and customizable job-tracking file. The new version adds fonts, larger address field, prioritizable to do list in which you can post future items, better tracking of calls, faxes and letters a new envelope printer and a new phone dialer.

**White Crow Software, Inc.**  
800.424.0310

# WHATEVER YOUR TASTE

Whatever your platform (be it Atari™, Apple Macintosh™ or the PC\*), you can enjoy the wonders of Cubase...The Freshest MIDI software tool available.

Cubase is renowned for its user friendliness, intuitiveness and flexibility. M•ROS (MIDI real-time operating system) lets you record, edit and arrange your music in 'real-time' in a logical graphic environment, where all functions are available (even saving your work to disk) without stopping.

Cubase adapts to the way you work, offering more ways to manipulate, edit and arrange your music than you ever imagined. Everything you need is at your fingertips: Linear or Pattern-based sequencing; 4 Graphic Edit windows (each with a dedicated tool

box); a Logical Editor for event-specific manipulation; 8 creative Quantizing options (including user definable Grooves); add-on modules which range from MIDI Processing to composition assistance; and File-Format compatibility between computer platforms.

Whatever your musical style, or the way you work, or the computer you use, we invite you to savor the many flavors of Cubase...Whatever your taste.

\*Windows 3.0™ 386 SX and up.

**Steinberg**  
**JONES**

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Northridge, California 91325  
818-993-4091 FAX: 818-701-7452



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have exactly what I am looking for. Can you recommend others, or a source for this type of information? I would also like to correspond with others who may be pursuing similar or compatible goals.

John R. Grant  
Upper Marlboro, MD

**A** The sources you've mentioned are your main options. Steim, however, (Achtergracht 19, 1017 WL Amsterdam, Holland; tel: 011-31-20/6228690; fax: 011-31-20/6264262) makes a device called the SensorLab, which has 8x8 diode matrix key scanning, 32 analog-to-digital channels, serial bus, battery-backed RAM, etc. Steim is not a manufacturer per se, and essentially makes these on a custom basis. Check for current pricing and availability.

Craig Anderton  
West Coast Editor

### TRIGGER MAN

**Q** I'm a musician in a five-piece band. We'd like to sample prerecorded music and trigger the music, so that the music responds to our live playing. What gear would we need to pull this trick off? (I also need to trigger a Roland TR808 kick sample from my acoustic kick drum.)

Rhasaan Muhammed  
London, England

**A** You have two needs: one device to store the samples, and another to translate triggers from acoustic instruments. A rack sampler would be ideal for storing samples: Look for expandable memory (8 Mb or more), and a SCSI port if you want to pull samples from a hard disk instead of from the much-slower floppy disks. SCSI can also access CD-ROM sounds if you have a compatible drive. Ensoniq, Peavey, Kurzweil, Akai, Yamaha, Roland, and others make samplers that fit these requirements. There are also computer-based samplers, but I assume you'd prefer not to take along a computer on gigs.

If you don't need a lot of sampling time, some digital delay and multieffects devices (e.g., Alesis Quadraverb Plus) can store short samples.

There are several devices that

trigger MIDI sound sources, starting, of course, with keyboards. Drum pads such as the Kat and Roland Octapad are excellent options (the Kat can trigger from your hands as well as from sticks). For acoustic triggering, several manufacturers make drum-trigger-to-MIDI converters. These generally use piezo contact transducers that must be mounted on the drums since it's very difficult to coax mics into giving

good triggers. Prices and capabilities vary greatly; check with MIDI-literate music stores for the latest options.

We hope this answers your question. Send us your CD after you get a bitchin' record deal so we can hear how you ended up using all this stuff!

Craig Anderton  
West Coast Editor  
*continued on page 104*

# 16 channels of 3-band parametric equalization in 3 rack spaces



**Y**ou've never seen this much EQ in this little space before **16** More importantly, you've never heard a more musical equalizer **16** Speck optimized the response for electronic musicians, so **16** sounds fall into place quickly and easily **16** No more repatching **16** It's the answer to your limited-eq console **16** It's available in 16 mono channels, 16 stereo channels, or an 8/8 combination **■** Get to your dealer today for a live audition... and while you're listening, ask him to tell you the price. That'll be music to your ears, too.

The model

# EQ 16

Some of us need more equalization than others

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Fallbrook, CA 92028

**speck**  
**electronics**

# NAMM VIEWS

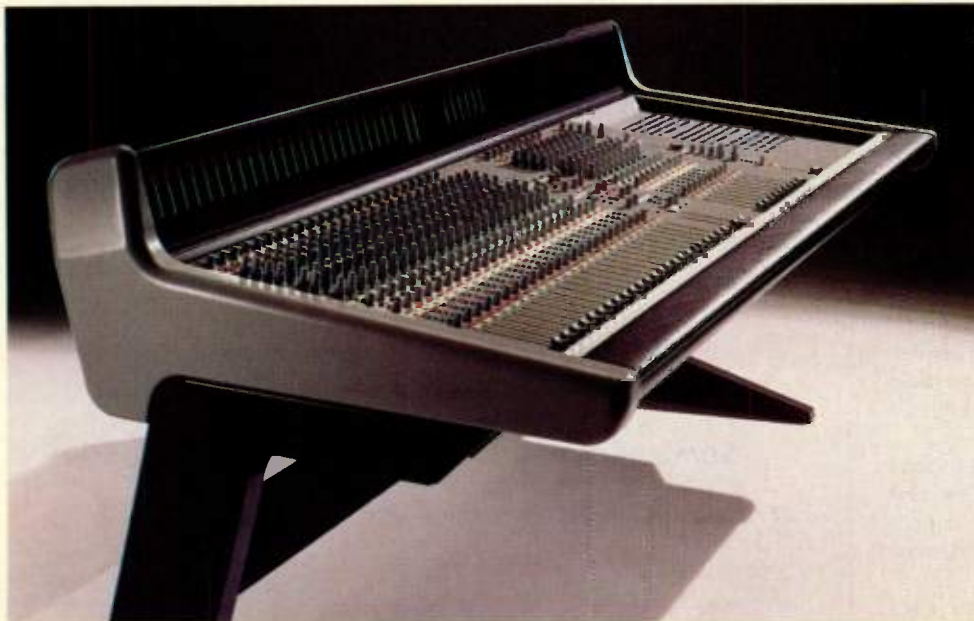
## ONE PLUSONE EQUALS PLENTY

InVision Interactive and Korg USA have introduced the PlusONE™ sound memory upgrade for Korg's M1 Music Workstation. The new Korg M1 — dubbed the M1-PlusONE — doubles the internal PCM ROM of a standard M1 with all new world percussion, distortion guitar, rock organs, electric pianos, violin, flute, and house percussion. The M1-PlusONE incorporates a new sound memory board from InVision Interactive, called the PlusONE. It is also available through Korg dealers or from InVision Interactive as a retrofit for existing M1 keyboards. Installation takes just minutes and does not affect the M1 warranty. M1-PlusONE is available from all Korg dealers and the PlusONE upgrade is available from either Korg dealers or Korg-authorized service centers. For more details, contact Korg USA Inc., 89 Frost Street, Westbury, NY 11590. Tel: 800-645-3188. Circle EQ free lit. #165.



## STAR BOARD

Orion is a new 8 bus in-line mixing console from D&R Mixing Consoles. The signals travel a minimal audio path, providing high headroom, clear sound, and extremely low distortion and noise that almost matches a straight wire. Along with advanced digital-ready electronics, the Orion is totally modular and is available in three welded-steel frames. An optional all modular patchbay with Bantam jack sockets and 120 tie lines is available and most ins and



outs are balanced. A full four-band parametric EQ is featured. There are six discrete audio sends per module, each assignable to 8 aux busses. Aux 1-4 is switchable between monitor/channel and pre/post fader while aux 5-6 and 7-8 are post fader being fed from the channel path only. To increase the number of sends, you can switch the outputs from the aux 5-6 sends and reroute them to the aux 7-8 busses. A dual stereo input module provides two stereo returns. For more information, contact D&R USA, Rt. 3 Box 184-A, Montgomery, TX 77356. Tel: 409-588-3411. Circle EQ free lit. #166.



## VINTAGE SOUNDS

**E**-mu systems has introduced Vintage Keys, a digital sample playback module that features the most popular classic analog synthesizer and keyboard instrument sounds from the '60s, '70s, and '80s. Vintage Keys accurately re-creates the feel and texture of classic analog keyboard instruments while integrating MIDI compatibility and the greater reliability and stability that today's technology allows. A single rack space module, Vintage Keys features 8 megabytes of sounds (expandable to 16) stored in ROM, 32-voice polyphony, and 32 "analog sounding" digital resonant low pass filters. The 16-bit CD-quality sounds range from the classic Fender Rhodes and Wurlitzer pianos to a Hammond B3 organ with variable Leslie control and Moog, Oberheim, and Arp synthesizers. Vintage Keys retails for \$1095. For more information, 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. #167.



## MICROSOUND GETS BIGGER

**M**icro Technology Unlimited is introducing a number of upgrades to its MicroSound™ Digital Audio WorkStations. MicroEditor™ 2.0 offers over 100 new fea-

tures including: record and playback at the same time on one hard drive; enhancement of 38-track playback capability; addition of Edit Zones for precise amplitude control and delete editing; and the capability of archiving entire 38-track projects to DAT. MicroSync™ is an optional synchronization board that allows MicroSound WorkStations to vari-speed resolve to external SMPTE timecode and Video Black Burst. It provides full slave operation and chasing during record, playback, and within a Mix project. Sync-Lock is regained within one second after high-speed shuttling, accurate within one millisecond over two hours at any of 15 sampling rates. All SMPTE frame rates are supported and MicroSync installs inside any ISA/EISA bus computer running MicroSound. For the rest of the story, contact Micro Technology Unlimited, 156 Wind Chime Court, P.O. Box 21061, Raleigh, North Carolina 27619-1061. Tel: 919-870-0344. Circle EQ free lit. #168.

## TAKE CONTROL


**M**usic Industries Corporation has unveiled the velocity-sensitive, two-octave, battery operated micro keyboard controller for the Yamaha QY/10 Micro Workstation. In a compact molded casing, the Novation MM10 Mini MIDI controller permits programming and performance with dynamic polyphony and frees you from step-time data entry. Full-sized keys plus pitch and modulation wheels make the unit user-friendly, while an instant octave transposition feature facilitates easy access to all eight octaves through the use of up and down buttons. The QY/10 sits neatly atop the MM10 for easy access and visibility. A molded, multi-connector cable takes care of the MIDI, DC supply, and audio requirements. The MM10 incorporates a dual stereo amplifier for headphones. It can also be used for a multitude of other functions as it also controls other keyboards as well. For more information, contact Music Industries Corporation, 99 Tulip Avenue, Floral Park, NY 11001. Tel: 516-352-4110. Circle EQ free lit. #169.



© 1997 Yamaha Corporation of America, Special Musical Instruments, P.O. Box 10700, Denver Park, California 95022-0700



**YAMAHA®**

A black and white dog is sitting on a light-colored bench. To the left of the dog, a portion of a dark-colored Yamaha SY85 synthesizer keyboard is visible, showing the keys and some control buttons. The background is a plain, light-colored wall. The right side of the advertisement is a solid dark blue color with white text.

# Sound will obey.

The dog will never be the intelligent, obedient and loyal servant you would like him to be. Your music, however, will do whatever you want.

How come?

Quick Edit. It's a mode of programming in the SY85 AWM synthesizer. It allows you to, very simply, create any sound you can imagine.

How simply? You can layer, split, and cross fade up to four voices at once. Eight control sliders let you modify whatever parameters you like. It's easy and it's quick, hence the name.

You need more control? While playing live you can use those same sliders to modify the effects, filters, attack, release, and balance, all in real-time.

The SY85 has SIMMs and battery backed, expandable RAM, MIDI capability and, of course, our distinctly superior sound quality and playability. It is, after all, a Yamaha.

Would you like more information? Go play the SY85 or call us. Obediently, we'll send you a brochure. 1-800-932-0001, ext. 100.



## The SY85.

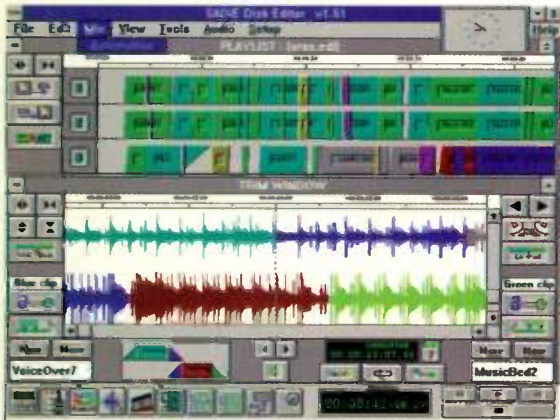
CIRCLE 74 ON FREE INFO CARD

# NAMM VIEWS



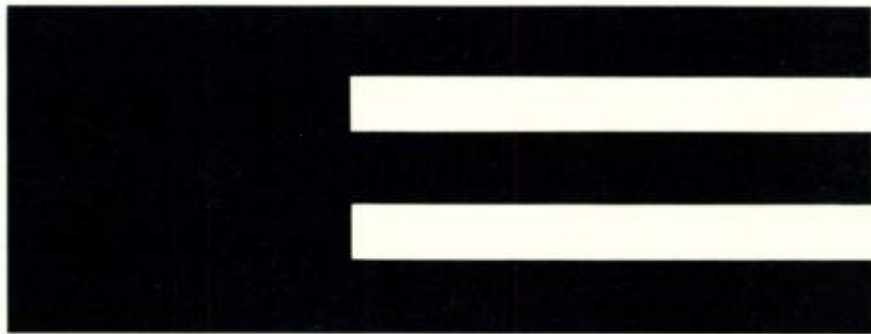
## POWERFUL PIONEER

**P**ioneer Laser Entertainment, a leader in LaserDisc products has introduced the M-V3000 power amplifier for professional sound applications. The M-V3000 puts out 500 watts a channel into four ohms at 1 kHz with just 0.1 percent THD. The amplifier is a two-rack unit size and, thanks to its modular design, it allows for high serviceability. A Canon connector pin assignment switch allows matching any plug wiring pattern. For further information, contact Pioneer Laser Entertainment, Inc., 2265 East 220th street, Long Beach, CA 90810. Tel: 310-835-6177. Circle EQ free lit. #170.



## SADIE'S IN TOWN

**M**anufactured in the U.K. by Studio Audio & Video Limited, SADiE™ is a real-time desk editor for Windows 3.1. It operates on an IBM PC-AT/compatible platform with certain minimum power and memory capabilities. The X-S2™ or X-S4™ (two AES/EBU/SPDIF outputs) floating point digital cards using the AT&T DSP 32C and the X-ACT™ analog converter and timecode interface card are the hardware side of the system. With SADiE, recording time is dependent on disk size. Mono or stereo recording is possible, while all tracks are stored as mono signals, but are phase locked in EDL when recorded as stereo pairs. New software features include auto cut, chase lock to SMPTE, 29.97 drop and non-drop frame rate support, and EQ and pitchshift of clips as well as level. For more details, contact A.R.A.S., P.O. Box 4392, Ann Arbor, MI 48106. Tel: 313-572-0500; fax: 313-434-2281; Compuserve: 71756,1245. Circle EQ free lit. #171.



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  $\pm 12$ dB 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.



## INTELLIGENT AUTOMATION

**C**M AUTOMation has introduced the MX-816 and FX-100 Automation Control Console, a turn-key interactive intelligent automation system. Each of the eight-channel FX-100's has built-in expandability, smooth 100 millimeter faders, and an intelligent mute/solo switch for track muting. The view and scene switches select the current fader view or scene, and the fader and mute switches toggle fader and mute record

status. Global record in and out and update/rehearse modes are all controlled by panel switches. Combined with the rack-mount MX-816, a transparent and user-friendly atmosphere to record automated mixes into any MIDI sequencer is achieved. The MX-816 is available in an 8-channel version for \$489.95 or a 16-channel version for \$799.95. The FX-100 Automation Control Console retails for \$449.95. For more information, contact CM AUTOMation, 402 Museum Drive, Los Angeles, CA 90065. Tel: 800-238-7010. Circle EQ free lit. #172.

## HIGHER VOLTAGE

**M**illennia Media's HV-3 high voltage mic preamp powers both +48V and +130V microphones and, optionally, performs high resolution A/D conversion at the source. The HV-3 offers two channels with two inputs per channel employing gold three-pin XLRs for conventional microphones and gold four-pin XLRs for Bruel & Kjaer 4000-series high voltage mics. The HV-3 utilizes an advanced octal-matched discrete/hybrid front end and short circuit protected laser-trimmed 50v FET-based monolithic driver stage. Each channel is designed to maintain tight stereo tracking. When using the HV-3 for stereo image recording, phase and gain are matched to better than 1/4 degree and 1/8 dB, respectively. Hard-wired transformerless audio paths ensure lowest noise with .0006 percent distortion typical. For the full story, contact Millennia Media, P.O. Box 277611, Sacramento, CA 95827. Tel: 916-363-1096. Circle EQ free lit. #173.



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 Corporation 3630 Holdrege Avenue  
Los Angeles CA 90016

*\*Slightly higher in Canada*

**CIRCLE 06 ON FREE INFO CARD**

# NAMM VIEWS



## WINDOWS OF OPPORTUNITY

**D**igidesign's new Session 8™ is a multi-track recording system designed for the project recordist, integrating random access digital audio, MIDI, and analog mixing and patching. Session 8 operates on the IBM/Windows platform. The system consists of both audio recording hardware and software. You can connect your existing audio equipment to the comprehensive Session 8 Audio Interface, which includes four professional quality mic inputs, eight line inputs, four assignable

inserts, S/PDIF digital inputs, and a 10x2 analog sub-mixer. The Audio Interface provides eight line-level outs, stereo monitor out, and a digital output. Two computer extension cards handle the interfacing, providing Session 8 with its digital signal processing and SCSI controlling functions. The main Session 8 card includes a Motorola 56001 DSP chip which will support eight tracks of CD-quality digital audio on a single SCSI hard disk, and which will offer up to six bands of parametric equalization. The software combines input routing, digital mixing, and multi-track waveform editing under a single program with user-friendly Windows displays. Session 8 retails for \$3995. For more information, contact Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. Tel: 415-688-0600. Circle EQ free lit. #174.

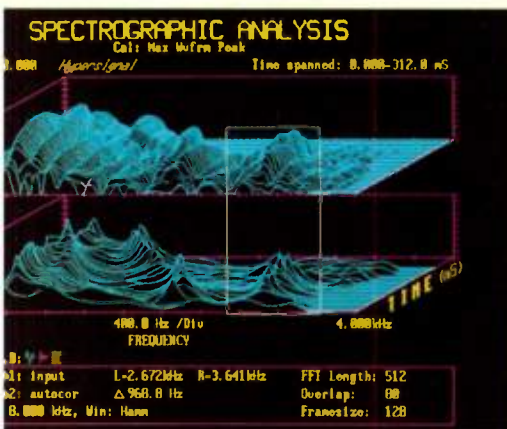


## Cause.



## LITTLE BIG MONITOR

The Audix Powerhouse Series of compact monitors are two-way vented cabinets that deliver very big sound from a small versatile format. Designed primarily as a low cost monitoring system for professional applications, the Powerhouse Series is suited for stereo TV, broadcast, offline editing, digital workstations, keyboards, and other applications. Incorporating an advanced hybrid technology which combines both surface mount technology and discreet electronics in the 50-watt amplifier design, the Powerhouse speakers provide superior size/performance ratio, increased component quality, higher tolerances, and greater stability than traditional designs, according to the manufacturer. Low noise external power supplies are used to enhance system flexibility and maximize signal-to-noise ratio and overall dynamics. Each of the four models in the series features long-excursion low-frequency drivers, seamless crossover filtering, and ultra-clear high-frequency polymer tweeters. The easy to connect and use monitors are housed in a lightweight but durable poly-carbonate housing. For more information, contact Audix, 19439 SW 90th Court, Tualatin, OR 97062. Tel: 503-692-4426. Circle EQ free lit #175.



## THAT'S LOGICAL

Signalogic is taking a different approach to DSP product development. The company says it allows for dramatic savings in development time and cost through the use of a line of embedded DSP modules developed by Electronic Tools of Germany. Now, the full range of functions, displays, and instruments offered by Signalogic's Hypersignal-Macro DSP software can be used directly with the actual product or target system. These include design/simulation functions, DSP/math functions, filter design, difference equations, interactive waveform display, real-time instrumentation and measurement, and real-time development functions. The software communicates with the embedded modules via a plug-in interface card. Also, an initial I/O module has been created that contains dual 12-bit input/output channels, anti-alias filters, variable gain, and programmable sampling rate (up to 100 kHz). For more information, contact Signalogic, 9704 Skillman #111, Dallas, TX 75243. Tel: 214-343-0069. Circle EQ free lit. #176.

1. What would independent multiple effects be like if you couldn't apply them separately to the different inputs? Like Rogers without Hammerstein.

2. True stereo inputs let you do two independent reverbs at once at once. Got it got it?

3. Also because of true stereo inputs, you'll have both gate and ambient reverb to play around with simultaneously.

4. Can you say *ambience*? Then you can also simulate the use of an ambient microphone while recording.

5. You'll not only be able to utilize up to five independent delay lines, but also set intervals up to two seconds apiece without compromise.

6. How do four independent pitch shifters, each with a four octave range, sound? Great, that's how.

7. Join this rotary club and you'll simulate a classic rotating speaker with separate rise/fall times for the lows and highs.

8. Severely detuned signals. Mild flanging. And everything in between. Ladies and gentlemen, the SE-50's stereo flanger.

9. For a mild phase to one that's truly radical, the stereo phaser is sure to come in handy.

10. Plug a mic into one input and a keyboard into another and you're set for vocoder.

11. Shhh! The SE-50's noise suppressor is about to kick in.

12. Having separate EQ and noise suppressors per input is one thing. Being able to add reverb, delay and chorus to either or both is quite a cool other.

13. The SE-50's chorus recalls the renowned Roland space chorus circuitry.

14. Naturally, you'll be able to call up the classic gated reverb effect with the SE-50.

15. The compressor evens out dynamic levels and produces more sustain on your guitar.

16. For everything from heavy metal to blues to country, the SE-50 is ready to kick into overdrive or even distortion.

17. You've also got a line driver with the SE-50. Drive carefully.

18. The limiter prevents clipping or overloading on a mixer, an amplifier or even a tape recorder.

19. To simulate panning, move this magazine from one ear to the other while flipping the pages.

20. Add more high end, more low end—you know, more clarity—with the SE-50's enhancer.

21. Need enough reverb to fill a small room? How about the Royal Philharmonic Amphitheater?

Now consider you'll have 28 powerful preset algorithms for combining up to eight effects simultaneously, full MIDI control, not to mention 128 memories. All in a sleek half-rack design.

The SE-50 Stereo Effects Processor, part of the BOSS Pro Series.

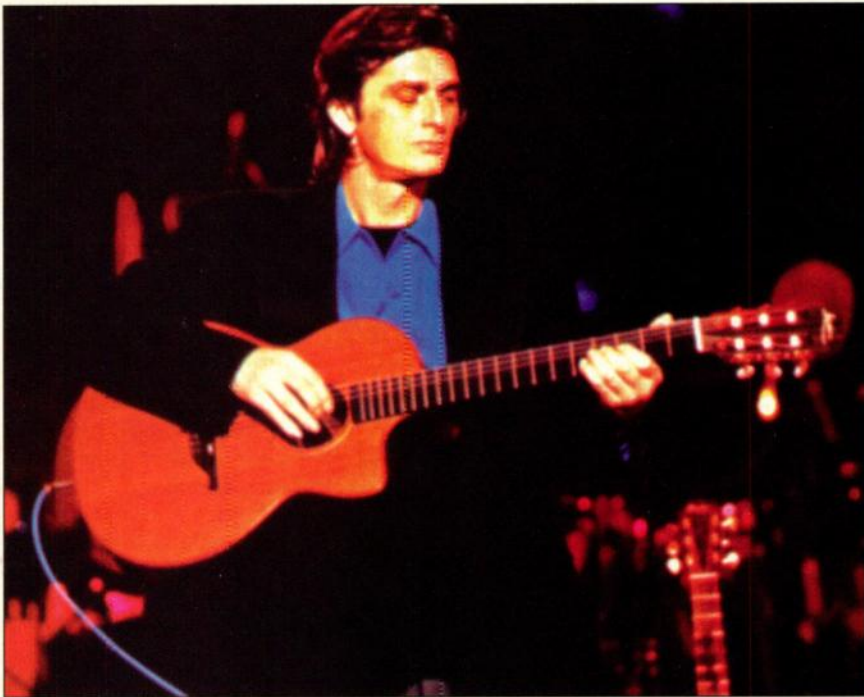
It could effect you in a serious way.



**BOSS**

BOSS, Roland Corporation US,  
7200 Dominion Circle, Los Angeles, CA  
90040-3647. 213 685-5141.

## Effects.



MICHAEL OLDFIELD knows for whom the tubular bells toll.

## TOTALLY TUBULAR Michael Oldfield

"For *Bells 2*, we had a hard time finding a set of bells that sounded as good as the original, which I had hit so hard during the recording of the *Bells 1* that I destroyed it."

ALTHOUGH IT WAS written and produced well before the movie was made, many people recognize the haunting strains of "Tubular Bells" from its use in the terrifying classic *The Exorcist*. There, amongst the spinning heads and projectile pea soup, "Tubular Bells" added a chilling ambience that has since been adopted by the horror-film genre.

"Actually," confesses Michael Oldfield, composer of the haunting tune, "I didn't even see the movie until a long time after it was released. And then I spent most of it laughing."

Now, nearly 20 years later, Oldfield has released the sequel to the original *Tubular Bells* album, which was one of the most successful

albums in music history, selling over 16 million copies worldwide. The success of the long-awaited sequel, *Tubular Bells 2*, seems certain, as it hit the number one slot on the British charts only a few weeks after its late-August release. "It's not like a part two," explains Oldfield. "It's like a James Bond movie — it's a new story in a new setting, but some of the characters are the same. It's different, but at the same time it sounds familiar."

The recurring characters, the tubular bells, however, have changed quite a bit themselves over the last 20 years. "For *Bells 2*, we had a hard time finding a set of bells that sounded as good as the original, which I had hit so hard during the recording of the *Bells 1* that I destroyed it," said Oldfield. "They probably threw the set out."

"I rented lots of different sets, but I couldn't find the right sound. I spent a whole day at the Sound Library in Los Angeles going through every bell in America. Jeff Downes and I spent another day with a Synclavier going through all the different samples, plus he invented a few. It's although we designed these bell sounds and I took them away on my DAT machine. Actually, I found a really pure tubular bell sound on a Korg M1."

Unfortunately, the electronic bells had the same problems as the

actual bells, and Oldfield was forced to compensate. According to Oldfield, tubular bells have a weird harmonic that only works in minor keys, so he generated his own harmonic electronically from real tubular bells that could work in major keys as well.

Much of the new album was recorded in Oldfield's component home studio, which he began building with the profits from the original album. In it he features a 48-input digital Harrison Series 10 console, UREI compressors, a Steinway grand piano, and around 25 guitars. The studio is able to be packed up into cases and shipped all over the world — which it was, for this project.

Differences between the original and sequel can also be found in their attitudes. "*Bells 1* was very doom and gloom, which is probably why they chose it for *The Exorcist*, but *Bells 2* is happier and lighter. You put it on your stereo and it beams out and sort of smiles at you," Oldfield remarks. "Also, the original is out of tune and out of time — one of the disadvantages of working with a metronome and not an electronic click track."

The only thing Oldfield would have liked to have had on the original was real strings. "A few years after *Bells 1*, they had released a keyboard that sounded like a string orchestra. Of course, I bought it immediately and put strings on everything," Oldfield states. He pauses a moment, then adds, "Although it was probably a good thing I didn't have it because I would have had to discipline myself. Sometimes it's useful to have limitations." —Tony Savona

## FAST FORWARD

### Marcus Ryle

"Ryle is one of the unsung heroes of the personal studio revolution...he was part of the team that created the Alesis ADAT."

MARCUS RYLE DOESN'T seem like the kind of guy who designs high-powered music microchips and software all day long. He's too laid back. "We call him Moondoggie," a mutual acquaintance once told me. "He's

such a regular dude it's hard to believe what a genius he is."

Suitably enough, Ryle's headquarters are situated right near the beach of Venice, California, home to many of Los Angeles's most colorful characters. He shares the building with a boat repair company. You make your way through a maze of peeling hulls and sun-bleached tackle, eventually finding yourself before a plaque that reads, "Fast Forward Designs."

The name may not mean a lot to you, but if you've ever used Digidesign's Sample Cell, or a Dynacord ADS sampler, you've handled a Fast Forward design. Marcus Ryle is one of the unsung heroes of the personal studio revolution. One of MIDI's original architects, he was recently part of the team that created the product that promises to be just as much of a boon to project recording as MIDI was — the Alesis ADAT.

"I like to call myself a high school dropout," Ryle jokes, explaining that when he was 16, he took the GED exam so that he could graduate from high school early and get into the electronic music program at Cal State University's Dominguez Hills campus. Within a year, he was teaching there. One day, synthesis pioneer Tom Oberheim came to lecture and ended up offering Ryle a job at Oberheim Electronics. At age 19, Marcus designed his first product, the Oberheim DSX sequencer. At 20, in October 1981, he found himself in Japan with Dave Smith of Sequential Circuits, hashing out the details of what would become MIDI with engineers from Roland, Yamaha, and Kawai.

The Oberheim years were busy ones for Ryle. He did a lot of moonlighting as a session synthesist for music biz biggies like Kenny Rogers, Barbra Streisand, Jermaine Jackson, and Olivia Newton-John. Also, Oberheim was where Marcus met his current business partner, Michel Doidic. They worked together on classic synths like the OB8, Xpander and Matrix-12 before leaving Oberheim in 1985, shortly before the company went bankrupt. "At that stage in our lives," says Marcus, "neither of us was interested in taking huge financial risks. But we really wanted to design products."

The solution was Fast Forward, an independent design company that contracts its services to the big equipment manufacturers.

Ryle speaks highly of the ADAT project and its originator, Alesis co-owner and chief engineer Keith Barr. He says ADAT was Fast Forward's "most collaborative project yet," in terms of design interface with the Alesis engineering team. "In larger companies engineering tasks tend to be divided up so that the person writing the software has no idea what the hardware designers are doing. This isn't necessarily the most efficient way to design something. With ADAT, there were enough people involved in all the aspects — hardware, software, digital and analog — to enable us to do things such as saying, 'Gee, we can really get rid of this circuit here and do this by software control instead.' We ended up with a better and less expensive product, as a result."

Ryle also credits Barr and his partner Russell Palmer's "fearless marketing strategies," as being instru-

mental in ADAT's development: "They take calculated risks and they're quite good at it. And the risks go up in order of magnitude each time. Their first custom chip for the Midiverb II and Microverb was their first risk. Then their drum machine and sequencer [the HR-16 and MMT-8] required quite a large financial investment. Now you look at ADAT and it's on a whole new level of complexity and risk. It took an unbelievable amount of money to develop that product. But they really have the vision to know how successful it can be."

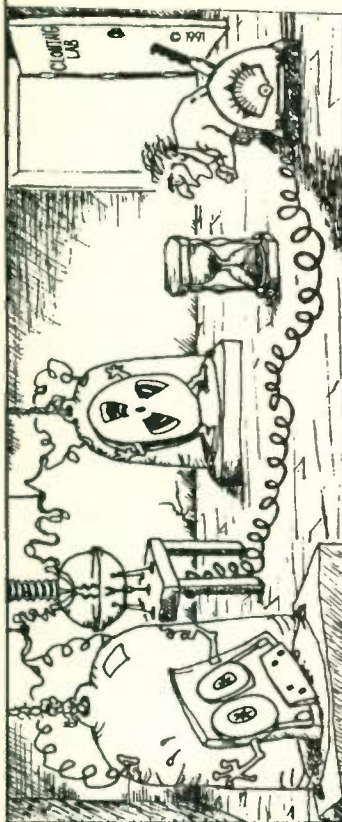
But ultimately, Ryle's enthusiasm reflects a musician's point of view as much as that of a designer. "There's no reason why someone with an ADAT project studio can't make a recording as good as the best recording in the most expensive studio in the world. Those technical barriers are being broken down. It's really exciting to be part of that."  
— Alan DiPerna



Photo by Ed Colver

MARCUS RYLE helps design the gear that makes the whole world sing (and record).

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30 FEBRUARY EQ

EQ PEOPLE



Photo by Ed Colver

TRAMPS LIKE THEM...Toby Scott helps Bruce Springsteen bring his music to life.

BORN TO RECORD

**Toby Scott**

"In the project studio, we have windows, and the doors are open. There is a relaxed, casual atmosphere that no project studio can re-create."

PROBABLY THE LAST place you would expect to find a project studio is backstage at New Jersey's Brendan Byrne Arena, but as local hero Bruce Springsteen plays to a sold-out house of screaming fans a few feet away, his engineer, Toby Scott, records the event from the confines of a large metal box that holds the contents of the Boss's home studio. The tour is in support of Springsteen's latest efforts, *Human Touch* and *Lucky Town*, the latter of which was recorded at Springsteen's studio house, Thrill Hill.

The flexible system is not used to tape all of Springsteen's concerts, just the ones that take place in large arenas like the Brendan Byrne and the Los Angeles Sports Arena. It was originally purchased in the beginning of 1988, when Springsteen was getting ready to go on tour. "At the time we decided to put a remote recording system together," explains Scott, "because we compared its cost against that of renting a remote truck, and found them to be very competitive; the only difference was that at the end of the tour we'd still have a console, tape machines and all the other gear,

as opposed to just a dozen reels of tape."

The system they configured is based on a 62-input Amek Angela console, although they are currently equipped for only 58 channels. It also has two Sony PCM 3348 48-track machines, along with the requisite assortment of delays, reverbs and compressors, drum machines and DATs.

This whole "studio-in-a-box" fills about ten Anvil cases. One case contains the console, and five others carry the power supplies, speaker amplifiers, outboard gear, and a patchbay. There are also a cable trunk and a couple of others that carry various monitors, test equipment and miscellaneous gear.

Since this system was set up regularly, night after night, in the late eighties, putting it together in Springsteen's home to record *Lucky Town* was no great feat for Scott. It took about two days before they started recording.

"There are completely different atmospheres in the project and professional recording studio," said Scott, who has worked with Springsteen on all of his albums since *The River*. "In the project studio, it's generally just Bruce and I, and the atmosphere is very relaxed and casual. It was relaxed at A&M too [where *Human Touch* was recorded], but there we had Bruce's producers, Jon Landau and Chuck Plotkin, Roy Bittan, and one or two assistant engineers in addition to Bruce and myself. Plus, there's always someone running around the halls in a multiroom facility. It's also a bit more formal — you're indoors, you come out onto a lot, and so on. In the project studio, we have windows, and

continued on page 117

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CIRCLE 53 ON FREE INFO CARD

# Living with Digital Tape



Photo by Ed Altona

## Tips on recording in the digital age

BY CRAIG ANDERTON

I recently replaced my venerable Tascam Model 58 analog 8-track with the Alesis ADAT, which, in case you've been living on Mars for the past couple of years, is an 8-track digital audio recorder based on S-VHS technology. I was expecting better sound quality than with analog, no need for noise reduction, and cheaper tape costs, and I was not disappointed. But I've found that going digital has had some ramifications that I didn't expect.

To lessen the culture shock for those who are succumbing to the temptation of translating music into numbers and back again, what follows are some of the things I've learned about life in the Digital Tape Age. Although my observations are based around ADAT, most will probably apply to digital recorders (such as the Tascam DA-88 and Fostex ADAT) that are due to arrive soon.

- You can trust your tape counter. With ADAT, the counter readings refer to the timecode that ADAT writes to an "invisible" control track (this is the same track that provides sync infor-

mation when syncing multiple ADATs). Readings never slip, so you don't have to rezero the counter every 10 minutes or so.

- You can forget about modulation noise, audible print-through, noise reduction pumping, wow, flutter, hiss, scraping reel flanges, or a guard track for timecode. Speaking of which, having the extra track is so nice — it's good to know that...

- You don't need to give up a track for SMPTE anymore. There's a lot of MIDI Machine Control code flying around ADAT's innards, and JLCopier makes an adapter box that generates MTC code from within the machine itself, obviating the need for a separate timecode track.

- The "continuous SMPTE sync" option with Sound Tools is usable. Sound Tools can sync to tape in two ways: SMPTE start, which starts Sound Tools at a particular SMPTE time and then free-runs; or continuous SMPTE sync, where Sound Tools "tweaks" its timing to conform to the code coming from tape. And that's the problem: even with decent analog decks, there's a bit of drift. As Sound Tools (which doesn't drift) compensates for these timing changes, it creates pitch shifts that sound like an off-center record. Setting a start point is generally the better of the two options, although Sound Tools and tape will eventually drift apart. You will then have to set a new start point and record the next segment — and so on until there is drift again.

Well, digital doesn't drift, ADAT doesn't drift, and timecode recorded on ADAT doesn't drift. End of problem.

- Avoid the pitfalls of virtual tracks. Virtual MIDI tracking — where you sequence MIDI-driven sounds, record acoustic sounds on tape, and sync the two together to gain more tracks — has been a boon to project studios. But virtual tracks also have limitations. When you're doing the mix of your life and get a stuck MIDI note, virtual tracks don't seem like such a good idea — or if you have to redo a mix, and you can't get the levels and signal processing effects for the MIDI tracks *exactly* as they had been.

So if you get a premix you like of the virtual tracks, record it on tape. Granted, that uses up two tracks, but sometimes it's worth it. And if you're desperate, you can always replace those tracks with overdubs and go back to doing virtual tracks.

Additional tip: If you're going to record a virtual track premix on tape, record a rough version first and do your acoustic overdubs on that. Then when you go all out for your virtual track premix, you can do it in context with the overdubs.

- Eliminating MIDI Timecode jitter. Compared to syncing to an internal clock, sequencer timing goes to hell (or at least to Houston in late July) when synced to MIDI Timecode. Okay, it's not really the fault of MTC per se, but of the processing speed of computers and the quality of a sequencer's coding.

The solution? Run the sequencer from its internal clock, record the sequenced premix directly to tape, and overdub the other tracks — just like in the old days.

### WHO NEEDS SYNC?

When it is mixdown time, you'll still be able to run a MIDI fader unit from the sequencer. Timing requirements aren't as tight for mixing moves and glitches fortunately tend to happen in the same way each time so there won't be a different mix every time, the tape plays back.

- Ah, the grunge of analog tape. Some people complain that digital sound lacks soul and warmth, and possibly promotes both tooth decay and wanton sexual practices. Although I generally like the sound of digital, many people don't realize how much they use analog tape's saturation characteristics until it's not there any more (especially with drum sounds and vocals; guitar parts are often so distorted that you'd never miss a few percent of THD). Here's a workaround.

Find yourself a studio-oriented multi-effects with distortion (intentional distortion, that is), since distortion can sound great on electronic drums. A little bit of overdrive acts as

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a hard limiter, and "crunches" the drums as it compresses them (I also throw in a little EQ to brighten things up). The sound quality is awesome, and what's really odd is that you *can't tell the drums are being distorted*, even with what seems like a lot of overdrive. But it's better than tape distortion, because you can control it, and you don't saturate the high frequencies. Try a little overdrive on your drum machine sometime — the results may surprise you.

For vocals, the distortion has to be a lot more subtle. A tube mic pre-amp with just a hint of distortion seems just about ideal. I'm not a hardcore tube fanatic by any means, but when it comes to vocals, I've seen the light — which is easy with tubes, considering that they glow in the dark.

- Backup for cheapskates. The \$4000 way to back up an ADAT tape is to get another ADAT and do a digital dub. The \$12 solution (assuming you have a DAT recorder that syncs to SMPTE) is to sync the DAT to ADAT

and record four pairs of tracks onto the DAT. Should anything happen to the master tape, you can always restripe an ADAT tape with SMPTE, drive the DAT deck, and rerecord the DAT tracks onto ADAT.

Don't have a SMPTE DAT deck? Well, because of digital's lack of drift, if you fly in parts and they sync up at the beginning (usually through dumb luck), they'll stay in sync until the end of the tune. Some people have reported running nonsynched DATs for 30 minutes or more without drift.

There's a trick to this: first, back up your stereo (or mono) drum tracks on DAT. Next, record another track, such as bass, *along with one of the drum tracks*. Then record another track and one of the drum tracks, etc.

When it's time to recreate the original tape, do the following:

1. Record the original drum track first.
2. Cue up the next two tracks and set up to record only the nondrum track, but monitor both tracks.
3. Cue up DAT and ADAT to the

beginning of the tune, with the DAT in pause mode.

4. Start ADAT a bit before the beginning, then at the precise moment the tune begins, start the DAT.

If you're lucky, the two will start in sync (as evidenced by the drum tracks flanging instead of giving a slapback echo effect). If there's a bit of a slapback echo, don't sweat it for relatively unrhythmic parts like vocals. Otherwise, try again until it syncs.

Make sure you extend the drum part about 15 to 30 seconds *before* the beginning of the tune (but mute this for a few seconds just before the song begins). If you record this "preroll drum part" on the DAT and the DAT and ADAT parts don't sync up properly at first, you can fiddle with ADAT's variable speed control to slow down or speed up until ADAT catches up with the DAT. Hopefully the two will be "synced" before the tune's actual beginning.

Well, there are more tips, but I've used up my allotted word count for this issue (time flies when you're having fun). Until next time... **EQ**

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CIRCLE 39 ON FREE INFO CARD

# Becker On Tap

If you were impressed with Spinal Tap's live performance antics [EQ, December '92], you might like to hear about the breakthroughs in state-of-the-art of audio recording techniques that took place in the recording of *Break Like The Wind*.

Firstly, all the vocals on the current album were recorded and remixed with the astonishing Crosley Phase Linear Ionic Induction Voice Processor System. This device was invented and first used by the late Graehham Crosley and later perfected for studio use by producer Reg Thorpe, who had an aborted go with the Tap lads during one of their early mid-seventies comeback attempts. There were a few bugs in the system at that time ("Like it wouldn't work. Period," recalls Nigel Tufnel fondly) and so work with it was abandoned. In the intervening years, Thorpe has managed to sort out the last remaining kinks in the system, and made it available for these sessions. He himself generously offered to make the crucial fine adjustments necessary to eliminate background chatter and allow the awesome fidelity and signal-to-noise ratio of The System to stand out — as I believe it does — in the final mixes.

Here's how the Crosley device works when a vocalist sings: A stream of accelerated air particles issues from his or her vocal cords, leaves his mouth, and goes out into the room where the diaphragm of an expensive

vintage tube microphone is waiting. This diaphragm does a passable job of imitating the vibration of the air molecules by twitching in its little suspension, which movements are turned into a low-level electrical flux in the tiny wires attached to the diaphragm assembly. But wait! For there are many problems inherent in a system of this sort, including mechanical resonances in the diaphragm itself, variations in the temperature and humidity of the air in the room, foreign particles issuing from the gaping maw of the vocalist himself (a particular problem for the Tap lads — corrosive smoke particles and bits of mango pickle from Indian takeaways) and so on, all of which result in reduced fidelity for you, the listener. However, the Crosley device does not care one whit about all of these things, for it measures only the flow of ionic muons (small charged particles with an atomic weight of between  $1.699669 \times 10^{-17}$  Electron Units and roughly twice that much, give or take a teenie bit here and there) past a negatively charged grid. The resulting current is used to modulate a constant voltage that is self-referenced to the known induc-

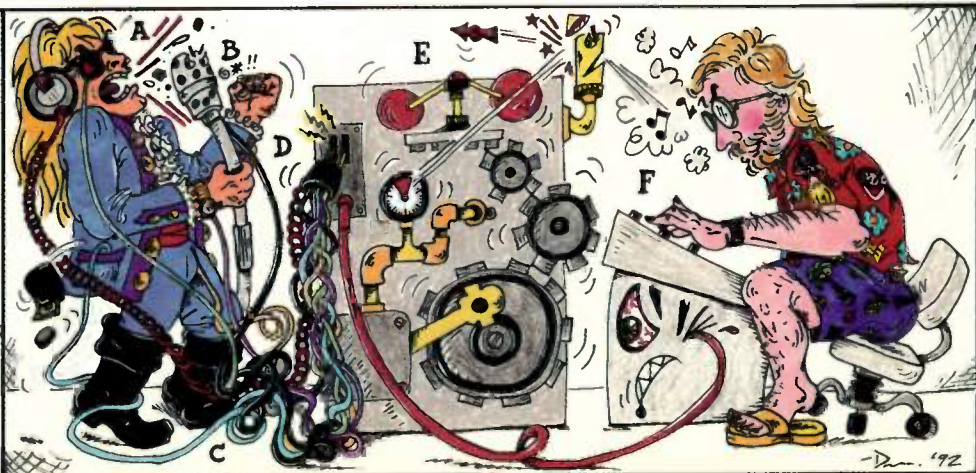
tance of the system itself and to the body capacitance of The Artist. For in order for the system to work, the vocalist must wear on his person a number of small balance plates that will offset the fields created by the various inanimate objects on his body at the time of recording (afterwards, he may wear what he likes). In the case of David St. Hubbins, for example, after much experimentation, the correct voltages were found that needed to be applied to these small balancing plates when attached to his billfold, to his wristwatch (a fake Rolex that he evidently took for the real thing), and to the Ray Bans that he habitually wore in the studio ("me lucky shades"). It was also necessary to put a plate in his groin region to offset the charge produced by, of all things, a roll of quar-

Behind the scenes recording Spinal Tap's *Break Like The Wind*. We think the author's only kidding.

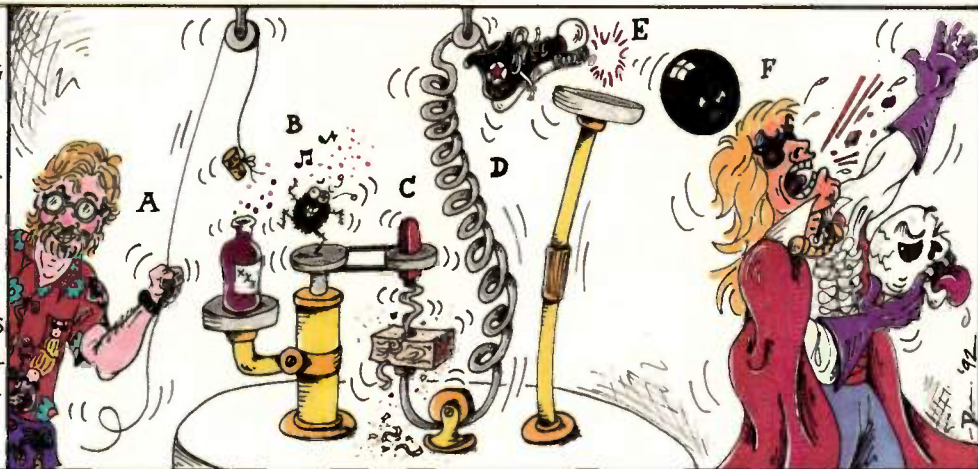
BY WALTER BECKER

Illustrations by Donald J. Guth Jr.

**THE CROSLY PHASE LINEAR IONIC INDUCTION VOICE PROCESSOR SYSTEM. TAKE 1:**  
 (A) FOREIGN PARTICLES ISSUING FROM THE VOCALIST.  
 (B) VINTAGE MICROPHONE COLLECTING ACCELERATED AIR PARTICLES AS WELL AS SOLID BITS FROM SINGER'S MOUTH.  
 (C) BALANCE PLATES ATTACHED TO THE BODY OF THE SINGER.  
 (D) CHORD CONNECTING PLATES TO THE CROSLY DEVICE.  
 (E) THE CROSLY DEVICE ITSELF.  
 (F) "THE BEAST"—DAVID'S BBC 16-CHANNEL CASSETTE RECORDER.



**WHEN ALL ELSE FAILS, DROP A BOWLING BALL ON THEIR HEADS:** (A) STRING IS PULLED, YANKING CORK FROM BOTTLE AND CAUSING HAPPY INSECT (B) TO WILDLY DANCE A JIG, CAUSING DRILL (C) TO SPIN. THE SPINNING MOTION OF THE DRILL CAUSES THE SPRING ATTACHED TO THE FOOT (D) TO TIGHTEN, FORCING THE FOOT TO FORCEFULLY KICK THE BOWLING BALL (E). THE BOWLING BALL THEN FLIES OFF ITS PEDESTAL INTO THE VOCALIST (F), KNOCKING HIM UNCONSCIOUS AND GETTING EVERYBODY OUT OF THE STUDIO AT A REASONABLE HOUR.



ters tucked into his shorts. This combination — spectacles, testicles, wallet, watch — seemed to do the trick and soon enough a frighteningly realistic and three-dimensional vocal image is suspended in space between the nearfields mounted on the console (Wombat G 7's and Holographe 96/96, respectively).

Derek Small presented a somewhat more difficult challenge. After several failed attempts to get the system to work, Derek recalled that he had had a kidney operation back in the mid-sixties that had resulted in the installation of a brass kidney. This was evidently an experimental treatment which the national health abandoned after only a few tries, Derek being one of the unfortunate guinea pigs. It therefore became necessary to install a plate in one of Derek's body cavities. Ears, nose, and throat were obviously not available, Derek adamantly refused to accept catheterization, and in the end, the necessary

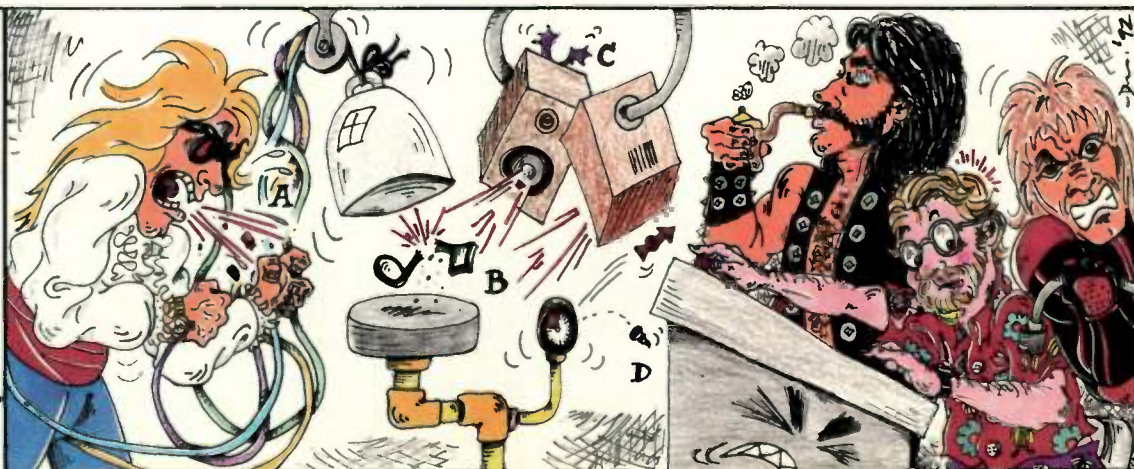
balance plate had to be installed rectally. Derek resisted this onerous procedure at first, and the whole Crosley gambit seemed as though it might fail. But, like a true Englishman, Derek eventually agreed to compromise his personal comfort somewhat so that the team effort might succeed. I can only add that Derek ultimately came to tolerate, if not actually enjoy, the daily installation and retrieval of the balance plate, and that in the process it was discovered by Ronnie, one of the engineers at the studio and the individual charged with performing these delicate operations, (a) that Derek's prostate was enlarged to the approximate size of a grapefruit, and (b) that Ronnie's engagement to Kimberly, the studio receptionist, was perhaps a bit premature.

The feed from the Crosley system was now presenting us with a glorious soundstage re-creation of the band's vocals. This was mixed in with the roar of the band's amps and drums

(so loud that mics were not necessary) and fed to the inputs of the huge BBC 16-channel cassette recorder that the band had schlepped over from David's home studio. The machine (affectionately nicknamed "The Beast") was based on a design found in Hitler's bunker at the end of the war, and its sound quality, in the opinion of many recording artists, has never been equaled. This was then mixed down to acetate and bunged over to the digital (phooey!) mastering format for cassettes and CDs, in which form it is currently gracing your living room or, more likely, your car, as the case may be.

*A much-edited version of this article was printed in the liner notes of the album. Walter Becker is currently working with our own Roger Nichols on Donald Fagan's new album and plans to start work on his own album when Donald's is completed.*

**THE CROSLY PHASE LINEAR IONIC INDUCTION VOICE PROCESSOR SYSTEM. TAKE 2:** (A) ACCELERATED AIR PARTICLES AND SOLID BITS. (B) 3-D VOCAL IMAGE. (C) THE WOMBAT G 7 AND HOLOGRAPHE 96/96 NEAR-FIELD MONITORS. (D) "THE BEAST" AGAIN.



# The Ear In Review

**E**ars. Who needs 'em? After all, Ludwig Van Beethoven composed sonatas, string quartets, his Ninth Symphony and his great Mass — the *Missa Solemnis* — all in his later years when, in one of life's tragic ironies, he was deaf.

So if you're a musical genius of the caliber of Beethoven, can hear the orchestral tones in your head while writing, and have the divine mission to continue against all odds, you might not need your hearing. Of course, part of the tragedy will be your inability to hear your works performed.

For us mere mortals, the ears are two of the most important tools we'll ever use in making music. Unfortunately, most musicians and recording engineers tend to take them for granted, at least until the ears become damaged. (Just ask Pete Townsend.)

The science of examining the physical properties of sound and how it is received and interpreted by humans is called psychoacoustics. The physics involved in the creation and transmission of sound and the physical and psychological mechanisms governing how we perceive that sound are very complex and beyond the scope of this article. There are, however, some basics that will allow you to get the most out of the tools at hand.

## NOTHING LIKE THE REAL THING

Music has been defined as organized sound. No matter how you organize your music (or what you use to make it), it's not sound until it moves air molecules. Although we are used to seeing sound represented as a line on a graph of amplitude versus time, it is, in reality, a three-dimensional phenomenon. It's because we convert sound to electronic or mechanical energy and store it in a linear fashion that we tend to think of it in the simplified representation.

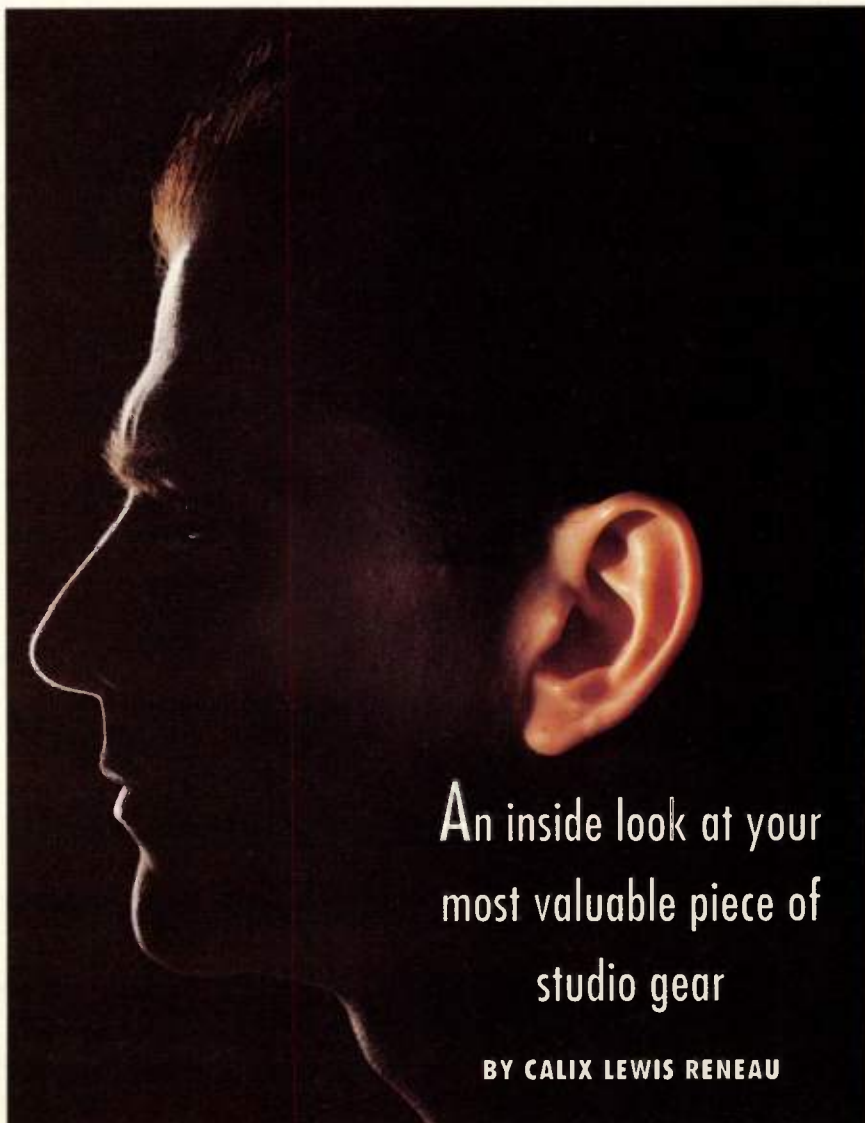
In nature, "real," or acoustical, musical instruments, as they resonate, radiate different sounds from different parts of their bodies. These sounds travel in different directions and at different frequencies. That's one of the reasons it's so difficult to

create acoustic sounds synthetically.

Loudspeaker design attempts to imitate a point source of the sound, so that what comes out of the speaker is exactly the same as what went into the microphone in the first place. Most recording, including both digital and analog, is linear in nature. This means that the three-dimensional sound is

represented by a series of changing voltages or digital samples. When this energy is turned back into moving air, the loudspeaker does so in a linear fashion: the voice coil moves along only one axis in response to the electrical impulses. That is why sound coming from a loudspeaker never sounds quite "real," regardless of the care put into generating and maintaining the signal.

Sound has other definable properties to consider. There are three characteristics of sound that help us to distinguish between, say, a flugelhorn and a bull horn: frequency, timbre, and amplitude.



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BY CALIX LEWIS RENEAU

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The frequency of a sound, how fast the air vibrates, determines the quality we call pitch. The average human can hear from about 30 cycles per second, or Hertz (Hz), to 18,000 to 20,000 Hz. Most people have difficulties at the outside ranges because of the nonlinear frequency response of the human

ear (more on that, later). Also, some believe that frequencies outside of this range can sometimes be perceived even if not heard, and therefore should be reproduced by the loudspeakers.

Almost all commercially available music uses the same standard western tuning of 12 notes per octave. Pitch, or

tuning, is one of the simplest factors to manipulate in synthesis, but most music still uses the traditional 12-tone tuning scale. As synthesizers grow more powerful and more common, I would predict that over the next several years alternate tunings will become more prevalent.

## WHAT'S YOUR EAR Q?

**How well do you know your ears? How well do you know other people's ears? Take our tests and find out.**

### True Or False

How much do you know about noise and hearing loss? Take this brief quiz by answering "true" or "false" and find out.

1) If loud music is destroying my hearing, I'll know because I'll feel pain or notice that I can't hear as well.

2) If I damage some of my hearing, I can still hear all the music by turning up the volume.

3) Even if I listen to very loud music now, I won't have a hearing problem until I'm much older.

4) Permanent hearing loss comes only from listening to music for long periods of time.

5) Loud noise can give my ears a workout and get them in condition to take louder sounds.

6) The only way to prevent hearing damage is to turn down the volume.

### Answers

The statements are all false. Here's why:

1) Unfortunately, we can damage our hearing and not even know it. That's because noise-induced hearing loss is very gradual. While some people do

notice losing the higher-pitched sounds, most do not know they are losing their hearing until the loss starts to interfere with normal conversation. By that time, the damage is permanent.

2) Turning up the volume doesn't help. Victims of noise-induced hearing loss may still hear the lower-pitched sounds quite clearly while missing all the higher frequencies. So music may sound as loud as before, but it will be distorted. In conversations, an inability to hear higher consonants could make words such as "feet," "seat," "heat," and "wheat" all sound the same.

3) Many teenagers and young adults are now losing their hearing as a result of overexposure to loud music. Dr. John House, president of the House Ear Institute, says that unless listening habits change, most of the current young generation could suffer hearing loss early in life.

4) The amount of hearing damage depends not only upon how long we listen but also upon how loud the sound is. The louder the sound, the less time it takes to damage hearing. In a typical live concert, or in a car with a boom box stereo cranked halfway, sound levels can easily reach 115 dB — enough to cause perma-

nent damage in about 15 minutes. Of course, some stereos and live concerts can be even louder, and damage hearing more quickly. Music around 125 dB is almost as loud as a jet engine at close range and can cause permanent hearing loss in 5 to 10 minutes. How loud is too loud? The standard rule-of-thumb: if you have to shout to be heard, the noise is damaging your hearing.

5) There is no evidence that ears can be trained to accept loud sounds. Instead, research at the House Ear Institute indicates that repeated exposure to very loud

noise leads only to permanent hearing loss.

6) Turning down the volume is just one of the ways to protect your hearing. You can also wear ear protection such as the HIP (hearing is priceless) campaign E.A.R. plugs at concerts, dance clubs and even aerobics classes. Also, limit your exposure to loud noises to less than 10 to 15 minutes at a time.

For more information about this quiz and other aspects of hearing, contact: the House Ear Institute, 2100 West Third Street, Los Angeles, CA 90057. Tel: (213) 483-4431.

## EAR MATCH

Match the famous ears to the famous names — all of which have appeared in the pages of EQ. Answers are on page 112.



- Bruce Swedien
- Don Was
- Ric Ocasek
- Stanley Clark
- Dave Edmunds
- Les Paul
- Craig Anderton



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How much danger of damaging your most precious musical resource are you in? If you're like most musicians — a lot!



Keep in mind that there is no absolute or “correct” tuning system. There are some psychoacoustic principles affecting how we perceive the interaction of any two musical tones as sounding, but strong cultural influences determine the correctness of a sound as much as does the basic makeup of the human mind.

Timbre is the spectral quality of the sound. To the synthesist, this is the most difficult aspect to work with. Every sound has harmonics — frequencies that are mathematically related to the root or pitch (a.k.a. the fundamental) frequency. Even the idealized pure sine wave has some harmonics, because any vibrating membrane, speaker, or string that produces that sine wave will induce its own harmonics. It's the complex relationship between these harmonic frequencies that gives each sound its recognizable characteristics and helps us to organize our sound into music.

These harmonics are rarely static or unchanging over the duration of the sound. In all acoustic instruments (and in most well-programmed electronic ones) the amplitude or relative loudness of the harmonics in the sound change dramatically over time, and most of the harmonics in an individual tone change at different rates. Also, in most cases a single tone can have harmonics that change in pitch relative to the fundamental over the life of the tone. Since there are literally dozens upon dozens of harmonics in a single tone, and each can behave in a slightly different (if somewhat related) fashion, you can well imagine the trouble in trying to duplicate these relationships mechanically or electronically. Additionally, in the three-dimensional nature of sound, harmonics complement or negate each other as the waves pass one another.

Since all sounds have harmonics, another way of considering music is as the interaction of these harmonics. That's why two pitches an octave apart can sound good together, while two pitches a half-step separated usually don't.

#### EAR'S TO YOU

In many ways your ears are like a pair of microphones taped to the side of your head. Sound is collected by the pinna (those floppy cartilagenous things that hold your glasses in place) and focused through the meatus, or ear canal, to the eardrum (tympanic membranes). This might be a good time to repeat the old adage: Never stick anything in your ear smaller than your elbow. The tympanic membrane is thin and delicate and very hard to fix once broken, and it's set back less than an inch inside your head.

The tympanic membrane is attached to another membrane, called the oval window, by the malleus, incus, and stapes — not a law firm, but the three smallest bones in the body (the hammer, the anvil, and the stirrup).

The oval window is where the microphone analogy really begins to break down. A microphone takes a complex, three-dimensional changing pressure system and reduces it to a relatively simple analog voltage. The oval window, on the other hand, passes the vibrations to a fluid-filled organ known as the cochlea. It is here that sound becomes electricity in the human head.

Running through the center of the cochlea is the basilar membrane, and lining this membrane is the organ of Corti. The organ of Corti is actually composed of frequency-specific nerve endings — about 30,000 of them (talk about your full spectrum analyzers!). These nerves feed the massive bundle known as the auditory nerve, where

the electrical impulses are passed on to the brain. It is now thought that the two auditory nerves correlate their information via crossover networks before entering the brain.

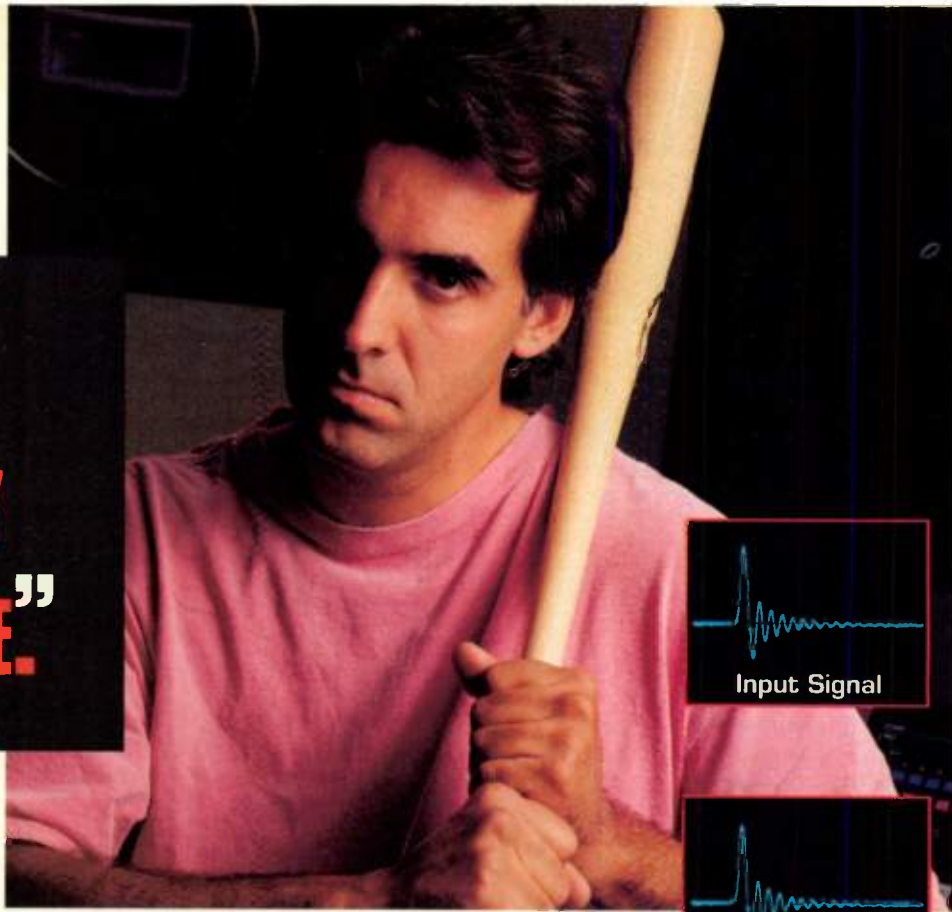
One point to consider about hearing is the concept of stereo imaging. The average person, by noting the differences in intensity and the time delay between the ears, can recognize the direction of the source of a sound with amazing accuracy. By contrast, in most cases, what passes for stereo in music is simply left-right panning. This gives some illusion of space. Placement of a signal in a reverberant field (artificial or natural) will also help some, but true stereo imaging will include some time delays for each instrument and possibly different frequency ranges for each instrument (since, in a three-dimensional, real-world sound field, different frequencies interact with the environment in different ways, the delays needed will often be frequency-specific for individual tones). Currently, most efforts at creating true stereophonic sound (such as Q-Sound, Roland RSS and other spatial imaging techniques) are focused on providing cues that trick the mind into creating a three-dimensional sound.

Given the three smallest bones in the body, two very thin and highly sensitive membranes, and 30,000 specialized hair cells, it's amazing that our ears stand up to all of the rock and roll abuse that we dish out. In reality, most of us have already damaged our hearing. Additionally, our hearing range decreases in both amplitude and frequency response with age, as the tympanic membrane hardens and the organ of Corti grows less sensitive. In both cases the physical organs are damaged and can't function properly. This will usually affect perception of higher frequencies. Also, despite the youthful body's resilience and ability



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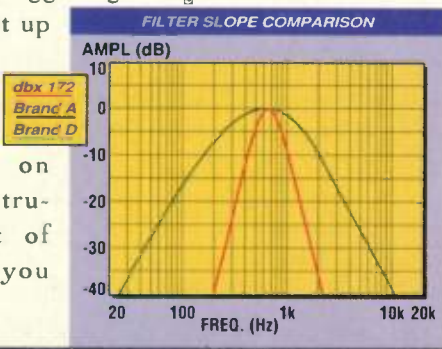
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## TECHNIQUES SOUND

to heal itself, hearing loss due to abuse is often irreversible.

How much danger of damaging your most precious musical resource are you in? If you're like most musicians — a lot! Environmental sound is one of the factors regulated by the Occupational Safety and Health Administration (OSHA), and most musical situations would fail an inspection.

An example: You're in the studio on an all night mix. You don't run your speakers that loud, maybe 95 dB SPL. By OSHA standards, you're in trouble after only four hours. Also, not many of us would listen at 95 dB SPL for that long. First thing you know, the faders are inching up to make up for audio fatigue, shortening the acceptable time of exposure (and most likely the usable lifespan of your ears).

Another example: You and your band are playing a concert and pushing the volume to 120 dB. Better cut the solos from your set list, buddy; the standard allows for only seven min-

utes of exposure before it becomes a no-no. In fact, any unprotected exposure to volume levels this high are dangerous and unhealthy — no matter how short the duration.

For an eight-hour period, OSHA allows exposure to 90 dB SPL, A-weighted. Even at that, OSHA requires an annual hearing test program if there is on a consistent basis exposure to levels over 85 dB SPL — a program that is a good idea for the practicing musician as well. For every 5 dB SPL increase, cut the time in half: 95 dB SPL, 4 hours; 100 dB SPL, 2 hours; etc. Anything over 110 dB SPL should bring out the earplugs or other hearing protection.

Also, remember that the ears are less sensitive at higher and lower fre-

## TIPS FROM THE DOCTOR

By Richie Moore, Ph.D.

It does no good to maintain all the high-tech equipment we have if we can't hear the reproduction. The human ear is probably the most sophisticated electro-mechanical device we have at our disposal. We must also realize that there are no spare parts available if the units are damaged.

From a medical standpoint, regular inspection by a qualified ENT (Ear, Nose and Throat) specialist is a good start. The human ear secretes wax to protect the drum and cochlea from high sound pressure levels. I always go three times a year to have my ears inspected and cleaned. There is absolutely no substitute for having a medical technologist clean your ears. They do it properly.

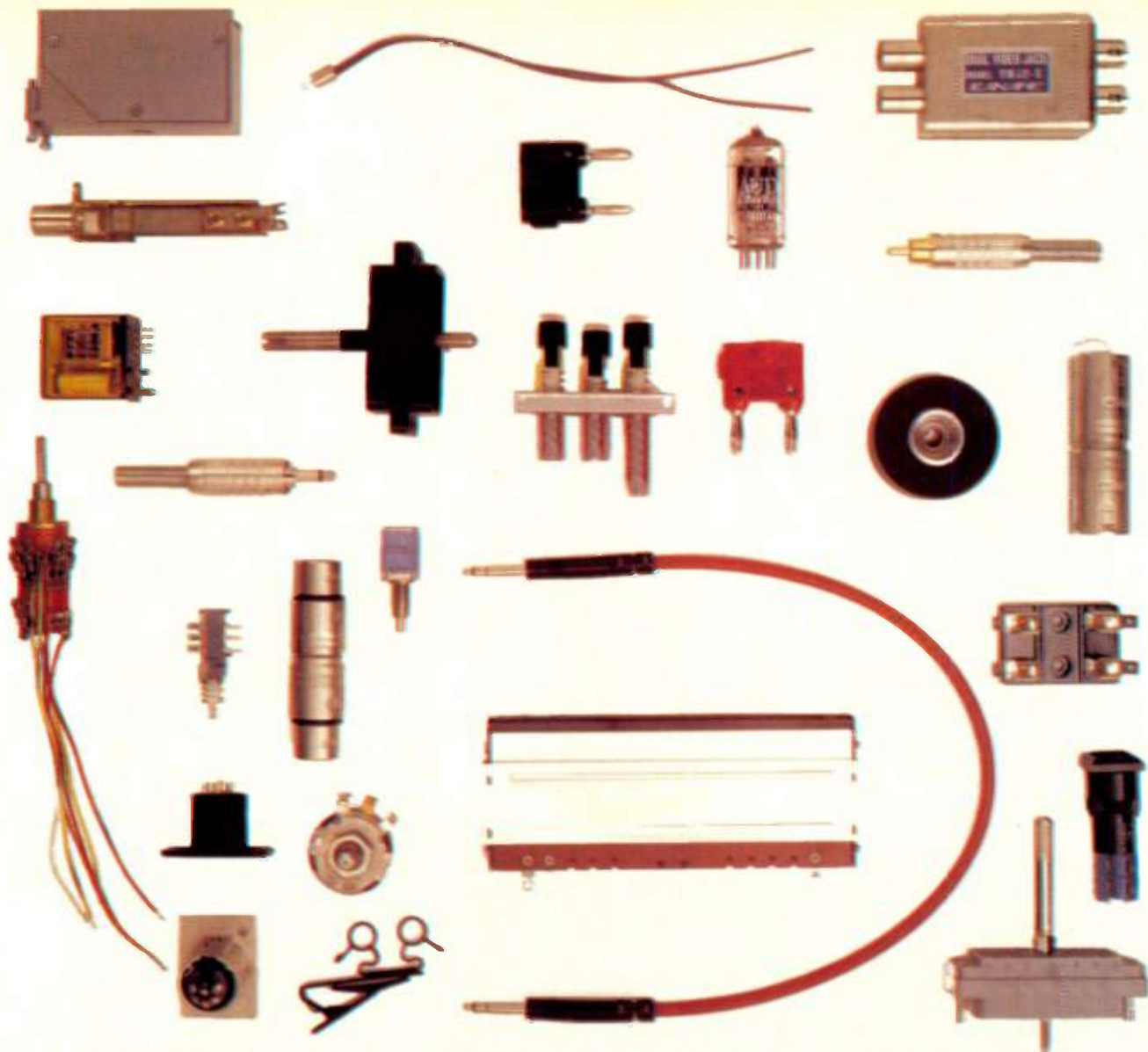
Q-tips are great for cleaning the heads on a tape machine, but they are terrible for cleaning your head. You risk the chance of infection and jamming the wax up against the ear drum which may have to be removed medically. If you must clean your ears between medical visits, a little hydrogen peroxide poured in the ear and left to sit for 15 minutes will dissolve the wax buildup.

On the day-to-day maintenance side, there is no substitute for common sense. Most of us are faced with fairly high sound pressure levels every day. In fact, if we were to be governed by OSHA safety standards in the studio, we might be better off. I have done some sessions where I have been exposed to 100 dB+ levels for more than eight hours. This is cruel torture to the ear. Near-field monitors have helped decrease the problem, but face it — the big monitors sound great.

I leave you with two simple axioms of my wife's to mix by:

1. If it's loud, turn it down. If you can't turn it down, keep your distance.
2. If your ears are ringing, answer them!





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## TECHNIQUES SOUND

quencies. So, if you're playing at 90 dB SPL and you need to double the high end to get it to cut through, you've got to pump 10 dB more SPL out of your speakers — which cuts by four the length of time you can listen.

### PUMP DOWN THE VOLUME

Loud monitoring can not only distort your speakers, it can also distort your hearing system. We've all heard the rebel rocker's chestnut: "If it's too loud, you're too young." But if you can't cut the gig volumes down, then at least wear hearing protection. In fact, hearing protection is a smart move in any musical situation where you're not 100 percent in control of the volume.

In the studio? Take a break. It's easy to get caught up in a project and lose all sense of time, spending 10, 12, or more hours at a shot on the board. It's even easier with a deadline or a client looming over your shoulder. But once you've pushed your ears past the limit, you're on a steep slope of diminishing returns for your efforts. In fact, it has been known to happen that an engineer or producer will push to finish a project only to find out the next day that the mix is useless because of audio fatigue error.

The maxim applies: if you don't have time to do it right, how will you find the time to do it over? Don't sit at the console for more than 45 minutes — one hour, tops. Take a five- to 10-minute break. Get up and walk around. Don't work more than six hours without a more extended break. Don't forget to eat. Remember, OSHA also requires employers to give their workers two 10-minute breaks and a lunch break in each eight-hour shift. Even if you're working for yourself and love what you are doing, it makes sense to use your best energy in your project.

Your speakers can only work as well as your ears, and your ears can only work as well as your brain is decoding the information. Anyone who's been behind a board knows that engineering, producing and mixing is hard work. To get the best out of your system, you have to get the best out of yourself.

The art of listening is as important as the art of moving air, and learning the basics of hearing and perception can go a long way to helping you make your music sound better, both to yourself and to your audience.



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Producer/Engineer,  
2-time Grammy Winner

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Tom Lord-Alge (seated), Chris Lord-Alge (standing)

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# DYNAMO

## JIMMY JAM EXPLAINS HOW HE AND TERRY

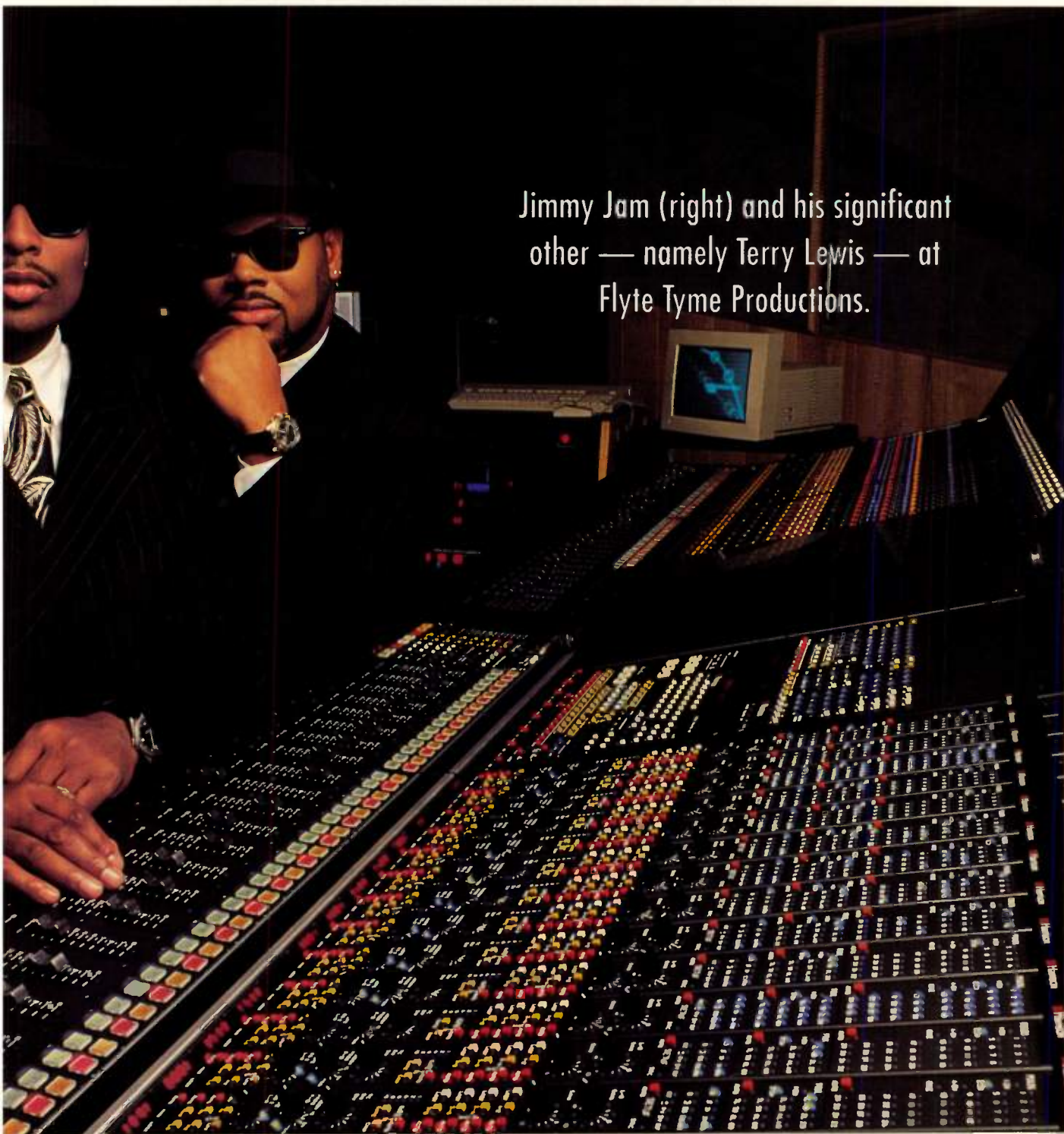
**T**erry and I have a saying that helps us come up with a solution to any problem, whether it be musical or technical: *We have no slack*. It means that if one of us is experiencing a creative block for some reason, the other one picks up the slack. If, for instance, there are four or five projects going on at the same time — a Johnny Gill vocal in one studio, a Sounds of Blackness track in another, and so on— we'll split the duty. Terry tends to be the one doing most of the vocal work, while I gravitate toward tracking and mixing. In fact, Terry calls me "Trackmaster," and I call him "Vocalmaster." It's a tribute to our friendship that we've been able to collaborate so successfully and for so long.

**BY JIMMY  
JAM**



# IC DUO

**BY LEWIS WORK AS A PRODUCTION PAIR**



Jimmy Jam (right) and his significant other — namely Terry Lewis — at Flyte Tyme Productions.

Photo by Per Breihagen

Terry and I originally met in junior high school. He was a very gifted athlete, but he liked to play bass as a hobby. As a matter of fact, it was Terry who interested me in playing keyboards, even though my initial love was the drums. It was while I was taking a beginning piano class that I came in contact with another person who, in addition to Terry, would have a great effect on my life. While

the teacher was showing everyone how to play "Mary Had A Little Lamb," I would be jamming and writing songs with this other kid. It wasn't until a few years later that I would audition for my ex-jam/classmate, who was forming a band under his own name, Prince.

#### GO FOR THE GOLD

I didn't make it into Prince's band, but I gave it my best shot. (Matt Fink got the job.) I play well enough to write songs, but if I had to make it as a pure musician, forget it.

I learned early on that there are different approaches to songwriting

## FLYTE OF FANCY

**Studio Name:** Flyte Tyme Productions

**Location:** Edina, MN.

**Main Men:** James Harris III & Terry Lewis (Owners & Executive Producers); Steve Hodge (Chief Engineer); Bradley Yost (Studio Manager & Engineer)

**Production Credits:** Janet Jackson, Johnny Gill, Ralph Tresvant, Human League, Luther Vandross, Sounds Of Blackness, Mint Condition, Karyn White, George Michael, Robert Palmer, S.O.S. Band, Gladys Knight & The Pips, Thelma Houston, Cherelle, Flavor Flav.

*There are four main studios; Studio A specifications are as follows:*

**Console:** Harrison Series 10-B 48 module automated console with 192+ line inputs and 40 microphone preamps.

**Recorders:** Otari MTR-100A 2" 24-track w/Dolby SR (x2); Otari MTR-12 1/2" 2-track master; Panasonic SV-3700 DAT; Tascam 122 (x2).

**Synchronizer:** Otari EC-103 w/remote.

**Monitors:** Westlake Audio HR-1 (main); Yamaha NS-10m & Auratone 5C (nearfield).

**Outboard:** Lexicon 480L, 224XL; Eventide H-3500; T.C. Electronics 2290 (x2); Yamaha SPX-1000, SPX-90-II (x2); AMS RMX-16, SDMX; dbx 160X (x4); Orban D-Essex (x3); Drawmer 1960 compressor/limiter; Klark-Teknik 510 dual gate, 514 quad gate; AXE quad direct.

*In addition, most of the following pieces of equipment float throughout Flyte Tyme, between Studios A, B, C and D:*

**Keyboards & Modules:** Arp Omni (x2); E-mu Emax, Proteus; Ensoniq SD-1, Mirage (x2), VFX (x2); Hammond B-3 w/122 Leslie; Korg M-1, M-1R; Oberheim OB-8; Roland JX-8P, MKS-70 Super JX, D-50 (x2), D-70, JX-10, P-330, P-550, SH-1000, JX-3P; Sequential Prophet VS; Syntovox Vocoder; Yamaha SY-77, DX-7, CP-70 electric grand, KX-

88 controller, TX-816; Yamaha C-7 (5400B) acoustic grand piano w/MIDI, and much more.

**Drum Machines:** Akai MPC60 (x3); Alesis HR-16B (x2); E-mu SP1200; Oberheim DMX; Roland R-8; Sequential TOM-420.

**Microphones:** AKG C414 (x5), C422, C451 (x2), Tube (x4), D-112, D12E; Audio Technica ATM-63 (x8); B & K 4003x (x2); Electro-Voice PL-20; Neumann KM-84i (x2), U47 fet-i; Sennheiser MD421 (x6); Shure SM81 (x2) SM57 (x2); Yamaha MZ101 (x5).

**Equipment/Studio Notes:** Brad Yost says: "All of our keyboards generally float from studio to studio, but most of them are used in Studio C for tracking and production (that counts double for the Synclavier) and sometimes in Studio D for mixing. Jimmy and Terry have an Ensoniq EPS-m, as well as three EPS-16+ units in their personal room, Studio B. Virtually everything is nailed down in there—the EMAX Se, an Akai S1000 w/hard drive, a Korg T-2—and no one takes anything out of that room. Jimmy & Terry also have a wide range of drum machines and samplers, but the Roland TR808 drum machine is really one of the good ones. It was used in the '80s to get a real, trashy sound. If you're looking for a whole variety of wonderful sounds, the EPS-16+ can do the trick quite nicely, thank you.

"The Akai MPC-60 is one of the biggies around here, mainly because it has an extremely long sample time and you can tailor your sound to how you want it. Most machines have only factory-stored sounds, but the MPC-60 allows you to sample anything — anything."

—Jon Varman



Photo by Per Breihagen

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depending on the artist you're writing for. For example, we write very melodic songs for Janet Jackson and Ralph Tresvant, because that's where their true strengths lie. The power of Johnny Gill's voice alone can bring a melody to whole new levels. Melody is very important to a good song because you want to have something that people can hum or sing along to, even if they don't know the words.

Soundwise, I think our music has a lot of different vibes. For each artist,

we change what we do because Janet Jackson isn't going to sound like Cherelle and Cherelle isn't going to sound like Karyn White. For instance, some of the drum sounds and synth vibes created for Janet would sound great on songs by other artists, but we

can't use them because we would end up getting caught in one mode.

Overall, we record in a very old-fashioned way. We just turn on the tape and go for the gold. That's how you make those wonderful mistakes that give your song the unique touch

## TAG TEAM

How L.A. Reid and Babyface, another dynamic duo, work it out

By L.A. Reid

One of the biggest advantages of having a producing/songwriting partner is that you always have someone to bounce ideas off. Working by yourself can sometimes get a little stale, so it's better to have a collaborator around to help keep up the inspiration level. There are always ideas out there that you may not have thought of, and that your partner has humming around inside his head. Plus, you don't have to second guess yourself when working with someone whom you trust. As my partner, Babyface, says: "By working as part of a team, one always has the benefit of a second opinion."

I first met Babyface in Indianapolis, Indiana, sometime around 1980. We were playing in rival bands at the time, which ended a year later when we hooked up and started to write songs together. We formed a group called The Deal, with me on drums and keys, and Babyface singing lead vocals. It was obvious from the outset that we were able to trust each other's musical instincts wholeheartedly. Instead of making choices separately, we began to make choices as one.

Today, we continue to make hard choices together, whether they involve our music, the business, or our recording facility, Studio LaCoco. The primary goal these days is to establish LaFace records as a major label within the next few years and to then move into film and television. After the success of the *Boomerang* motion picture soundtrack, we now have time to work with a variety of diverse and talented artists who may someday appear on future records or soundtracks. By working out of our studio's home base in Atlanta, we're able to maximize our privacy while still keeping one hand in the creative process.

### L.A.'s Women

The label has had a head start thanks to TLC, an all-girl trio that has taken off in a big way. My wife, singer Pebbles,



Two's company for L.A. Reid (right) and Babyface.

played a major role in helping "Oooooohhh...On The TLC Tip" go platinum, considering she's the one who discovered the act. Actually, there are a lot of groups that Pebbles discovered that have come to LaFace for future development.

After she introduced the girls to me and Babyface, we knew right then and there that TLC was going to be a hip act with a strong connection to America's youth culture. We wrote songs for them that essentially jibed with their attitude that they "can have any man they want — and that's actual and factual!" The song that inspired those lyrics, "Baby, Baby, Baby," was recorded in our studio with a musical mind-set that lay somewhere between hard and soft sounds. The melodies went down smooth and mellow, while the drumbeats remained relatively hard.

While we were recording Boyz II Men's "End of The Road" at Studio 4 in Philly, Babyface turned to me and said, "What we have here is a very good song." But when it was originally being written, I don't think we even tried to ask if it was going to be a big hit or not. [Editor's note: "End of the Road" has become the longest-running #1 pop single in rock history.] Our responsibility as producers and writers is to create quality music, not to worry about how big a song's going to be or what star is going to sing it. Most of the time, songs don't go to who you think they're going to go to anyway. As a matter of fact, there have been times when we wrote something for a woman and it ended up going to a man, and vice versa.

We only had 6 hours to record all the vocals on "End of the Road," which is not a lot of time. Each guy sang on his

*continued on page 127*

Photo by Mike Guastella/Star File

**A N O T H E R   D Y N A M I C   D U O**



# EXPLOSIVE FEATURES!

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you're looking for. It's like when you do a demo of a song and you know it's not the real thing and some unexpected things get in that you initially don't like. But, when it comes down to recording the song for real, you usually end up trying to duplicate those things — those wonderful mistakes. That's why it's always important to save the original tracks, or the scratch vocals. Nine times out of ten, the scratch vocals are better than the real thing because the artist doesn't have the pressure — that "this is it!" rolling around in his or her mind. We used to give the vocalist a tape and say "Here's how it goes. Learn it and come back tomorrow." We never do that anymore. You can catch gold (or platinum, as the case may be) while an artist is in the process of learning a song and playing around with addictive new melodies.

#### JANET'S LAST JAM

Strangely enough, one of the biggest singles off Janet Jackson's last album, *Rhythm Nation*, was a song that went straight to wax with a scratch vocal. "Escapade" was a very upbeat, festive melody that craved for a certain feeling. I laid down four minutes of bass, keys, and drums on tape, and then

Janet came in to sing the guide vocals. We had every intention of going back into the studio and cutting the vocals for real, but we never did. Subsequently, when we sent the work tape to Shep Pettibone to be remixed, he asked us where the individual tracks were and we told him that what he had was the record. Basically, the demo version of "Escapade" was what was released to the public, except that it was demoed on a 24-track. There are a lot of tracks that Janet has done that way, simply because we like to keep them as skeletal as possible and then fill in the other tracks around her vocals. "When I Think Of You" was also released in its original, raw version.

Janet's voice is especially unique since it actually adds rhythm to the track. After we have a track done, she'll sing on it and make it funkier than it was before. It's a combination of her breath, her style, and the way she pronounces certain words. Plus, she sings in beats, which makes it much easier for us to work. As far as EQ'ing goes, we put Janet on tape flat and let our engineer, Steve Hodge, choose the right mix to go with the flow. On the song "Nasty" (*Control*, 1987), we used a lot of high-pass filter

while on "Rhythm Nation" we overloaded the tape so that the effect would sound very frantic, very urgent.

For Janet's duet with Luther Vandross, "The Best Things In Life Are Free" (*Mo' Money Soundtrack*), we tried to separate the vocals rather than blending the two. Janet's voice has more of an edge to it with some light high-pass, while Luther's voice is just Luther. He seems to glide above the track, kind of playing around with the melody. I think that "Best Things In Life..." shows that Janet can't necessarily sing like Luther, but Luther can't necessarily sing like Janet.

In a creative music business, you've got to be where you can create good music. That's why we chose the town we grew up in, Minneapolis, as the home for our studio, Flyte Tyme. We settled in this city ten years ago, and stayed here when we opened our new state-of-the-art headquarters in 1989. It's great in Minneapolis because you don't live under a microscope the way you do in L.A., where everything is so music-oriented. Plus, all our friends and family live here and that enables us to maintain a well-rounded lifestyle.

There are four studios here at Flyte

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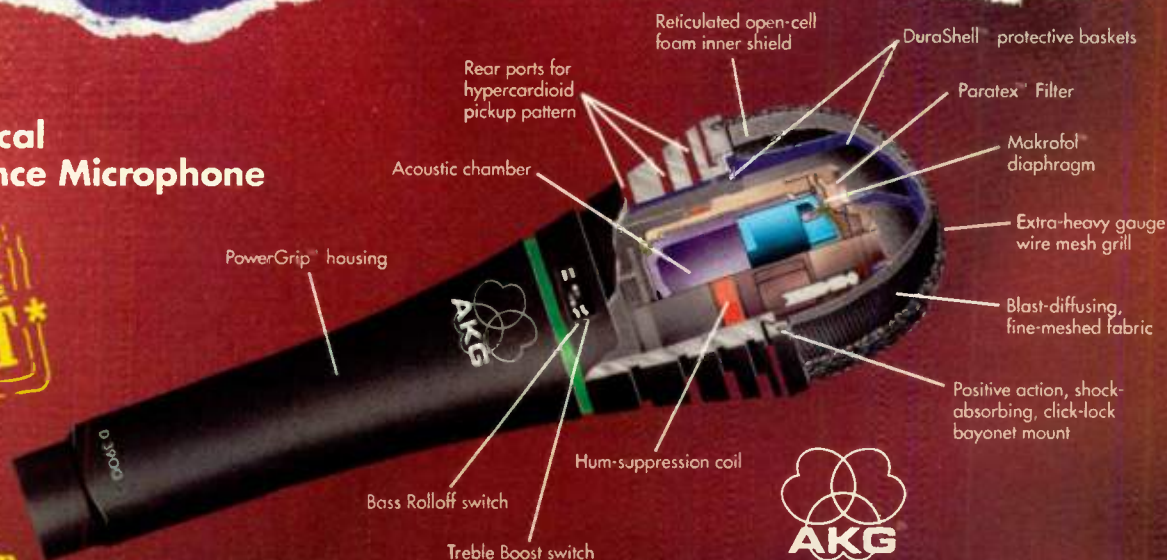
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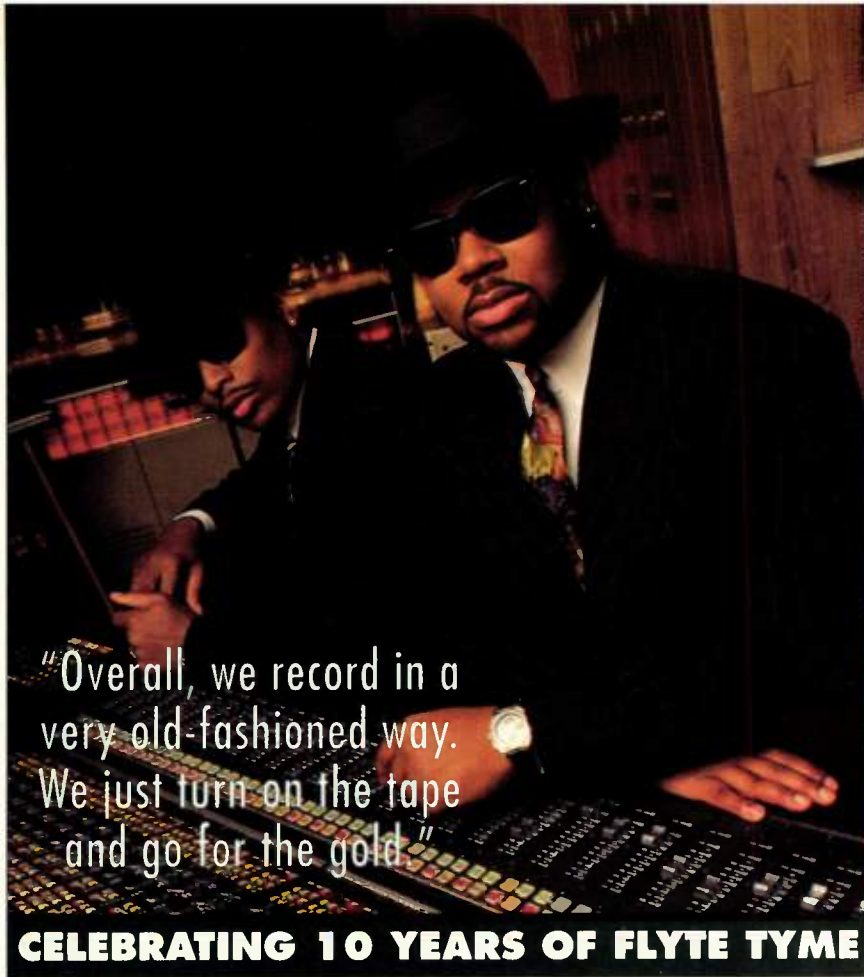


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**CIRCLE 02 ON FREE INFO CARD**



"Overall, we record in a very old-fashioned way. We just turn on the tape and go for the gold."

## CELEBRATING 10 YEARS OF FLYTE TYME

Tyme, each with its own Harrison console. Both Studio A and D have a Series-10 while the other rooms hold Raven and MR-4 boards. We record some of our biggest acts (from our label, Perspective) in Studio A, including Sounds Of Blackness, a 40-person gospel group that I'm very proud of. That room is really great for string sessions, which I prefer over sampled string sounds. Studio B is our personal studio, located directly across from our office. That is the place where Terry and I can be found during the midnight hours, letting the creative process run wild. Our funkiest stuff comes out of Studio C ("The Funk Room"), which has its own Synclavier setup. A couple of producers around here, Lance and Prof T., really like that room because it has two JBL monitors that were left over from the original Flyte Tyme, and they are just too big for the tiny studio. When you go in there all you hear is this loud, crazy bass.

Since we're not a commercial operation we don't have to compete with the other studios over having the latest "whatever" just because it's new. For most of our artists we'll pull out vintage equipment, such as an OB8 for Johnny Gill or an old EMAX for Janet. Out of ten new products, there'll probably be only one or two that will really stick around. The Akai

MPC-60 has become the drum machine of choice, but a lot of times we prefer to program basic beats into an old Linn LM-1 just for simplicity. It's quick, easy, and you don't have to spend time assigning outputs. I tend not to get too involved with a lot of drum programming because even after the beat is down, we'll go back and add live cymbals and toms.

Some of my favorite samples are the really dirty ones we did on "Rhythm Nation" and "Alright," which featured loops from Sly & The Family Stone and James Brown, respectively. We also used the Ensoniq Mirage for sampling trashcans and factory sounds (which actually originated from the old Linn machine), while the EMAX system supplied us with everything from gun shots to white noise like that you hear on a TV. As far as keyboards are concerned, I'm a preset guy at heart. The SY77 by Yamaha is not very pretty, but it's great for bass and Wurlitzer piano sounds, and recently we started playing with Ensoniq's SQ2. Basically, I'll roll with any keyboard that has a good bunch of presets, but I don't like to spend all my time creating new sounds because there's some guy sitting at Yamaha or wherever, getting paid to come up with good ones. If that's what he does

for a living and he can't create an incredible preset, why do I need it?

Finally, when it comes to miking vocalists, the AKG tube is big on our list. We like it because it's very forgiving with all types of singers, loud or soft. Janet likes to sing with her mouth literally on the mic and her headphones at full blast, yet the tube mic never breaks up. We also use AKG's 414 mic. As a matter of fact, when we recorded Luther he insisted on using one. That's one of those mics that will never say die. But in the end, we set up two or three mics to see which one sounded best, and 90 percent of the time it was the AKG tube that would have us smiling.

### MO' MOVIES

Before *Mo' Money*, we had never done a complete soundtrack, just a few songs that appeared in movies like *Krush Groove* and *Ghostbusters II*. So when Damon Wayans asked us to write and produce the soundtrack for *Mo' Money*, we jumped at the opportunity. I've always been a big movie fanatic.

Terry and I would like to continue doing soundtracks, but it's a very time-consuming process. I really like Ennio Morricone (*Bugsy*, 1991) and guys like that, but Quincy Jones (*Color Purple*, 1986) is the real cat. And he goes way beyond movie scoring — he's the godfather of producers. We're not even in the same ballpark, or the same city in the same ballpark, that he's in. Quincy was one of the people instrumental in getting the general consumer to know who the producer is.

After *Thriller*, everyone wanted to know: "What exactly does a producer do?" The producer's not just a guy who simply sits in the studio and spends all the money. The producer can be a writer, an engineer — a self-contained entity. And Quincy's the man who proved that to the world.

As far as the future of music goes, I see kids moving away from the sampled beat and going back to live sound. Now that a lot of musicians are hooked on samples by bands like Arrested Development and Black Sheep, they're saying, "Instead of learning how to sample this, I'm gonna learn how to play it." Technology is here and we're obviously going to use it in new and inventive ways, but I hope that it doesn't affect too drastically the way people write and produce songs. There's something about playing together, in a band or in a duo, that just can't be replicated with the crutch of too much technology. **EQ**

Like the dinosaur, conventional mixers have bodies that are bigger than their brains. But now there's a leaner, smarter, faster species of mixer for both stage and studio: the DCM-100 Digitally Controlled Mixer and MIXTAB™ Controller.

## THE DINOSAUR MIXER IS ABOUT TO BECOME EXTINCT.

Say goodbye to the dinosaur's big footprint. The DCM-100 packs a full-featured, 16 channel (8 channel stereo) mixer in a single rack space. Cascade three of them for up to 48 inputs.

Say goodbye to high cost. With MIDI parameter automation you don't pay for zillions of knobs and switches, most of which you set and forget anyway.

And say goodbye to mixing with a mouse. The MIXTAB human interface provides 8 channels of hardware knobs, switches, and faders for level, muting, EQ, panning, and more. It works and feels like a traditional mixer. Use it to program your sequencer quickly and painlessly, change selected parameters *in real time* to add spontaneity to your mixes, or to control the DCM-100.

There's more: 100 "snapshots" you can recall with MIDI program changes. LED null indicators for easy level matching before you record new moves. Exceptional sonic integrity. And a mercifully short learning curve.

The DCM-100/MIXTAB combination is a whole new kind of animal – after all, dinosaurs belong in museums. To find out more about the latest evolution in mixers, see your favorite Fostex dealer.

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**SON OF SIM:**

# MEYER SOUND'S SIM

**TEST YOUR EQUIPMENT TO THE SOUND**





# SIM SYSTEM II

## OF MUSIC (JULIE ANDREWS NOT INCLUDED)

Every once in a while there is a quantum leap in a particular field because someone wasn't paying attention when he was told that it couldn't be done or that there wouldn't be a use for what he was building. I guess that is what happened when Edison said that someday every household would have a telephone and when Tesla said that fluorescent lights would provide for a more efficient use of electricity.

Well, there is another one of those guys, a Quantum Leaper if there ever was one: John Meyer. He was told that nobody would want a perfect speaker because it wouldn't sound good. He came up with the HD-1. Most recently he decided that there should be a way to test the frequency response, signal-to-noise ratio, and distortion of an audio component by playing music through it instead of tones or pink noise. People laughed. They not only told him that it couldn't be done, but that there was no reason for doing it. Well, it turns out that the reason some people didn't want things tested this way was because their devices would fail the scrutiny of this new test instrument.

Enter SIM™, Source Independent Measurement. At first glance, you ask yourself why. After a short exposure to what the system reveals, you ask yourself why it took so long before there was a SIM machine.

One disclaimer before we begin: The SIM System II starts at \$18,000, so it's not for everybody. It does, however, give us all a glimpse into the future of audio system measuring.

### THE NEED

Ever since I started measuring pieces of audio equipment, I've had the sneaking suspicion that the test equipment wasn't telling me everything I wanted to know. How come

two pieces of gear could measure identically and yet sound so different? The systems look perfect when they are fed pink noise, but that is not usually my favorite thing to listen to, except at the end of a long party when I can't get all the guests to leave.

John Meyer has been thinking about the same thing for a long time too. The difference was that John was smart enough to be able to figure out how to measure audio components while music was playing through the system instead of test tones. I, however, am at least smart enough to know this is the machine to use to find out how a piece of equipment is really performing. I wonder if John Meyer had

## THE ROGER NICHOLS REVIEW

been around before the distribution of electricity, would he have developed a gas-powered SIM machine?

## THE PROCESS

The process of testing audio gear can be very simple. When you test an amplifier for frequency response using tones, you compare the level of the original tone going in with level of the tone coming out. If the comparison is identical over the entire audio band, then the frequency response is flat. The tone sweep only tests how the gear responds to one frequency at a time, and not necessarily how the device will react when subjected to music. Music contains many frequencies at many different levels in various harmonic relationships, all happening at once. Pink noise provides us with a noise source that has energy spread over the entire audio spectrum. You could put pink noise in one end and measure the energy spectrum on the signal coming out, but that wouldn't give you much more of an insight into the equipment's reaction to music.

As the name indicates, the SIM machine doesn't care what you give it — the measurement process is independent of the source. It compares the GOZINTA with the GOZOUTA. It analyzes the information presented and displays the results on the video screen.

In the Lab mode, SIM compares two signals, the input and the output, of the device under test. The on-screen menu lets you select the refer-

ence channel, either the internal generator or the front panel input, and the measurement channel, which could be the output of the piece of gear under test or the microphone input in the case of speaker testing.

The screen is divided into three major areas. The top two displays depend on the measurement being performed.

In the spectrum mode, the top graphic display shows the spectrum of the source and the lower graphic display shows the spectrum out of the device being measured. During any measurement you can select the amount of data averaging in the display.

In the frequency response mode, the top graphic display shows a frequency response trace and signal to noise ratio or coherence trace. The S/N (coherence) display is graphed against frequency, so you can see exactly where the noise lies. The bottom graphic display shows the overall phase response of the device under test. There is a screen cursor that can be placed on any trace in the graphic area. The cursor values are displayed in the data area of the screen.

The data area at the bottom portion of the screen displays setup information such as channel gain, cursor data, name of file being displayed, display offset values, reference source, and number of vectors averaged for the particular test being performed. All parameters necessary to re-create the test are displayed in this

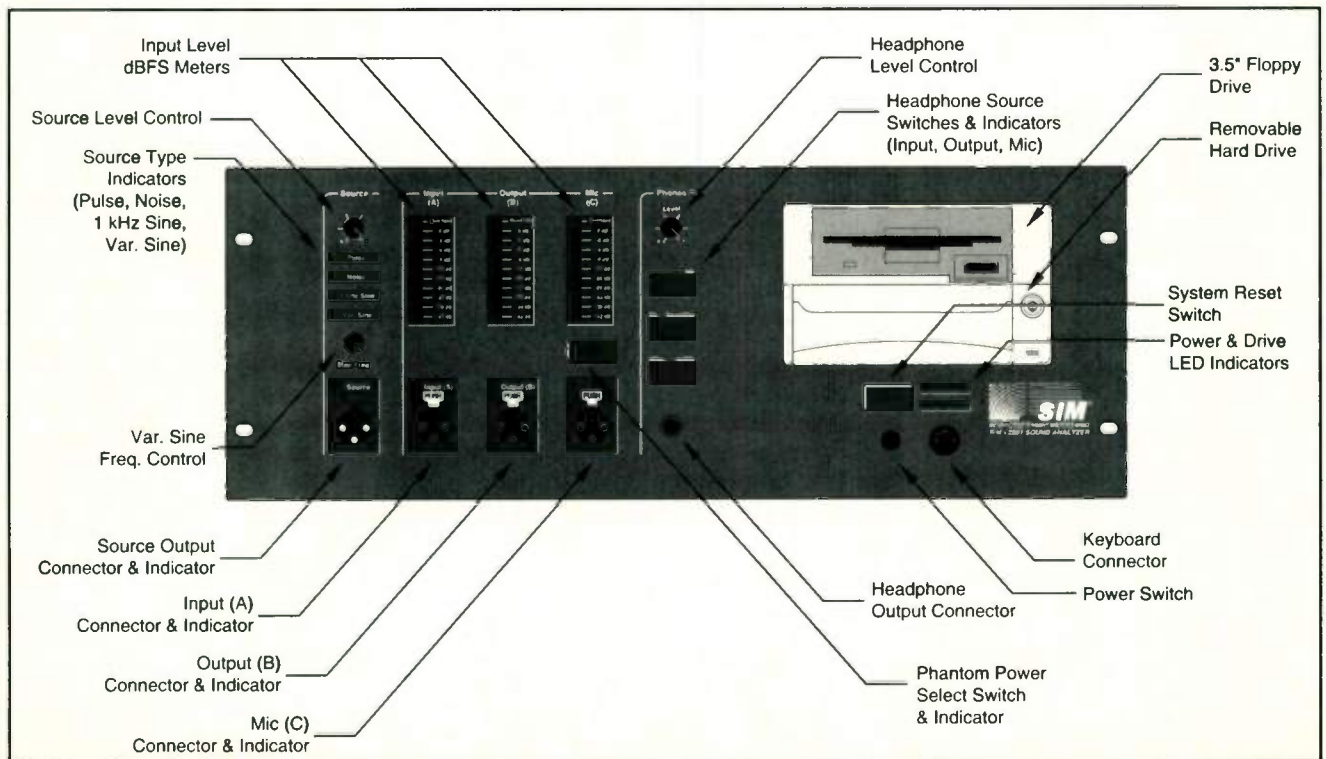
area. When the graphs are printed out to a printer, all of the test parameters are printed as well.

A unique measurement that SIM performs is automatic delay finding. In the delay finder mode, SIM compares the source and measurement channels and figures out how much delay there is in the signal path. The range is 0 to 983 milliseconds, in 20 microsecond steps. It has never been wrong yet. It does it by performing FFT/IFT pairs on the data. It requires either pink noise or music to figure it out. It wouldn't be fair sending it a sine wave, now would it? After SIM determines the delay, one key transfers the setting to the internal delay line. SIM System II has now synchronized the reference and measurement channels.

During frequency response measurements the data can be averaged over multiple samples. The choices are 1, 2, 4, 8, 16, and continuous. An additional choice is whether the averaging is RMS (level only) averaging or vector averaging, which takes phase relationship into account during the averaging. The data is processed in a band as narrow as 1/24th of an octave, so small anomalies will show up readily.

## THE HARDWARE

SIM System II is based around the AT&T DSP32C floating-point signal processing chip. This is the same chip that is used in the DisQ digital console, the SADIE hard disk editing system, and the CEDAR single ended



ZERO ZERO ZERO ZERO ZERO

# S01

DIGITAL SAMPLER

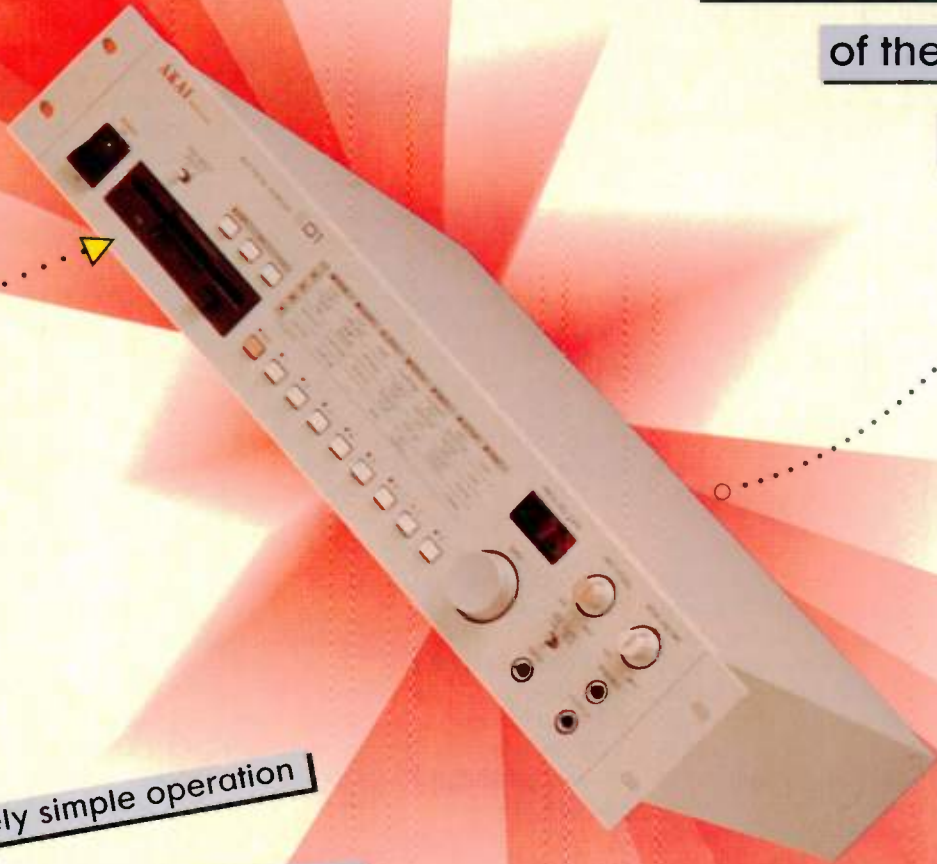
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supremely simple operation

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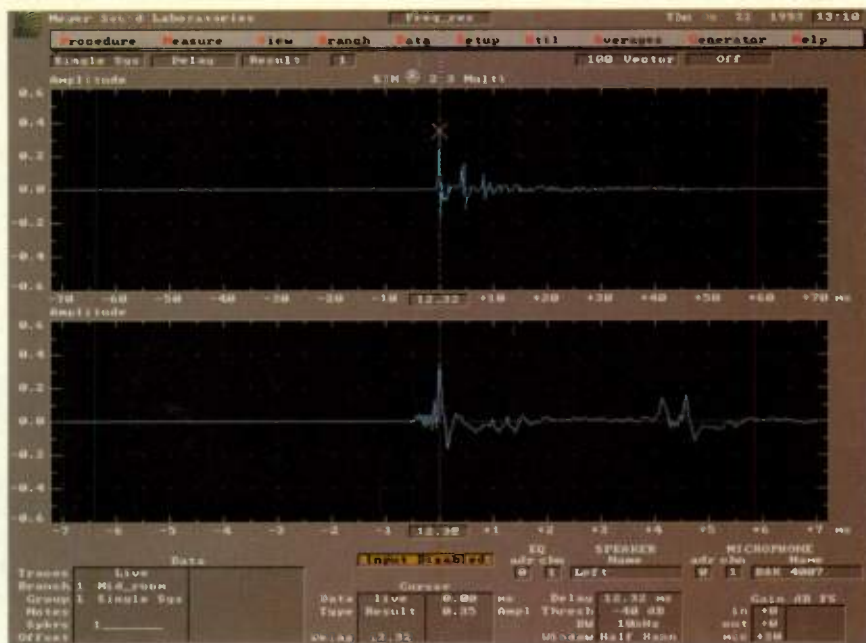
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*Sensibly priced at  
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The SIM System II delay display.

noise reduction system. There are three DSP32C's in SIM System II v.2. The DSP housekeeping is done by an 80486 computer running at 33 MHz with 16 megabytes of memory, a 109 megabyte removable hard disk, and a Super VGA graphics display. Meyer has custom built the A/D convertor boards that supply data to the DSP32C's. That data is supplied directly to the DSP chips without passing through the PC buss.

The computer is shock-mounted, and housed in an industrial strength enclosure. The cooling fans have been replaced with quiet ones so that there is minimal additional noise generated in the measurement environment. There is a special card brace that holds the cards in their slots, so that you don't have to open up the box and reseal the cards every time you move the SIM machine to another location.

The rear of the machine contains connectors for power, video display, printer, mouse, optional microphone switcher, and the main test I/O. A military style multipin connector attaches to an 8-line snake interface to the external audio equipment. These connections go to Console Out, EQ In, EQ Out, and Monitor In, and are switched internally to the correct reference and measurement inputs of the system. There is also an XLR output on the rear from the internal signal generator.

The front panel displays metering for reference, measurement, and microphone inputs. There are also input connectors on the front panel for reference, measurement, and

microphone signals. There are connectors for the internal generator, for a set of headphones that let you listen to what is being measured, and for the computer keyboard. Controls on the front panel include the power switch, computer reset, 48-volt phantom supply to the microphone, headphone level, internal generator level, and sine wave oscillator frequency. The hard disk is removable by pulling it out of the front panel, thus allowing multiple users to have their own data and test setups without disturbing those of others.

#### USING SIM SYSTEM II

SIM was originally designed for the sound reinforcement business. In the past the sound reinforcement companies would equalize the venue during the day, long before any music was played. During sound check, a few final "tweaks" would be done "by ear" based on what the sound technician heard. When the show started, the room sounded quite a bit different because the hall was now filled with sound-absorbing people. It took a few songs before the sound technician could get things back under control; it had to be done "by ear," with maybe the aid of a spectrum display to show how much energy at various frequencies was reaching the reference mic.

With SIM, there are three major advantages:

1 — You can measure the system with speakers on only a short time and store the resultant curves. With

the speakers turned off, you can still send signal through the EQ and display the 1/EQ curve on the display. Now you adjust the EQ curve to match the response curve. When the speakers are turned back on during sound check, the system is already set to go.

2 — When the audience fills the hall, the sound changes. Even the background music played before the concert starts is enough to enable you to adjust the EQ. When the show starts, you are already 99% there and with just a couple of twiddles (technical term) of the EQ knobs, you're done.

3 — The top display on the graph is a red line labeled "Coherence." If any anomalies show up during the show, such as a power amp crapping out or a speaker clipping, it will instantly show up on the display. Since SIM is comparing what is being sent from the console with what is coming out of the speakers, a distorted keyboard or guitar on stage will not show up as a problem in the PA system.

I have been SIMing everything that moves. The ADAT passed with flying colors. It looks a lot better than the 3M digital machines that I love so much. The 3M machine has a 180-degree phase shift at 18 kHz and is 270 degrees out by 20 kHz. The Sony 3348 has the same phase shift, but it doesn't happen until up above 20 kHz. Analog EQs really show their phase shift when you crank in a lot of boost in the high end. The Meyer CP-10 EQ was flat as a ruler, no matter how much boost or cut was cranked in.

When looking at digital machines, you can see the noise increase as you get up toward the Nyquist limit. You can see how different dithering schemes used by convertor manufacturers affect the high frequency noise. In some cases, the S/N ratio at the higher frequencies drops to only 40dB, while in the midrange the S/N ratio is better than 100dB.

To measure THD (Total Harmonic Distortion), you select the spectrum display and the internal oscillator as the source. The cursor will jump to the peak of the spectrum display and the THD can be instantly read in the bottom data window.

#### DON'T TRY THIS AT HOME

Walter Becker played the guitar solos on Donald Fagen's new album. We didn't want to spend half an eternity getting just the right sound on the

*continued on page 128*

# YES!



The AudioEngine  
Digital Audio  
Workstation

## TO MUSIC PRODUCTION

- Lock to your favorite MIDI sequencer regardless of computer platform?  Yes  No
- Track live audio onto 16 channels, upgradable to 24, and punch in/out on the fly?  Yes  No
- Auto-mix hundreds of tracks, plus unique fades and volumes for each listed music event?  Yes  No
- EQ and digital signal process in real-time internally, & patch external via digital or analog?  Yes  No
- Scrub smoothly and precisely, back and forth, with a mouse, trackball, or scrub wheel?  Yes  No
- Pitch shift and time compress/expand an entire song, musical phrase, or just a single note?  Yes  No
- Create seamless vocal or solo composites from an unlimited number of takes?  Yes  No
- Copy and paste song verses, choruses, or just phrases or riffs to build a finished piece?  Yes  No
- Easily align downbeats in cross-faded or over-dubbed music tracks?  Yes  No
- Quickly reorder CD mastering song lists complete with cross-fades and segue effects?  Yes  No
- Customize the interface to match your working style?  Yes  No
- Show clients a great looking work environment that does their job every time?  Yes  No
- Create on the most flexible, most complete system in the world for less than going analog?  Yes  No

## YES!

YOU CAN! Just say YES to SPECTRAL, the system of choice for tracking and editing music, and you'll be able to say YES to almost any audio job. The most flexible, most cost effective system combined is upgradable to 24 tracks, 24 channels of I/O, and can also be configured for mastering, radio production, film and video post production, signal processing, sound design and more.

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MASTERING THE DIGITAL DOMAIN

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CIRCLE 64 ON FREE INFO CARD

WRX

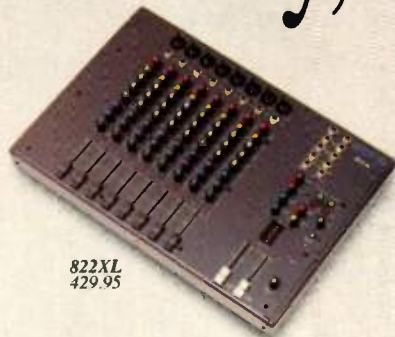


# The other guys missed the bus. Actually, 2 of them.

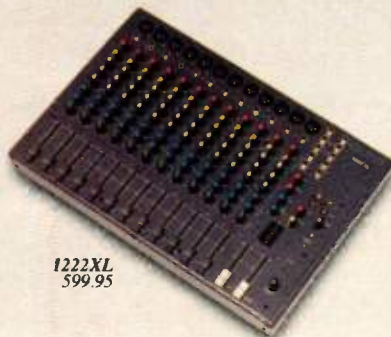
Why settle for a simple 16 channel stereo mixer, when you can have the 1642 4 bus mixer for \$1099.

Or if 8 or 12 channels are enough, you'll find most of the same features on the 822 and 1222 stereo mixers, starting as low as \$429.

With four similar discrete outputs (Sub1, Sub 2, Left and Right), the 1642 may be used as a 16x4 for recording, or, by assigning the subs to the L/R outputs, as a 16x2x2 for sound reinforcement. Each channel of the 1642 has a 3-band EQ



822XL  
429.95



1222XL  
599.95

*"Also available as 822RM and 1222RM rack mount versions at the same prices."*

with Adaptive-Q circuits for a contoured response that adds clarity to the highs and warmth without "boomy-ness" to the lows.

The 822 and 1222 models are offered in two versions, designated XL (table top) or RM (for rack mounting). Each comes with phantom power, 3 bands of EQ, 1 monitor and 2 effects sends,

and monitor & headphone outputs. We're so confident that you'll love our new mixers that we'll back them with a two year warranty. So if you want some great mixers with low

fares, don't miss the bus. Check out the 1642 and the rest of the DOD lineup at your favorite Dealer now.

## DOD

H A Harman International Company

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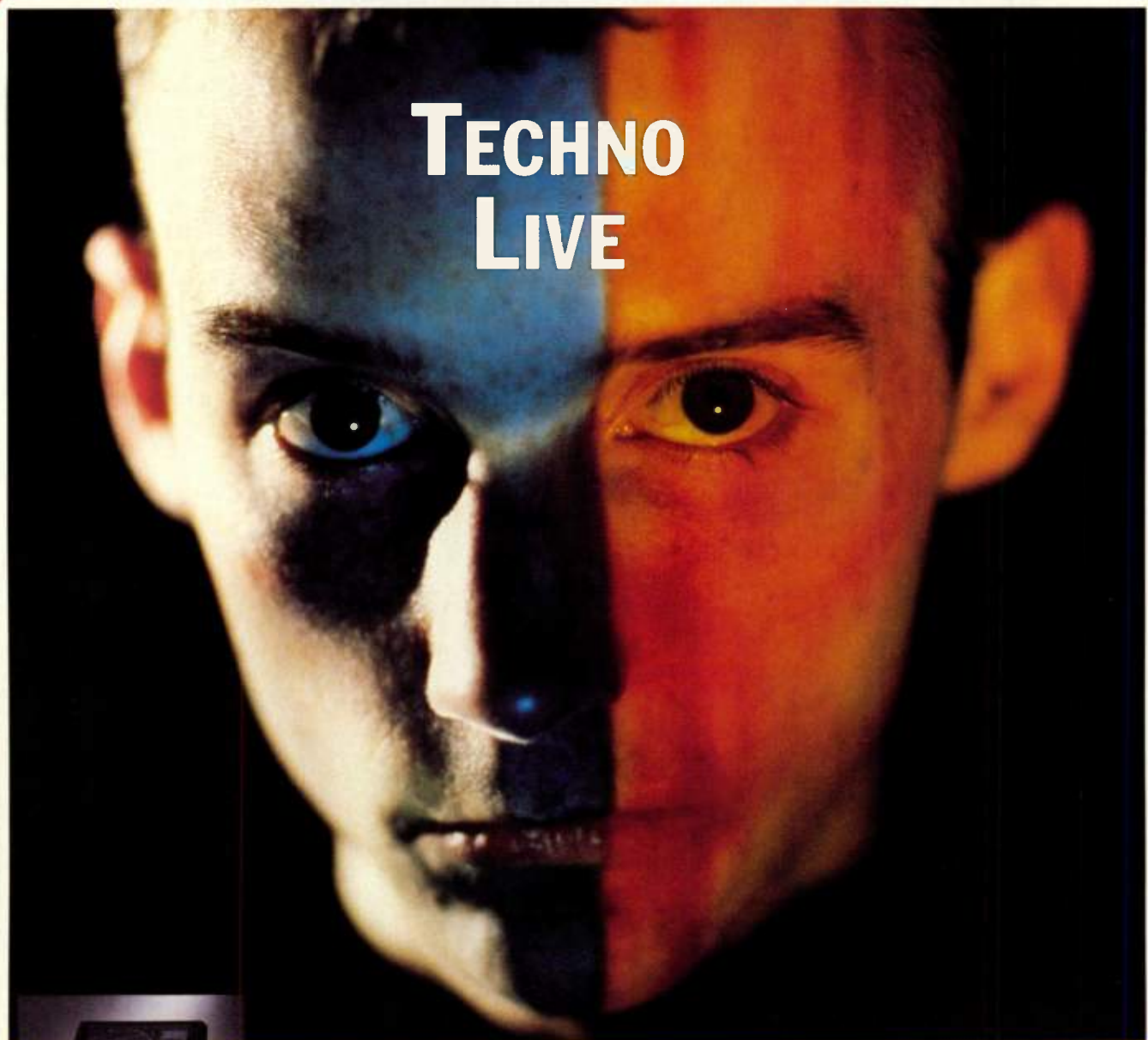
CIRCLE 27 ON FREE INFO CARD

# BAND IN A VAN



**FLYING RIGHT  
PAGE 72**

LIVE SOUND FOR THE GIGGING MUSICIAN



## TECHNO LIVE



**INSIDE:** THE LATEST VANS FOR YOUR BAND  
STAGE MONITOR BUYER'S GUIDE

■THE HAUNTING STRAINS of the theme from television's defunct series *Twin Peaks* begin their familiar rift, when suddenly the tune takes an unexpected turn. A driving percussion beat appears and is soon joined by an energetic synthesizer and by electronically altered voices yelling "Go."

You have left the bizarre world of *Twin Peaks* and entered into the techno world of Moby.

The song, appropriately titled "Go," did just that. It rose in popularity at a mind-staggering rate in both the United States and Europe, putting the spotlight on both its creator and the techno/rave scene. Since then, techno has emerged from the underground dance clubs to such famed venues as New York's Limelight, and Moby has released his first self-titled album on Instinct Records and toured the U.S. and Europe with electrifying live shows. Techno is inherently where the home studio meets the dance club, where music that is created digitally in a personal production space goes public via a deejay and dance-maddening sound reinforcement.

**GOING MOBYLE**

"What I used to do, when I first started playing live, was to basically set up my home studio on stage," explains Moby, who is the great-great-grandnephew of *Moby Dick* author Herman Melville. "At that time, it consisted of a sequencer, a couple of samplers, an effects unit, a drum

machine, and a 16-channel mixer. But as I started to do more shows, it became impossible for me to support myself technically on the road."

Moby has been busy. In the last 16 months he has done about 120 live techno shows all over Germany, Holland, Switzerland, and

Belgium, and in many other European countries. The fact that he usually traveled by train and alone made it almost impossible for Moby to travel with a large amount of equipment.

To make up for his decreasing touring rack, Moby now puts the rhythm tracks on a DAT and does

the electronic parts live using one of the synthesizers from his considerable home studio rack that includes Roland's Jupiter 6 and Juno 106, as well as a Casio CZ 101 and E-Mu's Proformer. Minimalist Moby is often seen on stage with only a synthesizer, moving wildly in time to the music he is creating.

As for a sound engineer, Moby doesn't use one. Instead, he engineers himself during the sound check and instructs the person monitoring the system during the show to basically leave it alone.

With so many shows in such a short period of time, it may seem that things might get boring, but that's not the case with Moby. "One of the nice things about my shows is that they're never the same twice. Everything is so alive," he states.

With techno/rave performances, however, there are many factors that can make or break a show. "My performance is pretty consistent," Moby adds, "so it is subject to various elements. Much of it depends on the club's atmosphere. The crowd can also bring it up or down. It's my job to keep the crowd up."

One thing that has changed since Moby came into the spotlight is the production value of his shows. He says, "Whatever money does get spent, gets spent on production in terms of lighting and visuals. Instead of a sound engineer, I travel with a

*continued on page 69*

# RAVE ON!



**A TAKE ON THE LIVE TECHNO SCENE FROM  
ITS MAIN MOTIVATOR, MOBY**

**BY TONY SAVONA**

Moby Photos by Jill Greenberg



# How to turn your 8" to 15"

NEW!



## Aphex Aural Exciter® Type C<sup>2</sup> with **BIG BOTTOM**™

It's the all new Aphex Aural Exciter Type C<sup>2</sup>! This 2-channel model with **BIG BOTTOM**\* gives you twice the excitement. **BIG BOTTOM** enhances *bass* the same way the Aural Exciter process enhances the high end. Makes *any* speaker sound bigger, it even makes your 8" speaker sound like a 15" woofer ... load up your tape with powerful drums, huge synth bass, fat pads and thunderous bass ... without all the mud.

Best of all, **BIG BOTTOM** does its job without vastly increasing amplitude or generating subharmonics which can damage your speakers or overload tape. **OVERHANG** and **GIRTH** give you flexible control on how **BIG** you want your **BOTTOM** to be.

Of course, the Aural Exciter is still the premier way to enhance highs, too. The Type C<sup>2</sup> utilizes the latest refinements in Aural Exciter technology and is easier to use, and is quieter than ever. It does the job by recreating and restoring harmonics ... musically and dynamically. A patented process that many have tried to emulate, and none have succeeded.

Hear how the Aural Exciter Type C<sup>2</sup> with **BIG BOTTOM** brings new levels of *excitement* ... live, recorded or even sampled ... at selected dealers around the world.

**APHEX**

SYSTEMS 11068 Randall Street ■ Sun Valley, CA 91352-2621 ■ (818) 767-2929

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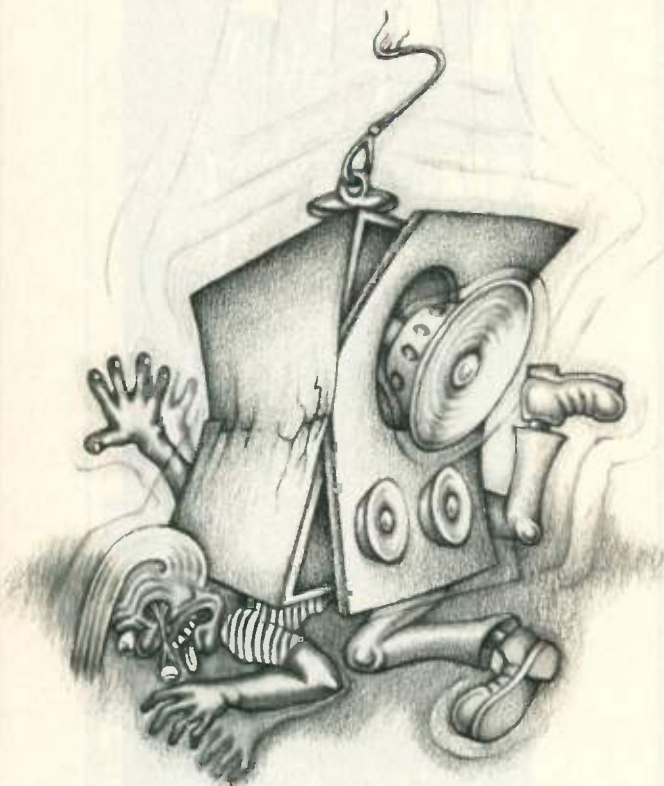
Aphex, Aural Exciter and Big Bottom are trademarks of Aphex Systems Ltd \*Patents applied for. Aural Exciter is covered by U.S. Patent No. 4,150,253, and other patents issued and pending.

**CIRCLE 13 ON FREE INFO CARD**

WRB

# COME FLY WITH ME, PART 1

Illustration by Normal Rockhard



■ **SOMETIMES YOU JUST gotta fly.** The club you're playing can't accommodate your stage stacks. Or they just don't sound quite right. Unfortunately, it can be extremely difficult to fly portable sound reinforcement systems in club venues. It can be even more difficult to incorporate a flyable loudspeaker system into the club venue itinerary. A flying loudspeaker system involves a considerable investment — not only in the area of finance, but also in logistical planning, and in the considerable obligation for safe and competent operation.

There's only one way to

fly a portable band PA — the right way. There are no shortcuts or cheap and easy solutions. Logistically, a loudspeaker flying hardware system will increase the time necessary to load in the sound reinforcement system. Also, the venues being booked will need to have the appropriate facilities to fly the loudspeaker system in a timely and safe manner.

Remember that while a flying loudspeaker system will noticeably improve the performance of the sound system, there are added moral and legal responsibilities that come with safe and responsible flying prac-

tices. The owner of the sound reinforcement system accepts the responsibilities of flying loudspeaker enclosures when he or she employs the use of a loudspeaker flying system. Be aware that any damage, injury, incident, or other misfortune that can be related to the flying hardware system will usually be pursued.

## HAVE A SAFE FLIGHT

When looking at flying hardware system safety, start with the loudspeaker enclosure itself. Flyable loudspeaker enclosures are mandatory. Many loudspeaker manufacturers offer loudspeakers with some type of flying hardware in place. Most of these loudspeakers have been designed and constructed to be flown, and have been tested to ensure their safety. However, an engineering data sheet that details the strength ratings of any manufacturer's flyable loudspeaker enclosures should always be kept on hand.

Some nonflyable loudspeaker enclosures can be modified to be flown. Internal bracing and enclosure modifications can strengthen the enclosure sufficiently. These types of modifications should only be made with the loudspeaker manufacturer's consent, and a rigging consultant should always be involved. The same applies to proprietary loudspeaker enclosures. In either case, structural testing and certifications must be obtained before the loudspeaker flying system is used.

## GIMME FIVE

There are many considerations when studying the different types of loudspeaker

enclosure flying hardware. At all times, a design factor must be exercised throughout the entire system. A design factor is a factor of safety built into the system. The most common design factor is 5:1, which means that every component's yield strength or ultimate load strength is divided by a factor of 5; the result is the safe working load for the component.

For instance, a cabinet fitting with a yield strength (load at which the part bends) of 1000 lbs would have a safe working load of 200 lbs. With this in mind, differences between alloys become an important factor. Steel alloys have greater strength than aluminum alloys. Steel alloys, also, have a tendency to bend long before they break, while aluminum is brittle and can break suddenly. If the loudspeaker enclosure hardware is being borrowed from another industry, such as the aircraft or cargo-control industry, it is important to find out if the hardware is approved for overhead lifting applications. Much of the hardware that looks like standard aircraft or cargo-control hardware is not and cannot be used for overhead lifting purposes.

In almost all instances, flyable loudspeaker enclosures utilize some variation of internal bracing. Usually the internal bracing is fastened directly to the external flying hardware component, distributing some of the load throughout the loudspeaker enclosure and increasing the load capacity of the enclosure. The external part of the enclosure flying hardware system can take many different forms. Perhaps the most common systems are the nut plate

**ALL RIGHT ALL YOU LIVE GIG ENGINEERS,  
IT'S TIME TO STRAIGHTEN UP  
AND FLY RIGHT**

**BY ANDREW MARTIN**

Listen to the sound of silence.....

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## Everything you ever wanted.....and more!

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WRB

# IN A BAND

(threaded plate), the pan fitting, the stud fitting, the cargo control track, and the increasingly popular threaded hole.

That's a start. You're not quite ready to fly. So keep your stacks stacked until next issue, when I'll be ready to issue your wings.

*Andrew Martin is president of ATM Fly-Ware.*

## GETTING HELP

When it comes time to fly, and you're looking for a little pro guidance, you can contact the author at 20960 Brant Avenue, Carson, CA 90810, tel: 310-639-8282. His company, ATM Fly-Ware, manufactures modular loudspeaker flying hardware systems, internal bracing hardware, and other rigging accessories, and serves as a consultant for loudspeaker rigging applications. AMFS Series modular loudspeaker flying hardware systems are presently available for Apogee Sound, Community Sound, EAWorks, Electro-Voice, JBL Architectural, Meyer Sound Labs, OAP Audio, Professional Audio Systems, and Renkus-Heinz. A complete series of loudspeaker enclosure internal bracing hardware is also available.

Or, if you're a do-it-yourselfer, the Master Class in Stage Rigging Level I is a seminar in rigging and rigging systems for any one who works with this type of equipment.

There will be three seminars held in 1993:

March 1 thru 8 — Edinburgh, Scotland

Contact: Celtech Events, P.O. Box 93, Edinburgh, Scotland EH3 8JG.

June 13 thru 20 — Louisville, Kentucky

Contact: Richard Nix, Musson Theatrical, Inc., tel: 502-367-1900.

July 11 thru 17 — Denver, Colorado

Contact: Bob Bauer, Theatrix, Inc., tel: 303-922-0505.

# Small SMOOTH LOUD

**MAXIMUM SPL 128dB!**  
**POWER HANDLING 350 WATTS!**  
**SMOOTH, LINEAR RESPONSE**  
**SUB COMPACT SIZE**

Take the Yorkville Challenge. Set up a pair of EX350's in a medium sized room. Feed them a strong, clean dose of your favorite music. Turn it up till it hurts. Take a close look at the size of these speakers and then try to believe what you're hearing. Turn it down before the cops arrive!

A breakthrough application of high modulus plastics in the 12" woofer's diaphragm material delivers a driver that is fatigue proof, highly consistent from unit to unit and completely free of glue joint failure. New Zero Deformation horn throat research has created a horn with startling linearity and no "nasal" sound. Advanced computer modeling has brought about the most sensitive 12" system commercially available. Add 25 years of speaker design experience and you've got the elite EX350...small, smooth, LOUD.

## élite EX350

**DIMENSIONS**  
17 1/2" W x 22 1/2" H x  
14 1/2" D



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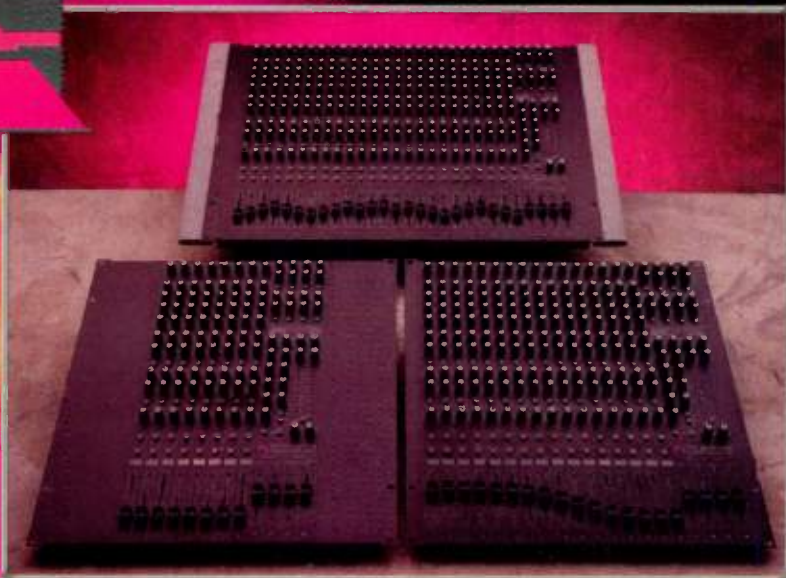
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# A.R.T. SHATTERS THE PRICE OF PROFESSIONAL MIXING TECHNOLOGY!!!

## THE PHANTOM PROFESSIONAL SERIES CONSOLE

Every once in a while a product comes to market that offers a brilliancy in design that seems beyond human engineering. The Phantom Series consoles offer the performance and features of mixing boards costing thousands of dollars more. They are rugged enough to take the pounding of steady live use. They are also so transparent and utterly free of noise that they are the first choice for precision multitrack recording! From a four track home studio to 32 channel digital, the Phantom consoles offer a level of performance that is inspiring. A.R.T. has taken the fidelity of world class recording mixers and made the technology available in a professional console that is as silent as its' name implies. Production unit will vary slightly from photo.



- 16/24/32 CHANNEL VERSIONS
- ULTRA LOW NOISE LINE AND XLR BALANCED MIC INPUTS
- 8 AUXES
- 8 DIRECT OUTPUTS
- 16 PATCH POINTS
- 4 SUBGROUPS
- OVER 20 MIX OUTPUTS
- COMPREHENSIVE 4-BAND EQUALIZATION
- PHANTOM POWER
- MAIN-SUB SELECTOR SWITCHES
- 8 CHANNEL DEDICATED TAPE RETURN SECTION
- BOTH PRE AND POST-FADE MONITOR AND AUX SENDS
- CLIPPING INDICATOR LIGHTS EACH CHANNEL
- FULL CHANNEL SOLOING
- FULL CHANNEL MUTING
- LONG TRAVEL SHIELDED FADERS
- SWITCHABLE OUTPUT METERING
- SWITCHABLE MONITOR METERING
- ISOLATED 2 TRACK MONITOR TAPE RETURN
- SEPARATE STEREO CONTROL ROOM OUTPUT
- ASSIGNABLE TALKBACK-MAIN, MONITOR, AUX.
- INDEPENDANT SOLO LEVEL
- SEPARATE HIGH POWERED HEADPHONE OUTPUT
- RUGGED ALL STEEL HEAVY DUTY CHASSIS

- SLEEK, WOOD END PANELS (OPTIONAL)
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# NEW! 8-BUS CONSOLES

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Built-in test-instrument-grade, ultra-low radiation **POWER SUPPLY** with toroidal transformer and external heat sink.

Two **TAPE OUTPUT SUBMASTER** jacks per bus (total of 16). Balanced or unbalanced.

**+4dBV balanced TAPE RETURNS**, switchable to **-10dBV unbalanced**.

Balanced **MIC**, balanced **LINE IN**, **PHASE invert**, **DIRECT OUT** & **CH. INSERT** on every channel.

All channels have Mackie's renowned discrete, wide-bandwidth **MIC PREAMP** circuit for ultra-high headroom & low noise. All mic inputs have **+48V phantom power** with switches in groups of eight channels.

Optional **METER BRIDGE**.

**6 AUX SENDS** with Solo and Solo LED.

**MIX B/MONITOR** section can be assigned to L/R Mix or used as direct out.

**6 STEREO AUX RETURNS** with 20dB gain. 1 & 2 are pannable; all have Solo and can be used in stereo or mono.

**4-BAND EQ** with "Expensive British Console Sound." Includes **TRUE PARAMETRIC HI-MID**, swept **LO MID**, shaving **HI** & **LO** plus **18dB/oct hi pass** (lo cut) filter at 75Hz.

**TWO SEPARATE HEADPHONE SECTIONS** can be used totally independently of each other with source selection between Control Room & any combination of Aux 1, Aux 2, Mix-B or External source. Solo allows control room to hear what musicians are hearing in their headphones.

**SPEAKER** section with separate Control Room & Studio levels. Source selection between L/R mix, Mix-B, Tape & External. Can be switched to Mono.

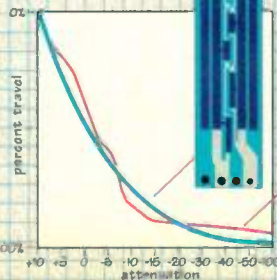
**TALKBACK** with assign to all Tape outs, Aux 1, Aux 2 or Phones.

**-40 to +10 bar graph LED DISPLAYS** for each submix channel & Solo/Main (with **+28dB CLIP LEDs**).

**ALTHOUGH** there are 8 buses, 16 tape outs are created by a second set of output jacks.

Built-in talkback MIC.

Conventional faders are overscreened with a second layer of resistive material in an attempt to create a logarithmic taper. Our **PRECISION NETWORK FADERS** are single-layer screened with both the primary linear resistive elements and also a complex auxiliary element to create the true logarithmic curve found in ultra-expensive console faders (blue line on graph).



**MIX-B/MONITOR** section on each channel effectively doubles number of inputs during mixdown.

**T**HANKS TO ADVANCES in component technology and quality, our ability to buy parts in large quantities – and a lot of fanatical Mackie engineering – you can “have it all” without hocking the proverbial farm.

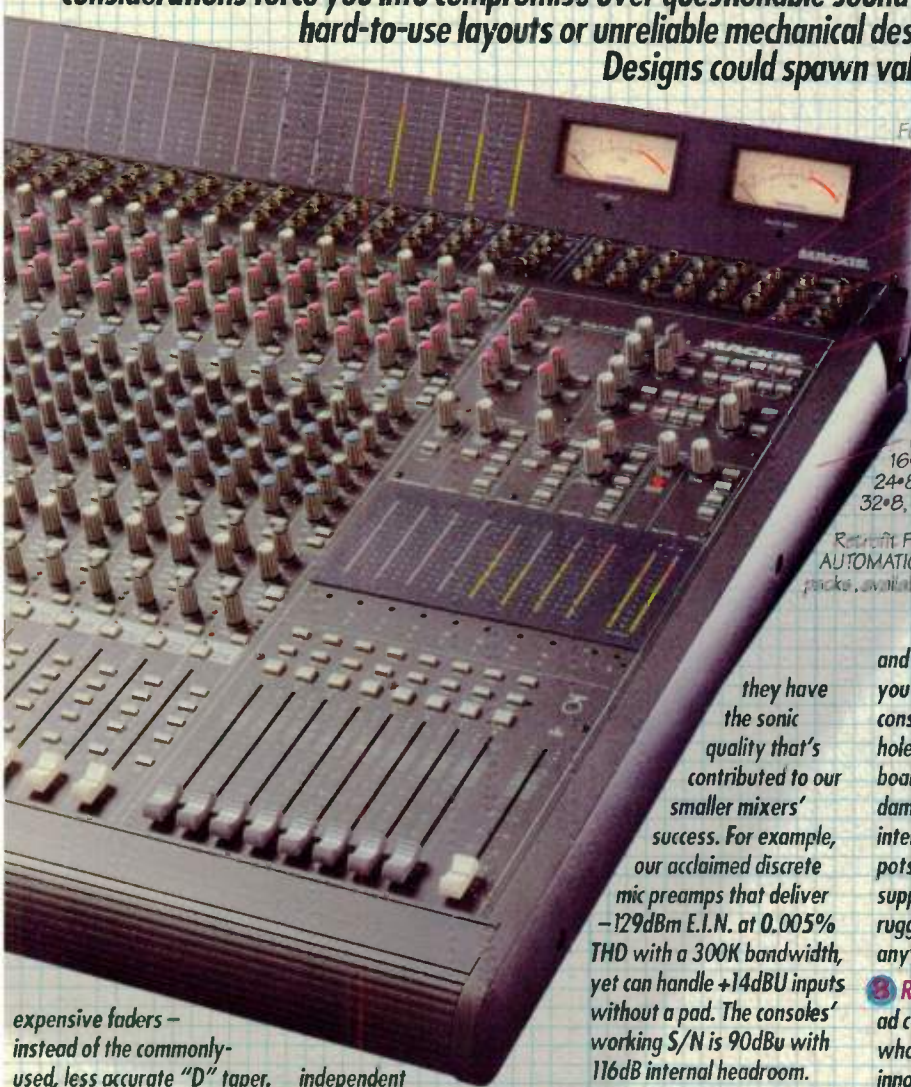
**B**ECAUSE WE SPECIALIZE IN MIXERS (and because we're probably a little crazy), we began the design of these consoles by first asking ourselves, “What is it that makes the finest British consoles perform the way they do? — And how much of that can we duplicate (using modern materials and methods) on far less expensive boards?”

**B**YE OLDE ENGLISH **SOUNDE**. For example, older Neve consoles have much wider-band mid EQ than lower priced consoles – it really has an effect on overall sound quality. So we incorporated the same capabilities on our new 8-Bus Series (along with our trademark low noise and high headroom). This also enabled us to add the flexibility of a variable “Q” control for true parametric Hi Mid EQ. It was an expensive proposition, but well worth it in terms of sound quality. We also wanted the same kind of true logarithmic taper found only on mega-

\* Meter bridge additional. Equally phenomenally-low prices for the 16\*8 (P3195) and the 32\*8 (4795). Neve is a trademark of Neve, a Siemens Company.

# HADN'T THREATENED TO HIT GREG UPSIDE THE HEAD WITH A RANCID SALMON, PROBABLY STILL BE ADDING FEATURES TO 32, 24 & 16-CHANNEL 8-BUS CONSOLES.

24 channels for \$3995! Finally, the "quality gulf" between \$20,000+ imported consoles and more affordable boards has been eliminated. No longer must budget considerations force you into compromise over questionable sound quality, poor EQ, hard-to-use layouts or unreliable mechanical designs. Only Mackie Designs could spawn values like these!



Full SUB-MASTER and MASTER Inserts.

Rugged STEEL CHASSIS.

SEALED rotary potentiometers resist dust and liquids.

Two independently adjustable HEADPHONE monitoring sections, plus separate TALKBACK and SPEAKER sections.

DIMENSIONS (H x W x D):

16" x 8.5" x 36.7" x 28"

24" x 8.5" x 36.5" x 28"

32" x 8.5" x 44.5" x 28"

retrofit FULL-FADER/MUTING AUTOMATION, via MID or external fader packs, available in the future.

In-line FLIP reverses tape and mic/line inputs. Incredibly handy feature but hard to explain in an ad, so read our brochure to appreciate it.

AUX SENDS 1-2 PRE button selects pre-fader/post-EQ or post-fader/post-EQ.

AUX 3-4/5-6. SHIFT changes 3-4 to 5-6.

SOURCE selects signal source of AUX 3-4/5-6 from ch. strip to ch. Mix B/Monitor send so you can build an alternate mix to assign to phones during tracking.

True 3-control parametric HI MID EQ with ultra-wide 50-10k frequency sweep range. Bandwidth can be adjusted from a very wide 3-octave width to a very narrow 1/2-octave width. SUB boost/cut.

LO MID EQ with ultra-wide 45Hz-3K sweep, 5dB boost/cut.  $\pm 15$ dB shelving HI (12kHz) & LO (80Hz) EQ.

Multi-purpose 18dB/oct. LO CUT filter @ 75Hz. Cleans up "mix mud," creates a "neo-peaking" base control, cuts PA rumble, etc.

MIX-B (Monitor) section with pan, level & source. Functions as independent monitor section, extra stereo Aux send during mixdown or doubles number of inputs during mixdown.

Mix-B SPLIT EQ assigns HI & LO EQ to Mix-B. Constant power, buffered PAN pot for rock-solid panning.

Selectable SOLO with CHANNEL METERING not only allows soloing in full stereo perspective but also always soloed channel operating level on master L/R meters so input trims can be adjusted for optimum levels.

At least! HIGHLY ACCURATE 100mm FADERS on an affordable console. (See explanation at left).

L/R MIX assigns channel directly to master L/R mix for ultra-quiet mixdown.

they have the sonic quality that's contributed to our smaller mixers' success. For example, our acclaimed discrete mic preamps that deliver  $-129$ dBm E.I.N. at 0.005% THD with a 300K bandwidth, yet can handle  $+14$ dBu inputs without a pad. The consoles' working S/N is 90dBu with 116dB internal headroom. Bottom line: For hard disk recording, ADAT or DAT, you've found your board.

**OPTIMIZED FOR PA AND RECORDING.** Along with elaborate monitor capabilities, balanced XLR main outputs

and 18dB/oct. hi pass filters, you get non-flexing steel construction, fiberglass thru-hole plated, horizontal circuit boards that minimize impact damage, gold-plated interconnects, sealed rotary pots and a built-in power supply. You won't find more rugged, compact PA boards anywhere.

**READ ALL ABOUT IT.** This ad can't possibly tell the whole story of the design innovations we've packed into these consoles. Call us right now toll-free for a comprehensive 8-page brochure, the name of your nearest Mackie 8-Bus Dealer... maybe even info on the type of salmon that we threatened Greg with.

expensive faders - instead of the commonly-used, less accurate "D" taper. So we commissioned a totally new custom 100-mm fader with the same taper as the most expensive British faders, yet at a fraction of the cost.

**DOUBLE THE INPUTS & MORE.** Each channel has in-line monitoring that effectively doubles the number of inputs (48 on our 24-B, for example). We also added features we personally find useful such as dual

independent headphone systems and separate MIX-B monitor section with Split EQ. The consoles' internal  $-10$ dBV to  $+4$ dBu level conversion allows use with semi-pro tape decks without the inherent noise penalty found in semi-pro mixers that operate at  $-10$ dBV internal levels.

**BEST OF THE CR-1604.** Though we designed these consoles from the ground up,

## MACKIE.

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WIN MACKIE'S NEW 8-BUS CONSOLE! SEE PAGE 79



# VANS FOR YOUR BAND



The Ford Aerostar can hold heavy systems with its 5000 lb. capacity.

■ YOU CAN'T BE a touring band without wheels, and it's not good business to miss shows because your van just died on the highway. So, as a service to our roaming engineers and musicians, *EQ* presents the new 1993 vans available from GMC, Ford, and Chrysler/Dodge. Find the ones that interest you the most, then hit the dealerships and start kicking tires.

## GMC SAFARI

The midsize GMC Safari is available in a choice of two body lengths, two engines, rear wheel drive, and three trim levels. Mid-size vans are smaller and more maneuverable than full-size vans, but offer more load space and power than front-wheel-drive minivans. They can therefore be an appropriate choice for many touring musicians. The 1993 Safari offers four-wheel antilock brakes as standard equipment and its 4.3-liter V6 puts out 165 horsepower and 235 foot-pounds of torque. A new electronically controlled four-speed automatic transmission is stan-

dard. The Hydra-matic 4L60-E includes a second-gear start-up feature and provides smoother and



Freedom of Choice: The GMC Safari comes in two body lengths.

more accurate shifting. Safari is available with a variety power trains, including all-wheel-drive. Standard seating accommodates five musicians.

## GMC RALLY

The GMC Rally is a full-size model for larger cargo demands. GMC's passenger van, it comes with windows all around and offers standard four-wheel antilock brakes. The electronically

controlled four-speed Hydra-matic 4L60-E transmission is also standard, and a brake/transmission shift interlock helps to prevent the vehicle from shifting out of "Park" without application of the brakes. Four engines are available: a 4.3-liter V6; a 5.0-liter V8; a 6.2-liter V8 diesel; and the massive 7.4-liter V8. A new type of window glass called Solar Ray™ reflects undesirable light wavelengths to keep the interior cooler on bright summer days and to reduce the deteriorating effects of ultraviolet light on interior materials.

torque and 250 horsepower. These vans can carry gross weights of 18,500 pounds while still getting you to the gig on time.

## FORD AEROSTAR

With heavy-duty outfitting, Ford's minivan can carry 5000 pounds. The seven- and five-passenger wagons have cargo-handling capabilities of 1150 and 850 pounds, respectively. The engine lineup consists of Ford 3.0-liter and 4.0-liter electronically fuel-injected V6's. The 4.0 provides 155 horses, while the 3.0 supplies 135. It features front independent SLA with upper and lower control arms and twin-tube low-pressure gas shock absorbers. The rear suspension is coil/link with two lower and one upper control arm tribeam springs mounted behind the axle on the lower control arms and also has the twin-tube gas shocks.

## DODGE CARAVAN C/V

The compact Caravan C/V has the highest optional payload rating and the lowest overall vehicle height of any van in its class, and it is the only vehicle of its kind to offer a four-cylinder engine for maximum economy. There are three engines to choose from, and 150-horsepower is achieved with the 3.3-litre overhead valve V6.

## FORD ECONOLINE/CLUB WAGON

The optional big-block 7.5-liter V8 engine has been upgraded for 1993, and now offers 410 foot-pounds of



The Dodge Ram offers the highest payload of any full-size van.

**TIRED OF BEING A BAND IN A PINTO?  
CHECK OUT THE LATEST VANS FROM  
THE BIG THREE.**

**BY DAVID JACOBS**





### DODGE RAM VAN

The Dodge Ram Van offers the highest payload of any full-size van. New this year is the more powerful Magnum 5.9-litre V8, which delivers up to 230-horsepower. Also new is a base door trim panel for better looks; a new AM stereo/FM stereo radio with graphic equalizer and cassette player; and revised steel wheels. It is also the only vehicle in its class to offer a single rear cargo door.

### CHEVROLET ASTRO

Regular body Astro minis offer 189.9 cubic feet of cargo space, but with an extended body, available on the cargo model, over 200 cubic feet is provided. All-wheel-drive (AWD) models with a full-time split torque system are available for rough terrain. The cargo van has a 4.3-litre V6 power plant and four-speed automatic transmission with overdrive. It can handle a payload of up to 1945 pounds and has a 27-gallon fuel tank to make long hauls easier.

### CHEVY VAN

The regular body full-size Chevy van features rear drive and a 4.3-litre V6 as standard. Four optional power plants are available, including the whopping 7.4-litre V8 and a 6.2-litre V8 Diesel. A payload of over 4000 pounds can be carried on the vehicle's four-coil spring suspension. The G10 and G20 series come with 110-inch and 120-inch wheelbases, respectively. The G30 features a 125-inch wheelbase and the extended body version of the G30 offers a 145-inch wheelbase. The G30 comes with a 5.7-litre V8 as standard. A four-speed automatic with overdrive is also standard and optional larger tire sizes can make for better handling with heavier payloads. ☺

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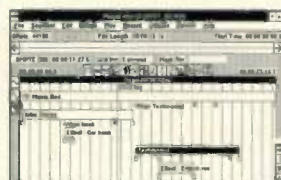
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CIRCLE 76 ON FREE INFO CARD

EQ FEBRUARY 77



# STAGE MONITOR BUYER'S GUIDE

■WE ALL USE stage monitors at least some of the time. Whether we're performing ourselves or doing PA duties for others, the monitor is an essential link in the performance chain. If a player can't hear himself or herself clearly and comfortably, the show goes on but it doesn't go anywhere.

Stage monitors come in various sizes and weights, as well as with various power-handling and sound-pres-

sure capabilities to accommodate a variety of applications, and prices vary widely.

In addition to the familiar speaker cabinets, some companies are offering radical new ideas in stage monitor systems design. New in-the-ear systems, wireless or wired, are providing musicians with high-fidelity personal mixes in a way that is nearly invisible to the audience. And there have been innovations in the conven-

tional cabinets as well, by means of which greater directionality, durability and higher efficiency in smaller packages are becoming readily available. High-fidelity frequency responses have become the norm, rather than the exception, in today's monitors.

Choosing the right monitor for your needs requires taking several factors into account, including the volume levels you will

be reaching, the types of venues you will be playing in, the number of personnel requiring individual monitors, transport considerations, and the budget.

The following chart offers descriptions of various models from some major manufacturers. Since we're "Bands-In-A-Van," it concentrates on lightweight stage monitors that can be reasonably and easily transported from gig to gig.—David Jacobs

Brand	Model	Price	Components	Frequency Response	Handling Cap. @1watt	Sensitivity @ 1 meter	Imp.*	Dimensions (inches)	Wt.	Lit. #
Adamson Acoustics	FM 121	NA	12 in./1 in. compression driver	60 Hz-20 kHz	350W	101 dB	8 ohms	15 1/2 x 23 x 6 3/4	45 lbs.	118
Artist Systems	System 3000	NA	Apogee DD1002(Lo)/Apogee, PZ10S (Hi)	65 Hz-19 kHz	300W	121 dB	8 ohms	16.5 x 13 x 10.5	38 lbs.	119
	System 3500	NA	Apogee DD1202(Lo)/Apogee PZ10S (Hi)	65 Hz-19 kHz	300W	121 dB	8 ohms	13 x 16.5 x 12.5	NA	120
	System 4000	NA	Apogee DD1202 (Lo)/Apogee CD 104 (Hi)	55 Hz-18 kHz	300W	123 dB	8 ohms	23.5 x 15 x 14.5	66 lbs.	121
Bag End	TA-12CF	\$690	12-in./1-in. constant directivity horn	72 Hz-19 kHz	200W/800W	103 dB	8 ohms	23 x 18 x 38	55 lbs.	122
	TA-15CF	\$916	15-in./constant directivity horn	50 Hz-19 kHz	200W/800W	103 dB	8 ohms	27 x 22 x 18	86 lbs.	123
Bond	DF-12M	\$2495	12-in. coaxial w/ 4 interchangeable horns	80 Hz - 17 kHz	800W (Lo)/ 300W (Hi)	100 dB (Lo)/ 104 dB (Hi)	8 ohms	17 1/2 x 17 1/2 x 14	62 lbs.	124
Bose	802 Series II	\$998	Eight 4.5-in. full-range drivers	50 Hz-16 kHz	240W	92 dB	8 ohms	13.5 x 20.5 x 13	31 lbs.	125
	802-W	\$998	Eight 4.5-in. full-range drivers	50 Hz-16 kHz	240W	92 dB	8 ohms	13 x 20.5 x 12.5	38 lbs.	126
Celestion	SR1	\$620	Two 8-in.	50 Hz-20 kHz	500W	97 dB	8 ohms	21.9 x 11.8 x 14.1	34 lbs.	127
	SR2 Sub.	\$950	18-in.	40 Hz-150 Hz	1000W	98 dB	8 ohms	23.6 x 20 x 28.1 x 20	108 lbs.	128
Circuits Maximus	System 1200	\$2549	ITE-20 Wearable Monitor/SBX-71P switchable mic/line level stage box and encoder/PM-7 beltpack decoder/amp/CT-9 15-foot cable	20 Hz-20 kHz	.01% THD	0 dBv	100k balanced	4.5 x 2.75 x 1 (belt pack)/3 x 7 x 1.5	4.5 lbs.	129
Community	CSX-58M	\$747	Two 12-in./1-in entrance pattern control horn/compression driver	50 Hz-18 kHz	200W	102 dB	4 ohms	15.5 x 33.5 x 24.5	88 lbs.	130
	CSX-35	\$408	15-in./PZT driver, molded horn	60 Hz-18 kHz	150W	99.5 dB	8 ohms	17 1/4 x 23 3/4 x 13 1/5	48 lbs.	131
	CSX-25	\$335	12-in./molded exponential horn	70 Hz-18 kHz	100W	97.5 dB	8 ohms	18 1/4 x 13 1/2 x 15	38 lbs.	132

\*Imp. = Impedance



Brand	Model	Price	Components	Frequency Response	Handling Cap. @ 1 watt	Sensitivity @ 1 meter	Imp.	Dimensions (inches)	Wt.	Lit. #
Electro-Voice	S-152	\$598	15-in./compression driver/constant velocity horn	60 Hz-20 kHz	200W	100 dB	8 ohms	21.2 x 16 x 27.2	55 lbs.	133
	SH1502ER	\$720	15-in./compression driver/constant directivity horn	62 Hz-20 kHz	200W	102.5 dB	8 ohms	24.7 x 16 x 31.9	81 lbs.	134
	SH-1512ER	\$750	15-in./compression driver/constant directivity horn	55 Hz-20 kHz	200W	100 dB	8 ohms	24.7 x 16 x 31.9	75 lbs.	135
Fastex	SPA-11	NA	Two 4-in.	80 Hz-18 kHz	100W	92 dB	8 ohms	350 x 182 x 270mm	16.5 lbs.	136
	SPA-32	NA	12-in./constant velocity horn	55 Hz-18 kHz	250W	97 dB	8 ohms	330 x 508 x 270mm	32 lbs.	137
Future Sonics	Ear	\$1500	Hi Fi custom-molded headphones	26 Hz-18 kHz	80mW	108 dB	20 ohms	NA	NA	138
Gane	SH12PM	\$400	12-in. cast basket fluid cooled/piezo tweeter	80 Hz-17 kHz	250W	99 dB	8 ohms	19 x 15 x 11	26 lbs.	139
	SH10PM	\$300	10-in. cast basket fluid cooled/piezo tweeter	90 Hz-17 kHz	225W	98 dB	8 ohms	16 x 12.5 x 9	23 lbs.	140
JBL	SR4704	\$1095	15-in./pure titanium compression driver/Flat-Front Bi-Radiat <sup>®</sup> horn	40 Hz-18 kHz	600W	98 dB	8 ohms	29 1/4 x 25 x 17 1/2	76 lbs.	141
	MR805	\$675	15-in./pure titanium compression driver/flat front Bi-Radiat <sup>®</sup> horn	55 Hz-25 kHz	600W	101 dB	8 ohms	29 1/4 x 25 x 17	63 lbs.	142
	MR802	\$595	15-in./pure titanium diaphragm compression driver. Flat-Front Bi-Radiat <sup>®</sup> horn	50 Hz-20 kHz	250W	100 dB	8 ohms	23 1/4 x 17 x 16	55 lbs.	143

# LAST CHANCE! TO WIN A MACKIE 8-BUS CONSOLE OR OTTO-1604 MIDI AUTOMATION!!!

**CONTEST DEADLINE IS JANUARY 31<sup>ST</sup>, 1993!**

*you've done a killer mix on a Mackie CR-1604 or MS1202, submit it to our First Annual Mixed on a Mackie Contest. First prize winner will win our new 24•8•2 console. Three runners-up will win our OTTO-1604 Add-On MIDI Automation board for the CR-1604. Everyone who enters will get a free commemorative T-shirt!*

*So whaddya waiting for? Call our toll-free number for an Official Entry Packet today!*

## OUR DISTINGUISHED JUDGES:



**TOMI.** First solo electronic keyboardist to Platinum since Wendy Carlos, Tommi's recent release, *Dare to Dream*, was widely recorded in his home studio and is shipping in excess of 750,000 units. His touring "band" includes a rhythm section and symphony orchestra.



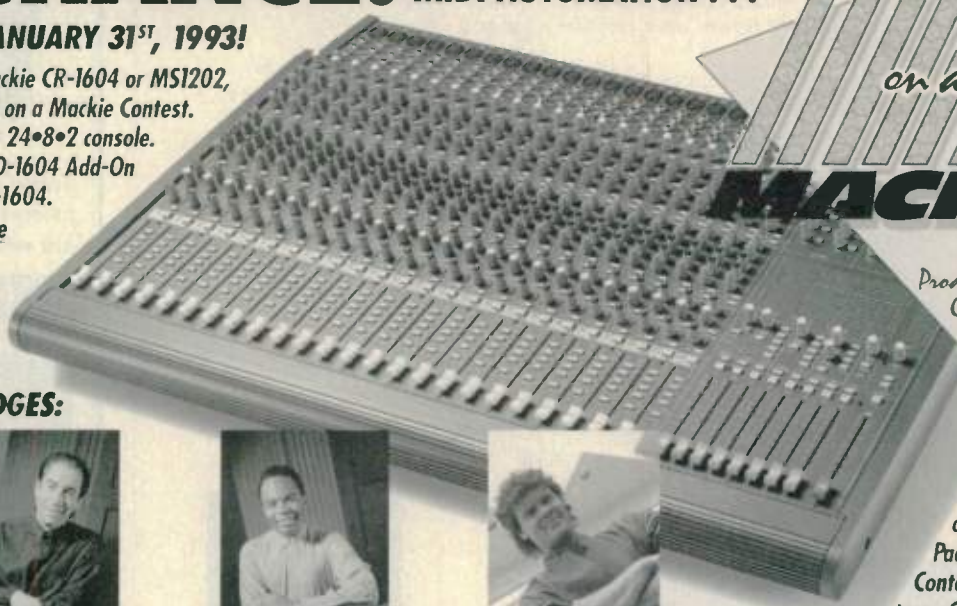
**TOM MGRDICHIAN.** Top studio keyboardist whose scoring credits include *Die Hard II*, *Friday the 13th Part VIII*, *Night Court*, *The Fisher King* and ABC's *Into the Night*. Has recorded and performed with *Olivia Newton-John*, *Air Supply*, *Seals & Croft*, *Ritchie Havens* and many others.



**JONATHAN MOFFETT.** Tour drummer for *Madonna*, *The Jacksons*, *Cameo*, *Elton John*, *Lionel Richie*. Recordings with *Madonna*, *Jurmaine Jackson*, *Kenny Loggins*, *Diana Ross*, *Janet Jackson*, *Nik Kamen*. Producing credits include *Chico DeBarge* & *Lafaye Jackson*.



**FRANK SERAFINE.** Sound designer, composer/engineer & owner of *Serafine Studios*, L.A.'s newest state-of-the-art film mixing, sound design and post facility. Feature movie credits include *The Addams Family*, *Hunt for Red October*, *Lawman*, *Man Star Trek*, *Polturpoint* and *Tron*.



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The Bond DF12M stage monitor



Bag End's floor monitors, shown in front, come in different styles.

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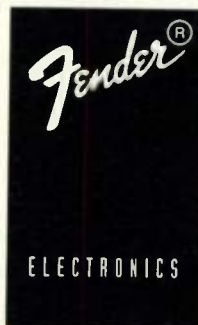
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The Community CSX-58M stage monitor system features a 200W handling capacity and a sensitivity of 102 dB.



Tannoy's CPA-12 pumps out a frequency response of 50 Hz to 25 kHz with a sensitivity of 98 dB.



JBL's SR4704 stage monitor has a 15-inch pure titanium compression driver and a Flat-Front Bi-Radial® horn.



Brand	Model	Price	Components	Frequency Response	Handling Cap. @ 1 watt	Sensitivity @ 1 meter	Imp.	Dimensions (inches)	Wt.	Lit. #
Klipsch	KSM-1	NA	15-in./1.5-in. compression driver	50 Hz-15 kHz	1600W (peak)	102 dB	8 ohms	23 1/4 x 20 x 25	59 lbs.	144
Peavey	1545Ti	\$500	15-in./22T titanium driver on CH 3 horn	88 Hz-14 kHz	250W	101 dB	8 ohms	24 3/8 x 16 1/4 x 18 7/16	53 lbs.	145
	1245M	\$450	15-in. Black Widow/ 22T on CH-3	100 Hz-14 kHz	200W	102 dB	8 ohms	20 7/8 x 17 x 17 3/8	53 lbs.	146
	115HS	\$300	15-in. Scorpion/CDM™ hi freq.horn	70 Hz-17 kHz	65W	100 dB	8 ohms	25 x 18 7/8 x 16	35 lbs.	147
Meyer Sound	USM-1/S-1	\$2530/ \$1445	MS-15 15-in. cone driver/MS-2001N 2-in. throat compression driver	40 Hz-18 kHz	1000W	130 dB	8/16 Lo/Hi	21 x 24 1/4 x 18	82 lbs.	148
	UM-1C	\$2000	MS-12 12-in. cone driver/MS-1401B 1.4-in. throat driver	60 Hz-20 kHz	250W	125 dB	8/16 Lo/Hi	14 x 14 x 22 1/2	67 lbs.	149
OAP	SM112	NA	12-in./1-in.	65 Hz-14 kHz	150W	98.5 dB	8 ohms	16 x 17.5 x 22.75	57 lbs.	150
Ramso	WS-800K	NA	8-in. woofer/twin Bessel horn	65 Hz-20 kHz	160W	92 dB	8 ohms	17 1/16 x 9 5/16 x 11 1/8	16.5 lbs.	151
	WS-A70	NA	8-in. woofer/twin Bessel horn	50 Hz-18 kHz	160W	87 dB	8 ohms	16 5/8 x 9 3/16 x 10 5/16	14.3 lbs.	152
	WS-A10	NA	4 3/4-in.	50 Hz-30 kHz	160W	88 dB	6 ohms	9 7/8 x 6 1/8 x 6 1/8	5.7 lbs.	153

# MINIMIX 16:2



Carefully designed to offer a large number of inputs in a small package, the Ross Systems Minimix provides studio quality mixing capabilities within the price range of almost any musician. Precision engineering has resulted in exceptional sonic and technical performance with careful attention to detail insuring total reliability.

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## CLASSIC EQ

SR6000 features a 4-band swept EQ with parametric mids and swept High Pass Filter. Based on the Classic AMEK parametric, the SR6000 EQ makes it easy to create mixes with precise definition, total clarity and absolute detail.

## TOTAL METERING

A 7-stage LED meter located next to the mute switch on each channel gives an immediate assessment of levels from signal present to +12dB. 12 VU meters with individual multi-source input selection enable rapid checking of levels through the output stages.

## MASTERS & SLAVES

Linking of multiple SR6000s in master/slave configurations is made easy through master/slave linking facilities.

## PEDIGREE

TAC has an acknowledged 12-year track record in the design and manufacture of the best concert, theatre and foldback desks available. From Sydney Opera House to Phil Collins, TAC outfront delivers the results the world's leading artists demand.

## FACILITIES

With many more features than can be listed here, SR6000 offers a considerable step forward in SR console design concepts and defines a new horizon for the technology.

## TOTAL CONTROL

SR6000's output system has been designed to allow maximum flexibility in configuration of output stages. Each input can separately address 8VCA/Mute groups and 8 audio subgroups, all of which are overlapping. The main stereo output and the 10 x 8 output matrix allow multiple speaker arrays to be controlled with ease, while the VCA Master gives overall control of all 10 main outputs.

## SPLIT AUXILIARY SYSTEM

SR6000's revolutionary auxiliary system allows the 8 send busses to be split between left and right sides of the console, giving the engineer 16 auxiliary paths for large, effects-heavy mixes.

## COMPACT SIZE

SR6000's compact chassis is only 1825mm (66 inches) wide for 40 inputs, 4 stereo effects returns and all output facilities. Robust steel construction coupled with side lift bars and concealed grip space under the armrest allow SR6000 to be manoeuvred and transported easily in the secure knowledge that all circuitry is fully protected from external impact.

# TAC



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CIRCLE 78 ON FREE INFO CARD

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Brand	Model	Price	Components	Frequency Response	Handling Cap. @1watt	Sensitivity @ 1 meter	Imp.	Dimensions (inches)	Wt.	Lit. #
Renkus-Heinz	W-121A	NA	12-in./1-in. throat HF driver	60 Hz-17 kHz	100W (Hi)/200W (Lo)	103 dB	8 ohms	16 3/4 x 35 1/2 x 19 1/4	50 lbs.	154
	W-1A	NA	12-in./2-in. throat HF driver	45 Hz-17 kHz	200W	105 dB	8 ohms	16 3/4 x 35 1/2 x 19 1/4	73 lbs.	155
Tannoy	CPA 12	NA	12-in.	50 Hz-25 kHz	300W	98 dB	4 ohms	14 1/2 x 19 1/2 x 14	44 lbs.	156
TOA	381-SDM	S892	15-in./3-in.	50 Hz-20 kHz	360W	99 dB	8 ohms	20 x 19 x 26	52.9 lbs.	157
	381-SEM	S1014	15-in./CD horn plus compression driver/exponential horn tweeter	50 Hz-20 kHz	360W	102 dB	8 ohms	22 x 20 x 30	75.8 lbs.	158
Yamaha	SW1820S Sub	S1750	Two 18-in.	25 Hz-100 Hz	400W	101 dB	8 ohms x 2	28 1/4 x 42 1/4 x 25 1/4	95 kg	159
	S1525S	S1595	15-in. coaxial	45 Hz-18 kHz	160W (Lo), 50W (Hi)	99 dB	8/16 Lo/Hi	17 1/4 x 21 3/4 x 13 3/4	36 kg	160
	SM1525	S1495	15-in. coaxial	60 Hz-18 kHz	160W (Lo), 50W (Hi)	99 dB	8/16 Lo/Hi	17 1/4 x 21 3/4 x 16	34 kg	161
Yorkville	YS-115M	NA	15-in./horn	70 Hz-16 kHz	200W	101 dB	8 ohms	24.6 x 18.9 x 22.8	49 lbs.	162
	P-15	NA	15-in./Tracrix	50 Hz-16 kHz	200W	98 dB	8 ohms	20 x 21 x 30	72 lbs.	163
	M-160M	NA	10-in./RCF	65 Hz-19 kHz	160W	118 dB	8 ohms	37 x 19.7 x 13	37 lbs.	164



# IDP is *not* a food preservative.

**I**ntegrated Dynamics Processing... the concept behind the new Symetrix 425 Dual Compressor/Limiter/Expander. Three totally *priority-interactive* processors in each of the Dual/Stereo channels provide the essential level control tools you need for any mixing, recording or sound reinforcement task. And it's dead quiet—super smooth.

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- **Transparent soft-knee compressor**
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- **Functional ease of operation**

**Set a new standard.**

# NEW GEAR FOR YOUR NEXT GIG



## Ross Is Boss

Ross Systems has introduced the RCS series of mixing consoles, available in 8-, 12-, 16-, and 24-channel configurations. All of the consoles include discrete studio-grade microphone preamps that utilize a four transistor quasi-Darlington topology to achieve an EIN specification of -130 dB. (In other words, these inputs are quiet. damn it!) A switchable 48V Phantom power circuit is incorporated into each unit to allow for use of remote condenser microphones without an additional power pack. The RCS series consoles feature a versatile three bands of EQ with center frequencies at 80 Hz, 1.8 kHz and 12 kHz. Three auxiliary sends are also included, with a monitor and two stereo auxiliary returns rounding out the units' connection capabilities. Prices for the consoles are as follows: the RCS802 (pictured) @ \$599.95; the RCS1202 @ \$799.95; the RCS1602 @ \$999.95; and the

RCS2404 @ \$1250. For more information, contact Ross Systems at 1316 E. Lancaster Ave., Fort Worth, TX 76102. Tel: 817-336-5114. Circle EQ free lit. #177.

## RUGGED RAMSA

If it's a rugged, wide-range compact system you're searching for, then Ramsa's T-Series trapezoidal speakers are sure to fit the bill. With a sound quality comparable to that of the finest studio monitor loudspeakers, the T-series units feature spherical high frequency waveguides (patent pending), which deliver cleaner, more accurate sounding reproductions with high-efficiency compression drivers. The Ramsa T-series speakers are also



noted for their careful design and integration of low and high frequency components. Finally, the speaker systems have been designed to achieve optimal efficiency and ripple-free constant directivity from one octave below the crossover to the highest audible frequency. For more information, contact: Panasonic/Ramsa, One Panasonic Way, 2A-2, Secaucus, NJ 07094. Tel: 201-348-7846. Circle EQ free lit. #178.

South Berendo Avenue; Gardena, CA 90247-2023. Tel: 310-715-1537. Circle EQ free lit. #179.

## HIGH OUTPUT

The KD-14 and KD-17 12-inch and 15-inch passive radiators from Klipsch are designed specifically for the high-output needs of pro sound. These speakers incorporate the latest materials, including Kevlar composite for the cones, for



rigidity, and a lightweight rubberized plastic for the surrounds that allows up to 1.2 inches of peak excursion. The radiators can move a lot of air without the noise associated with vented designs. The surrounds also stretch, which can reduce the possibility of woofer over-excursion. According to the manufacturer, passive radiators don't suffer from port turbulence and are less noisy than ports. They allow more freedom over vented designs because they are not limited to the mass compliance of air like vents are. In addition, the passive design concept produces an enclosure-extended low-frequency response from a smaller, lighter enclosure than can be achieved with traditional designs. For more information on these products, contact Klipsch & Associates at P.O. Box 688, Hope, AR 7180. Tel: 501-777-6751. Circle EQ free lit. #180.

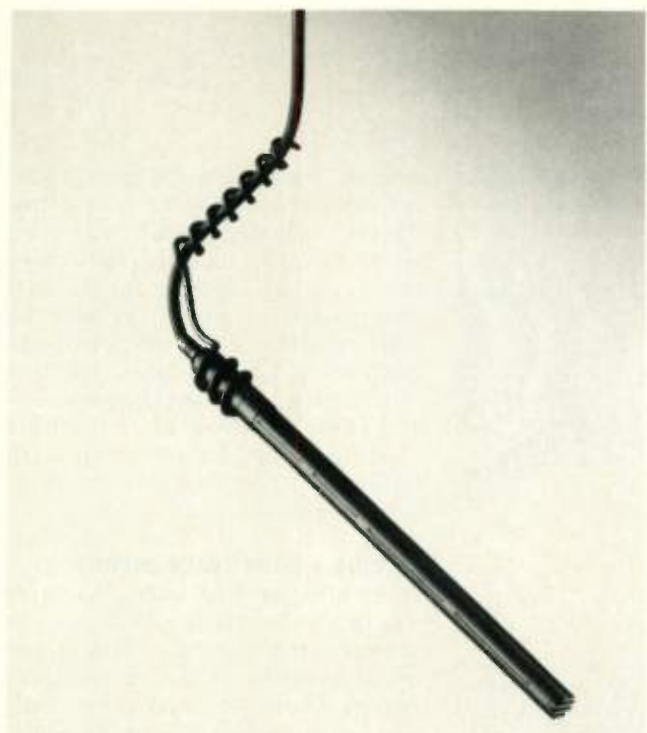
## LOOK MA! NO WIRES!

Epi•graf has announced the introduction of the InfraMIDI Equator™, the world's first MIDI-controlled infrared sampler. In addition to operating all brands of infrared (IR) remote-controlled equipment, the InfraMIDI Equator™ connects like a music keyboard



but performs like a smart IR remote control center. Basically a sampler that samples infrared waves instead of audio waves, Epi•graf's unit can save up to 120 commands in a 10-yr battery-backed memory. It should be noted that the InfraMIDI Equator™ is the only device capable of automating operation of IR remote-controlled media through use of MIDI. For more information, write: Epi•graf, 13623





## HAPPINESS IS A WARM SHOTGUN

From Audio-Technica's Engineered Sound series is the AT933R/ML MicroLine miniature shotgun microphone. Output is 15 dB higher than that of conventional miniature condenser mics. The AT933R/ML offers high signal-to-noise ratio for distance miking, and, despite its diminutive size, the narrow acceptance angle can solve a variety of difficult sound pick-up problems. The unique line-plus-gradient design is scaled to provide a polar pattern normally found only on much larger microphones. An included hanging bracket allows the MicroLine to be hung unobtrusively over vocal groups, acoustic ensembles, etc. The AT933R/ML is phantom powered, 9 to 52 volts DC, as is its sister model, the AT933PM/ML, which is designed for more perma-

nent installation purposes. For further information, contact Audio-Technica U.S., Inc., 1221 Commerce Drive, Stow, Ohio 44224. Tel: 216-686-1600. Circle EQ free lit #181.

## GETTING AHEAD

The beyerdynamic HEM 190 and HEM 191 (pictured) are, respectively, cardioid and directional electret condenser mics for use in



hands-free applications such as drumming, keyboard work, etc. These new mics are mounted on extremely thin and very flexible goosenecks, and both mics are supplied with a headband for mounting to Beyer DT 100 and DT 150 headphones. Frequency response is between 20 Hz and 20 kHz and these mics operate on phantom power (8 to 52 volts). Output is via a three-pin connector. For more information, contact beyerdynamic, 56 Central Avenue, Farmingdale, NY 11735. Tel: 516-293-3200. Circle EQ free lit. #182.

## SWINGING GATE

The RSP Technologies Studio Gate is actually four complete gates with individual range controls for threshold, hold, and release



functions. Individual in/out switches and LED indicators are provided along with +4 dB or -10 dB operating level reference switches. The Studio Gate works well in many applications, and is at home on the road as it is in the studio. According to the manufacturer, the Studio Gate's strongest feature is sheer transparency. Most any gate will turn on and off providing a cleaner source, but the audio may suffer due to poor trigger times, pops, or glitches due to switching functions and noise-floor modulation inherent in expander designs. The hold control is ideal for gated room effects on drums and minimizes erratic triggering that can distort or cause "chattering." For all the details, contact RSP Technologies, 2870

Technology Drive, Rochester Hills, MI 48309. Tel: 313-853-3055. Circle EQ free lit. #183.

## ALL TOGETHER NOW

DigiTech has introduced the Vocalist II, a rack-mountable, portable human voice processor, specifically developed for live applications. It offers many of the features found on the Vocalist VHM5. It includes DigiTech's exclusive digital splicing system that pitch shifts basic vocal notes without adversely affecting overtones or resonance. In situations requiring extra vocals the Vocalist II offers 99 user-definable and restorable factory presets. It also can be programmed to change chords automatically in synchronization with a drum machine or MIDI sequencer, and it's capable of storing virtually unlimited-length song lists of sequenced harmony chord changes. An included 13-button footswitch, the Model FS-100, is configured to allow selection of a song's verse, chorus, or bridge. In addition, an editable harmony library, with intelligent chordal, scalar, and chromatic harmonies, is provided. Harmony volume can be programmed, as can the speed, depth, and attack of vibrato. A built-in preamp and a mic jack are included as



well. Retail price is \$799. For further information, contact DigiTech, 5639 South Riley Lane, Salt Lake City, UT 84107. Tel: 616-695-5948. Circle EQ free lit. #184.

# Movin' On Up



Illustration by Normal Rockhard

Sooner or later you'll require the services of a larger outside studio, so here's how to make the transition

BY BOB ROSS

ONE OF THE obvious advantages of your own private studio is convenience. The comfort of working at home or in a familiar space, the low pressure, low rates (if any), round-the-clock access, are all reasons why personal project studios have proliferated in recent years. The disadvantage is, of course, the limitations imposed by average project studio facilities. Restricted real estate and restricted budgets are only two such limitations. At some point you are going to be involved in a recording situation that will require capabilities your studio cannot supply. This may warrant transferring the project to a commercial recording facility. (In the

interest of simplicity, I'll refer to project studios vs. commercial studios. This is to differentiate between smaller project facilities that serve the needs of creative musicians, songwriters and producers, and the state-of-the-art complexes whose existence is revenue-driven.) In this article I'll address the preparations and considerations you should be aware of when transferring work from the project studio to the commercial environment.

## KEEPING A GOOD TRACK RECORD

When bringing your multitrack masters to another facility for mixing or overdubs, the most important preparation is thorough documentation. Provide a complete track sheet. Indicate which instruments are on which tracks. If a track contains several different instruments, list their entrances chronologically in minutes/seconds. Mark the takes that are keepers. Ideally you'll have decided which are the final takes before you move to a new facility, for economic efficiency; but don't rule out the possibility of discovering some magic in an alternative take while you're mixing. Indicate SMPTE frame rate and start time. Was noise reduction used? On all tracks, or just selected tracks? Document that. It doesn't hurt to indicate what type of tape machine was used, either. No one ever complained about being given too much information on a reel of tape.

Test tones are a necessity when moving a tape between studios. These allow the engineer to calibrate the playback response of the multitrack to the machine on which the tracks were originally recorded. At the start of a reel, print 30 seconds each of 1 kHz, 100 Hz, 10 kHz, then 1 kHz again, all at 0 VU. Then document that!

MIDI sequences should be documented, too. Make a list of the tracks contained in a sequence, what instruments they play, what patch they start with, and which voices show up on which outputs. (See below regarding using the commercial studio's MIDI gear vs. your own equipment.) Go through your tracks individually, both

aurally and visually, and remove unnecessary data that could cause problems later. And back up your sequences! Bring two copies on separate disks to the session; leave a third disk at home.

If you'll be recording live musicians in the commercial studio, be sure they are rehearsed, or at least provide them with rough tapes and charts of the material well in advance of the session.

**SHOPPING LIST**

Use your ears. If you're looking for a facility to mix in, find some recordings with killer mixes and note where they were mixed. If you're looking for a facility to track in, do similar listening. While this is a slight oversimplification (it doesn't take into account financial or geographic realities), it does give you an idea of what you're trying to achieve. What techniques were used on those recordings? Look for a facility with those capabilities. What equipment was used? Look for a studio in your area with a comparable inventory. Some considerations:

**Monitors** — High-resolution reference speakers will be a major asset to recording and mixing. They allow you to make more critical decisions and more precise moves; they reveal what's really going to tape. These days engineers rely primarily on the recent generation of active console-mounted near-field monitors. Speakers such as Meyer HD-1's and Genelec 1031A's are fast becoming industry standards for discriminating listening.

**Outboard Gear** — Control rooms can be stocked with scores of compressors and digital effects; the type of music you're producing will determine whether this is a necessity or a luxury. For pop, dance, R&B, or other contemporary electronic music, a plethora of outboard effects is mandatory for competitive, cutting-edge mixes. Conversely, if your tunes consist solely of acoustic guitar and vocals, a dozen harmonizers will probably be overkill. If you'll be tracking at the commercial studio, especially with a live rhythm section, a varied abundance of dynamics processing is valuable. Check and see if the full complement of processing is included in the room rate, or if there is an additional rental surcharge for various pieces of gear.

**MIDI Gear** — If you've sequenced virtual tracks that you plan to sync to tape during the mix, you might consider using the studio's arsenal of MIDI instruments rather than the synthesizers with which you created the tracks. High-end synths and samplers are typically quieter than the lower-cost units found in many project studios, and their comprehensive programming capabilities can yield more distinctive and diverse sounds. However, it may be disadvan-



tageous to use different instruments. Be aware that virtual tracks created with your MIDI rig will respond differently when played back through a dissimilar sound module. Note velocity and durations may have to be edited, tracks may have to be shifted and any nested patch changes will have to be remapped in order to get the parts to sound "correctly." Allot time for this — you can't just take a string track created with, say, a DX-7 sound  
*continued on page 112*

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# Terminate Your SCSI Problems

## From SCSI Hell To Heaven

BY DAVID FRANGIONI  
AND CRAIG ANDERTON



**T**he SCSI (Small Computer System Interface) bus allows for high-speed data transfer between computer peripherals (hard drives, samplers, CD-ROMS, etc.) and SCSI-equipped computers, such as all Macintoshes since the Mac Plus. The SCSI bus starts at the computer and “daisy-chains” to other peripherals (see fig. 1 for David Frangioni’s setup, which is typical of many SCSI systems). If a SCSI device has two SCSI connectors, they are interchangeable — the extra connector is there to pass the signal along to the next device in the chain.

There are two types of common SCSI connectors: standard 50-pin SCSI connectors and smaller 25-pin DB-25 connectors. You may need an adapter cable with each end having its own connector type to hook up particular devices to a SCSI system.

SCSI can be quirky, since several aspects of its operation are critical. The following tips should help you get a SCSI system up and running in no time, or troubleshoot a finicky system.

### LET’S SEE SOME ID...

Up to seven external devices can connect to a SCSI system. Never set two devices to the same ID, as this will

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scramble data, keep each ID unique. The Macintosh CPU is always ID 7, so the other IDs can range from 0 to 6. Devices can have a fixed SCSI ID or be user-settable; the latter may require opening up the unit and setting dip switches or moving jumpers, although you may be able to select the SCSI ID from the user interface, as you would select a MIDI channel. In units with internal hard drives, the CPU and hard drive will have their own IDs. Here are some typical default device IDs:

Akai S1100 CPU, 5 (user-settable ID in software); Akai S1100 int. hard drive, 6 (user-settable via internal jumpers); E-mu EIII CPU, 1; E-mu EIII internal hard drive, 5 (user-settable ID in software); Ensoniq EPS and EPS 16 PLUS, 3; Kurzweil 2000, 6 (user-settable ID in software); Macintosh int. hard drive, 0; Peavey SP, 0 (user-settable in software, default via internal jumpers); Peavey SX, 0 on power-up (user-changeable in software); Roland S770/S750 CPU, 7 (user-settable in software); Roland S770/S750 int. hard drive, 0 (user-settable in software).

**TERMINATOR TWO (NOT THREE!!)**

A SCSI system moves up to 12 million bits per second, making it more like a radio frequency system than an audio one. A terminator is a (usually passive) electronic circuit that helps maintain proper bus impedances, reduce standing waves, and ensure proper voltage levels on the bus. Terminators should be present at the physical beginning and end of the chain (beginning and end has nothing to do with ID numbers, but rather with the location in the chain — see fig. 1).

With two or three external devices, you may not need to terminate the end of the chain, but this is still good practice. There should never be three terminators in a SCSI chain since this could draw excess current from the SCSI interface chip and fry it (sometimes meaning an expensive motherboard replacement).

The manual for a device will tell you whether it is internally terminated (which arrangement can be either permanent or removable), or unterminated. For example, the Macintosh

hard drive is internally terminated, as is the EPS. Therefore, in a system with a Mac and EPS, the EPS would be the last device in the chain, and all intermediate devices (hard disk, etc.) should be unterminated.

External terminators are available from computer supply stores for devices that are not internally terminated. The safest approach is to leave all external SCSI devices unterminated (if possible), and add an external terminator to the last device in the chain (remember, the computer is the first device in the chain and will already be terminated).

**THE SPECIAL FX**

The Macintosh IIfx plays by its own set of rules and this includes operation with SCSI. You must use the FX external filter (a black, 50-pin device that looks like an external terminator) on the last device in the chain and the FX internal filter on the motherboard. Using the EPS or EIII on the end of the chain with no filter, however, seems to work just fine (which is fortunate, because these devices have 25-pin SCSI ports, and there is no commercially available 25-pin filter for the fx).

Concerning the internal filter, put it between the hard drive SCSI cable and the drive itself. If you do not have an internal hard drive, then put the filter between the SCSI cable (going to the motherboard) and the terminator.

**THE CASE OF THE MISSING CARTRIDGE**

If your SCSI chain includes removable drives (SyQuest, optical, etc.), keep a cartridge in the drives at all times. This is especially important if you are recording to hard disk. Many times you'll see the drive light blink with a Mac SCSI system; this is because the Mac has branded the drive as one of its own (usually through an INIT) and is looking for the media in the drive. This could cause errors in recording or playback of digital audio because the Mac will skip as the result of timing errors. Insert the cartridge and let the Mac mount the drive; if this doesn't solve the problem, remove any system folder INITs pertaining to the removable drive, then restart the Mac.

**CABLE CONSIDERATIONS**

Use only cables designed for SCSI applications. Other cables may be physically compatible (such as those

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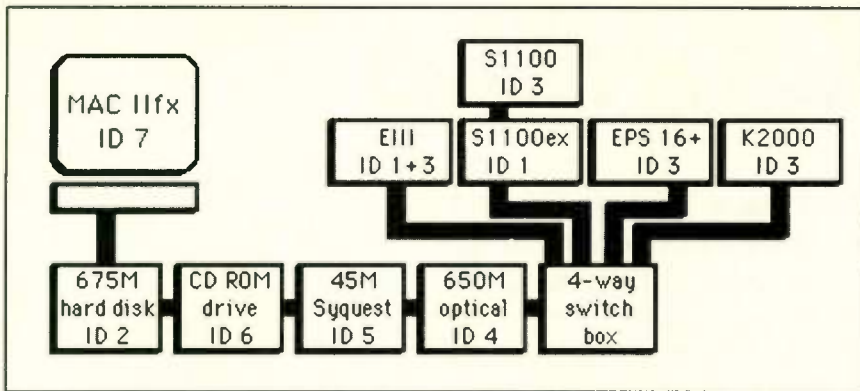


Figure 1: David Frangioni's SCSI system. The switch box selects which sampler will access the removable drives (CD-ROM, 45 Meg, and Optical) as well as talk to the Mac for high-speed sample transfers.

designed for printers), but will probably lack the shielding needed for SCSI systems. SCSI cables are delicate; avoid right-angle cable runs or bends, and always have spare cables handy. Keep the total length of the bus as short as possible. Problems can arise with a 10-foot bus, and anything more than 20 feet is asking for trouble.

#### TURN IT OFF!

Turn off all power before connecting or disconnecting SCSI cables. But even with power off, if you build up a static electricity charge and touch a SCSI cable connector, you could zap the circuit to which it connects. Never touch the exposed metal pins on a SCSI cable if it's plugged into a SCSI device. Touch something metal (to discharge static electricity) before connecting or disconnecting cables, and handle the cables only by their plastic sheaths.

#### TURN IT ON!

The power-up order is important. Turn on peripherals first (let devices such as CD-ROMs and removable drives come up to speed before turning on the next device), then turn on the computer. Some devices have particular needs. For example, the EPS 16 PLUS scans the SCSI bus to check whether other devices are present, so it is generally turned on last (but then restart the Mac after turning on the EPS so that it *seems* as if the Mac is the last device to be turned on). Sometimes turning on devices in a different order will solve SCSI problems when devices don't mount.

Note that all SCSI devices connected to the bus must be turned on, whether they're being used or not.

#### MOUNTING RELUCTANT DEVICES

Sometimes the Mac won't recognize a device connected to SCSI, even though it's turned on and present. Use a software accessory such as Apple's HD SC utility (part of the System Utilities disk), SCSI Tools, or SCSI Probe to prod the SCSI bus into recognizing and mounting all devices connected to it. Sometimes changing ID numbers can make a difference, as well.

#### SERVING TWO MASTERS

You generally can't share a hard disk between a device like a sampler and computer because each requires a different disk format. You could use two different hard drives, or a removable drive with cartridges formatted for the different devices.

#### THE BIG SWITCH

If you have several devices with internal termination that need to go at the end of the chain, use a SCSI switch box (available from Global Computer Supplies, 800-845-6225, for approximately \$60) to switch different devices onto the bus.

#### IN CONCLUSION...

It may take a while to sort out the proper cabling, turn-on order, ID settings, and so on and get a SCSI system up and running. But once you do, SCSI can be a joy if for no other reason than because of how fast it lets you transfer samples compared to MIDI sample dump standard devices. Good luck!



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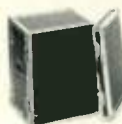
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EQ FEBRUARY 91

# Soothing Scratchy Faders

**S**cratchy faders. Who doesn't have this problem? A recent console overhaul led me to a conversation with a fader manufacturer whose suggestions saved money and produced great results. Before giving away the secret, let's look at what causes fader malfunction, at how to extend the Mean Time Before Failure (MTBF), and at what it takes to bring tired faders back from the dead.

To maintain their performance, faders need a little TLC and a safe environment

BY EDDIE CILETTI

## WHAT'S INSIDE

The two key component parts of a fader are its conductive element (made of either plastic or carbon) and metal fingers called "wipers." The element forms a "voltage divider," meaning the wipers take a percentage of the audio signal, depending on location.

## WHAT'S OUTSIDE

Liquids, dust, tobacco, marijuana artifacts, cigarette ash and hair will unfortunately find their way inside

your faders. Here's some nearly free advice (you did pay for this magazine, didn't you?):

1. No smoking, eating or drinking near the equipment.
2. Cover the equipment when it's not in use.
3. Change the air conditioner's filter regularly.

Following these suggestions will increase the MTBF and keep maintenance costs down.

## WAY DOWN INSIDE

Any debris that makes its way into the fader housing will eventually get onto the conductive element and in the way of the wipers. This usually interrupts the signal during critical takes and mixes, and eventually decreases the life of the fader. Contact lens users know what it's like to get a piece of dirt between their eye and the lens; eyeglass users know how easy it is to scratch lenses even while attempting to keep them clean. The life of a fader is no picnic! Have respect, keep a clean house.

## SPILLED LIQUIDS

Nothing is more damaging to equipment than spilled liquids. Faders are the most vulnerable. Any liquid that is sweetened poses a special threat because once the liquid evaporates, the dried sweeteners become like glue, sometimes locking the wipers in place. When the fader is moved, the wipers can be permanently damaged. The use of a contact cleaner immediately after a spill turns the sugar into a gummy substance that is more like rubber cement, and even harder to remove.

When spills occur, remove power immediately, disassemble if possible and flush with water. Dry as best as possible and wait at least 24 hours to guarantee dryness.

## WEAK WIPERS AND WORN ELEMENTS

Fader wipers are made from resilient metals such as stainless steel or plated beryllium copper. Once fatigued, the slightest bit of dirt will interrupt the signal. Damaged or worn wipers become sharp and will scratch the

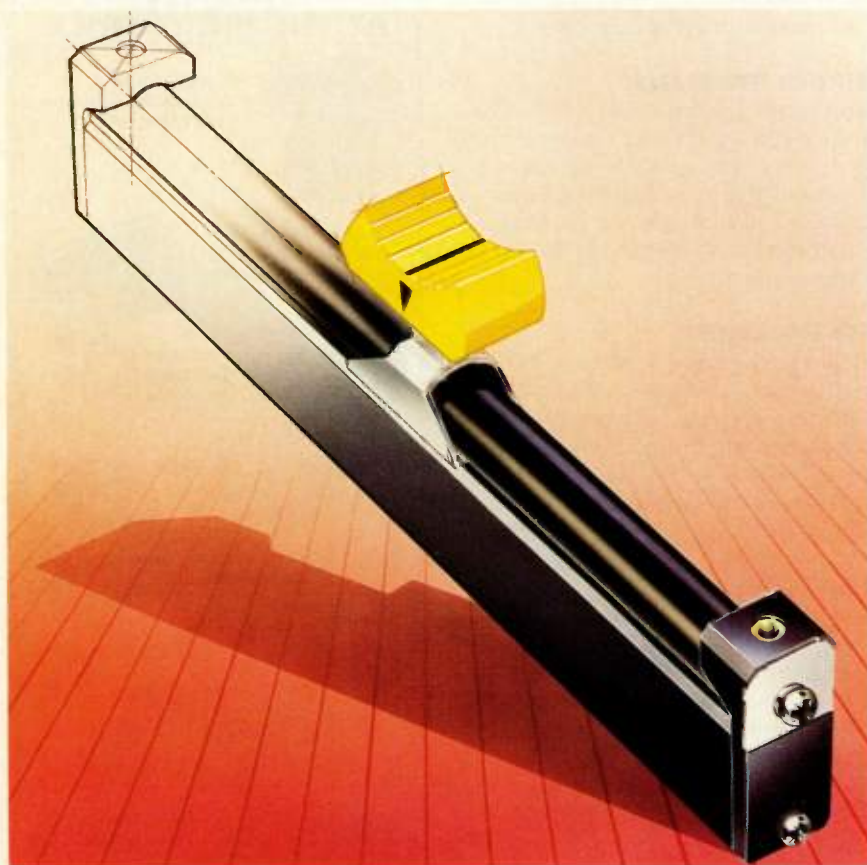


Illustration courtesy of Penny & Giles



## HOW TO DO IT

Before attempting to clean, repair or replace anything, it is important to determine exactly what type of fader you have. If you are not experienced, buy a few spares first, then feel free to experiment.

Penny & Giles faders are most popular in upper-middle to high-end consoles. Some midline manufacturers offer them as an option, while others, such as MCI, made their own faders from components made by another manufacturer. Most less costly mixers use faders by Alps or Noble.

Penny & Giles, a British manufacturer, has a branch in California. Whole faders and parts such as wipers, knobs, fascia and other hardware, plus the recommended lubricant, can be purchased directly from them. Alps, Noble and other fader manufacturers are predominantly Asian and classified as "Original Equipment Manufacturers," or "OEM." They do not sell quantities less than "thousands," nor do they sell "replacement parts." These faders must be purchased from the mixer manufacturer.

Typical P&G faders retail between \$75 and \$200 while OEMs range from \$2.50 to \$75. There are many different models, whose sizes, levels of precision, life expectancies and manufacturing methods all contribute to the cost. *It is highly recommended that you have a few spare faders.*

In most cases it is more effective to replace rather than repair the OEMs owing both to the cost of that type and the amount of labor required to service some of the inexpensive mixers. If you are like me, however, curiosity might just put you in the salvage business.

Here's a fader cleaning checklist:

- ✓ Remove faders from the equipment.
- ✓ Establish a clean, well-illuminated work area.
- ✓ Put all screws and hardware in a safe place!
- ✓ Be very careful not to damage the fader wipers during disassembly, cleaning and reassembly.

✓ Use cotton swabs, cloth and water to clean the wipers and the conductive element. Be very careful to clean the wipers in one direction only, away from the point where they have been secured.

✓ Use a water-based cleaner, such as Windex, as a last resort for stubborn spills. Rinse thoroughly afterwards.

✓ After a thorough drying, apply silicone lubricant sparingly to the conductive element and to all moving parts.

✓ After installation, use a low frequency, such as 40 Hz, to check performance. This technique will definitely help to find marginal faders.

A fader that doesn't clean up entirely after TLC may have wiper spring fatigue. P&G has replacements for under \$15, a solution that yields remarkable results. Be sure to check that the wipers are properly aligned with the element. If none of this helps, the element is either excessively worn or damaged.

A few last words about the general use of contact cleaners...

There are few environmentally safe contact cleaners. If you must spray, do so sparingly on components, such as pots and switches, that can't be disassembled for cleaning. When water-based cleaners don't cut it, denatured or low-moisture isopropyl alcohol will do the trick safely. Keep in mind that some sprays rob faders, pots and switches of important lubricants. Oily sprays leave a residue that attracts dirt and many may not be compatible with the conductive material. The use of such sprays might get you through a problem, but eventually that troublesome fader will have to be properly cleaned or replaced. Some clients have told me that they have attempted to clean pots by spraying "through" the top panel hoping that the "juice" will migrate to the problem.

Faders, parts and lubricant can be ordered from P&G directly at: Penny & Giles, Inc., 2716 Ocean Park Blvd., #1005, Santa Monica, CA 90405; tel: 310-393-0014, or directly from your console manufacturer.

conductive element causing permanent damage. They can, in some cases, be replaced. More on that later.

The conductive element is rarely repairable. It can be damaged by bent or excessively worn wipers, and its life can be shortened by the presence of debris.

### THE PROJECT

I recently overhauled the faders on a 22-year-old Neve console for producer Bill Laswell and bassist Jonas Hellborg. Upon inspection, I found the wipers were so worn down that some barely reached the element. They had also become very sharp! The faders, made by Penny & Giles, were of various vintages and all were in urgent need of attention. Replacement would be costly, so I consulted P&G to find out the best way to bring their children back to life.

### MANUFACTURER'S RECOMMENDATION

P&G recommended that their conductive elements be cleaned with distilled water and lubricated with silicone oil. Surprised? How many of you spray a contact cleaner into your gear for that "quick fix?" You know better now...

Cleaning alone was not going to solve the damaged wiper problem. So, I collected the model numbers of all of the various faders and ordered new wipers for the whole console. After proper cleaning, lubrication and wiper replacement, performance of all the faders was significantly improved. This was later confirmed by engineer Bob Musso, who was the first to use the console after the overhaul. He was so impressed that he called just to let me know that he could actually hear the difference. Go ahead, Bob, make my day!

*Eddie Ciletti wrote his first article on fader maintenance way back in 1976 when he was employed by MCI (now Sony). He is currently president of Manhattan Sound Technicians, an audio services company that specializes in rebuilding vintage audio equipment.*

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# Reach For The CD Stars



CD samplers and effects libraries are getting star struck as big-name players sell their sounds

BY DAVID JACOBS

**H**ow would you like Bob Clearmountain or Tommy Lee to supply some of the percussion on your next project? Maybe include some sound effects that Oliver Stone would choose for a major Hollywood production? Or how about a world-class violinist to help sweeten that soft ballad? Not in the budget? Whom are we kidding? Hey, there are some CDs you should check out, though you won't find them in Tower Records. Head to the pro audio store instead. There you'll find the abovementioned and more, and at reasonable cost, thanks to the growing choice of celebrity sound libraries.

It used to be that, on the whole, sound libraries were only capable of offering mediocre background music or analog sound effects. But today, sampled instrument sounds by the finest session players in the business are available, as are digital sound effects and high-quality production music in all musical genres.

#### YOU PLAY, YOU PAY

Libraries are essentially offered on three bases for payment: needle drop, buy out, or some form of a licensing or lease agreement. As a general rule, buy-out libraries are the least expensive way to go. These libraries sell you an entire volume, or part thereof, of catalogued music or sounds for a one-

time fee. You may then use the material as you wish and as often as you want. Figure on paying a few hundred bucks, on average.

Needle-drop libraries charge you a royalty fee every time you use them. These charges vary depending upon the use (soundtrack, record, demo, live performance, etc.), and on the amount and length of the selections involved. While needle-drop is generally the most expensive form of library, it is also often of the highest quality, used for feature film and network broadcast applications. Today, however, you can find high quality in all library types.

If you choose a library that offers its material on a licensing basis, you would have a contract specifying the type and length of use and other terms, and detailing the fees involved for the specific recording and the project at hand. Such contracts usually run for a year, but all this can vary.

As far as SFX libraries go, these are almost always sold on a one-time buy-out basis and sell for under \$500 — and sometimes for substantially less.

Who uses production music and sound effects libraries? You hear them being employed every day when you turn on your TV, see a movie or hear certain ad spots or records on the radio. Think of how much it would cost, both monetarily and logistically, if all the music and sound effects were composed and recorded on a custom basis for each and every scene or recording that's produced. Enter the production library. These companies offer all kinds of music and sound material preproduced and cataloged for easy retrieval. Some companies, such as Aircraft Music in Boston, offer packages that include sweepers and station IDs for broadcast clientele.

No matter what the recording project may be, there is a library out there that can be of benefit. For instance, The Hollywood Edge, in the town that bears its name, offers "the

best of a million-dollar Hollywood sound effects archive." Among the Hollywood Edge's clients and endorsers are Oliver Stone (*Born on the 4th of July*, *Platoon*) and Martin Scorsese (*Goodfellas*).

For a one-time fee, the *Hollywood Edge Sound Effects Edition* provides a CD library of DAT field-recorded sounds, sampled by engineers who have worked on several Academy Award-winning films. All the included stereo recordings are edited on the AMS AudioFile and mastered directly from DAT. The postproduction sound effects offered by this library had previously been locked in the vault of Soundelux Studios.

The Hollywood Edge's best-seller, *The Premier Edition*, consists of 20 CDs with more than 1500 effects on them. These effects run from a half-second to up to four minutes. For a lower cost, the company offers the *Edge Edition*, which provides 800 effects, and *CitiTrax*, which consists of ten hours of urban sound settings. So if you want to add background sound of

the quality found in *Goodfellas* or *Platoon*, you can do it without running out into the field to record them yourself.

**LIBRARIES UNPLUGGED**

Go ahead, blame it on MTV Unplugged. Recently, there has been a movement away from the synthesized sound that was so prevalent in the music of the '80s. Live musicians and more acoustic instruments are enjoying a resurgence in demand, and many production music libraries are reflecting this in their product. Whether the sounds are created using "real" instruments or created electronically, what most producers are looking for lately is a true sound — in complete music pieces, in sound effects, and in sample instrument sounds.

Q Up Arts, Aptos, CA, offers the *Heavy Hitters Greatest Hits™* drum sound library. This package provides over 400 actual licks from some of the heaviest hands in the business. Renowned session man Jim Keltner provides the clean stuff, while Motley Crue's Tommy Lee lends his explosive

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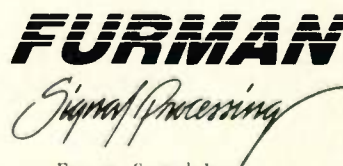
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## RESEARCHING LIBRARIES

There is a large choice of quality music and effects libraries available. Here is an abbreviated list of some of the major companies.

### Aircraft Music Library

Specializes in high quality rock sweepers and IDs for broadcast. Aircraft Music Library, 77 N. Washington St., Boston, MA 02114; tel: 800-343-2514. Circle EQ free lit. #101.

### Audio Action

Audio Action has added ten CDs of digitally recorded sound effects. Audio Action, 4444 Lakeside Dr., Suite 340, Burbank, CA 91505; tel: 800-533-1293. Circle EQ free lit. #102.

### Creative Support Services

This company has recently added two new sound libraries to its already extensive collection. Support Services, 1950 Riverside Dr., Los Angeles, CA 90039; tel: 800-468-6874. Circle EQ free lit. #103.

### DeWolfe Music Library

DeWolfe is constantly releasing new material. DeWolfe Music Library, 24 West 45th St., New York, NY 10036; tel: 212-382-0220. Circle EQ free lit. #104.

### East-West/Sound Warehouse

World's largest distributor of sampled sounds. East-West/Sound Warehouse, 1631 Woods Drive, Los Angeles, CA 90069; tel: 213-848436. Circle EQ free lit. #105.

### Firstcom/Music House/Chappell

This major industry production music consortium has complete catalogues of broadcast, nonbroadcast, commercials, programs, promos, documentaries, features and interactive video. Firstcom/Music House/Chappell, 13747 Montfort Dr., Suite 220, Dallas, TX 75240; tel: 800-858-8880. Circle EQ free lit. #106.

### Gefen Systems

Gefen Systems distributes sound effects and music software from many of the most influential libraries. Gefen Systems, 6261 Variel Ave., Woodland Hills, CA 91367; tel: 818-884-6296. Circle EQ free lit. #107.

### The Hollywood Edge

Distributes a tremendous selection of sound effect recorded by top Hollywood engineers. Hollywood Edge, 1060 Hollywood Blvd., Hollywood, CA 90028; tel: 800-292-3755. Circle EQ free lit. #108.

### Omnimusic

The Omnimusic library consists of 57 CDs in its *Professional Broadcast Series*, 17 CDs of music edits, and 12 CDs in its *OmniFX* library of sound effects. Omnimusic, 52 Main St., Port Washington, NY 11050; tel: 800-828-6664. Circle EQ free lit. #109.

### Q Up Arts

Distributes drum and sound libraries. Q Up Arts, P.O. Box 1078, Aptos, CA 95001-1078; tel: 408-688-9524. Circle EQ free lit. #110.

### Sonic Boon

This specialty company field records sound effects digitally for the action-minded producer. Sonic Boon Digital Sound Effects, 2453 East Virginia Ave., Anaheim, CA 92806-4228; tel: 714-535-3344. Circle EQ free lit. #111.

### Sound Ideas

Sound Ideas offers its *Wheels Series 5000* that provides 3000 sounds on 24 CDs. Sound Ideas, 105 W. Beaver Creek Rd., Suite 4, Richmond, Ontario, Canada L4 B1 C6; tel: 416-886-5000. Circle EQ free lit. #112.

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sounds and Alan White of Yes puts his power at your fingertips. These licks, recorded at some of the finest recording studios in the world, are available on CD and will also be offered on CD-ROM in the near future.

And Q Up also offers the *Sonic Images Library*, a collection of acoustic instruments blended with ethnic percussion, evolving synth textures, audio mood shifters, and the like. All of the sounds in this library have a 44.1 kHz sample rate and are 16-bit. *Sonic Images* is designed to operate within the Roland S-770 architecture.

Master synthesist and composer Denny Jaeger spent two years and over \$400,000 creating the most sophisticated string sample library ever available. According to the distributor, it is so startlingly real that leading composers have called it "the finest work ever achieved with sampled strings." The sounds have emotional substance and the system gives you control over tuning, the size of sections, acoustic vibrato depth, and

even the individual lengths of bow strokes and attack volumes from a keyboard. A demo CD is available.

East-West SoundWarehouse in Los Angeles is the largest distributor of sounds on the planet. It is the distributor of Prosonus, Denny Jaeger, and approximately 200 other sample collections, with a new product being released every week or so.

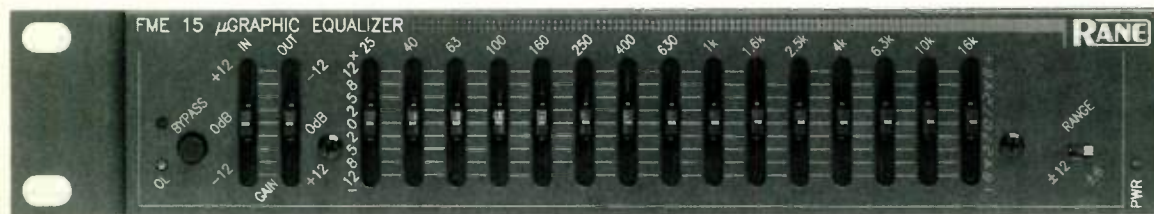
What's its biggest hit? The best selling sample collection of all time is East-West's *Bob Clearmountain Drums I* that provides percussion from virtually every banded instrument in the world — from toms and snares to bottles, sleigh bells, and tablas. Recently released is the *Bob Clearmountain Drums II* collection that features all brand-new sounds and is the first velocity-sensitive collection.

Grammy Award-winning producer Steve Levine has assembled a two-CD collection of sounds, also distributed by East-West, that includes all 88 keys of a grand piano, a full compilation of drum sounds, acoustic and electric guitar, xylophone, pan pipes, and more.

Another East-West release features EQ columnist David Frangioni of Arlington, Massachusetts, who is not only a world-class engineer, but is also the co-creator (with Rich Mendelson), of the first dance sample collection. *ProSamples 5* is an all-original collection of stereo dance loops that can be loaded into any sequencer from an optional MIDI file disk. You can then change the tempo of any loop without changing the pitch, cut and paste loops together, etc. The CD is fully indexed and even includes rhythm loops created by heavy industrial machinery. It's available on either audio CD or CD-ROM. With the CD-ROM version, 650 megs of memory, combined with a MIDI file, provides the "ultimate drum machine" in that dynamics are true and sound quality superb.

The praises of *ProSamples 5* have been sung by such top producers as Fred Zarr (Madonna, Debbie Gibson, Whitney Houston), Jeffrey Smith (Paula Abdul), and Jeff Lorber (U2, Hammer, Michael Franks), to name a few. **EQ**

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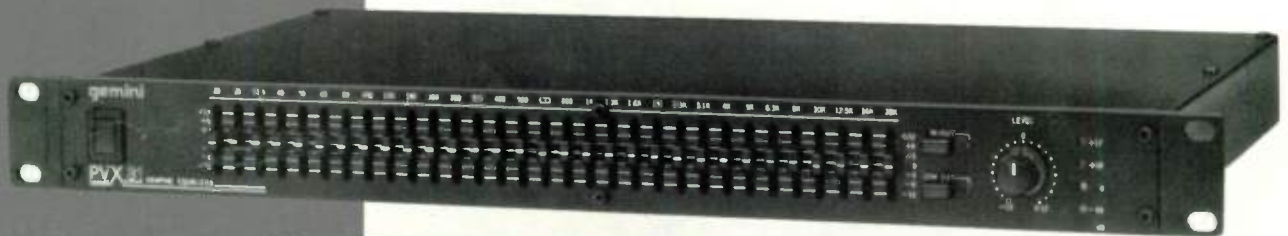


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# Fear and Loathing in Anaheim

As I write this, the end of the year looms large before me. While others, perhaps, glow with excitement contemplating the gifts that will be bestowed upon them or ponder their choice of venue for celebrating the birth of a new year, I instead contemplate the trip I will soon take to the great Southland, a.k.a. Los Angeles, to participate for the eighteenth time in that combination of trade show and carnival known as the NAMM show.

It is surprising how much importance has become attached to the West Coast show. When I first broke into the business in 1974, the winter show was the kid brother to the big show, the summer show, traditionally held in Chicago, with occasional visits to Atlanta and New Orleans. It is a measure of the movement of the geographic center of music manufacturing, which has migrated steadily to the west. In the "early days," the influence of Europe and conglomer-



Tales from the NAMM floor and what it all means, from an 18-year warrior

BY L.D. SHARP



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ate companies like Chicago Musical Instruments (former owners of Gibson among other companies) drew the show to the country's center. The ascendancy of Japan as a source of musical and audio equipment led to the reinforcement of Los Angeles as the "new" center of this type of equipment, with producers like Fender being joined both by new American upstarts (Alesis) and the U.S. bases of operation for Roland, Yamaha, Kawai, and many more.

When I first started attending NAMM conventions they were small enough to fit within the confines of the Disneyland Hotel convention area. How appropriate: a business built on dreams holding its annual confab at the Dream Palace. Even though the convention has migrated to the more spacious and ever-expanding halls of the Anaheim Convention Center, the close proximity to Fantasyland continues to provide an appropriate backdrop for this most fantastic of conventions. Anaheim deserves special mention. I pride myself in my sense of direction, but in Anaheim the built-in electronic compass in my Dodge Caravan is a godsend, since there are precious few geographical features, save Disney's Matterhorn, to provide cues. There's also the problem that every block looks frighteningly the same, with the motif of the corner mini-mall repeated just a bit too regularly for my comfort. Luckily there's the occasional shopping mall to break things up! Anaheim is also the spot where the best restaurant for conventioners, arguably, is Belisle's. Here the claim to fame is obscenely oversize portions. Coke glasses approach the one-liter size. A sundae feeds six. A side of rib looks more or less like someone dropped an entire half of a cow on your plate. And so on. So much for cultural highlights.

One bit of NAMM lore that must be mentioned: the working name for attendees of this convention is "NAMMsters." The resemblance to "hamsters" is not coincidental. From the opening moment until the last booth is struck, music dealers find

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themselves scurrying about the floor, sniffing out the great buys and innovations, and avoiding the fat cats and wolves that seek to ensnare them. The show itself has gone through several phases in my time; recent shows have reflected recessionary conditions, so the perks and goodies have been scarce, but in the past, entire orders were known to be written based on the quality of the company's tee shirt for that season, or even on the potency of the company rep's pharmaceuticals. Today's shows are hardly sober affairs; it's just that the pendulum has swung back to alcohol as the preferred form of self-abuse; normally half of the morning's shop talk is about how messed up one became the night before.

**THERE'S NO BIZ LIKE SHOW BIZ**

But beneath all of the conventioneer-ing there is a very serious business that runs in the hundreds of millions of dollars, and you as a reader of this magazine have a stake in the actions of both manufacturers and dealers. A NAMM convention is a very different affair for the end user from what it is for the dealer. A band member can stroll around the floor and glom onto the hottest new keyboard or the most eye-catching finish for a guitar, and then simply jot these items down on the shopping list for acquisition as soon as possible. An equipment dealer, on the other hand, has to navigate perilous waters; every new piece of gear could torpedo an existing product — and in accordance with Murphy's Law, you've just received a shipment of fifteen units. A second dynamic is also at work: the needs and desires of an equipment producer may be completely at odds with those of both the consumer and the dealer. My preliminary information indicates that this show, in fact, will produce a perfect example when it comes to mixing boards. Blame it on Greg Mackie; he's just been too damned successful for the other console makers to tolerate. Everybody wants a piece of the market he has so deftly defined. So just about every single manufacturer is going to show its "Mackie killer" at this show (some already have at previous shows and are getting ready to deliver them). Or if it doesn't show a "killer," it will



demonstrate some kind of answer-back product that perhaps read-justs the mix of features and price to identify a slightly different niche.

All this is healthy enough, and a natural evolution and reaction to market events. But here's the problem: exactly the same number of people are going to buy mixers. Now they have fifteen choices instead of two or three. And the dealer will go completely out of her or his mind attempting to sort out loyalties and commitments, all the time trying to figure out which supplier offers the best combination of quality components, manufacturing, and features — the combination that will best serve the needs of the customer. Needless to say, the mixing board melee is just a single example of a situation that exists with many products: In fact, that's why the keyboard market has splintered into many niche markets, without one predominant product leading the way. This is also why there are effects in every flavor from strawberry to menthol.

Another of my duties at these shows is to uncover the products that offer something fresh. After all, there was a day when there was no Alesis, and no Ensoniq; they had their coming out, and the folks who were on top of it jumped on board with their

products and haven't looked back.

So the search is always on for the hot new innovator in the industry.

Back in 1974 the door was open quite a bit wider for the garage producer to make it onto center stage. You didn't need a national ad budget, four-color separations and a computer-assisted design team to put you on the map. But there are still the innovators in the software aisles and over in the Marriot, making the niche products that have been overlooked by mass marketers.

Finally, there is the quest for the best freebie the show has to offer. It can take many forms, ranging from apparel (who could soon forget Roland's Boss socks — "Step on It") to the buffet dinner with the tower of jumbo shrimp. Who cares if you've made the wrong decision on tens of thousands of dollars worth of gear if you can proudly claim to have come home with the no-cost giveaway of the show?

And yet, when all the hoopla and frenzy die down, the equipment-buying public ends up receiving amazingly good value for the money, and retailers make the smart business decisions that keep them in business another year, so they can once again make the pilgrimage to that most dubious of shrines, the Anaheim Convention Center.

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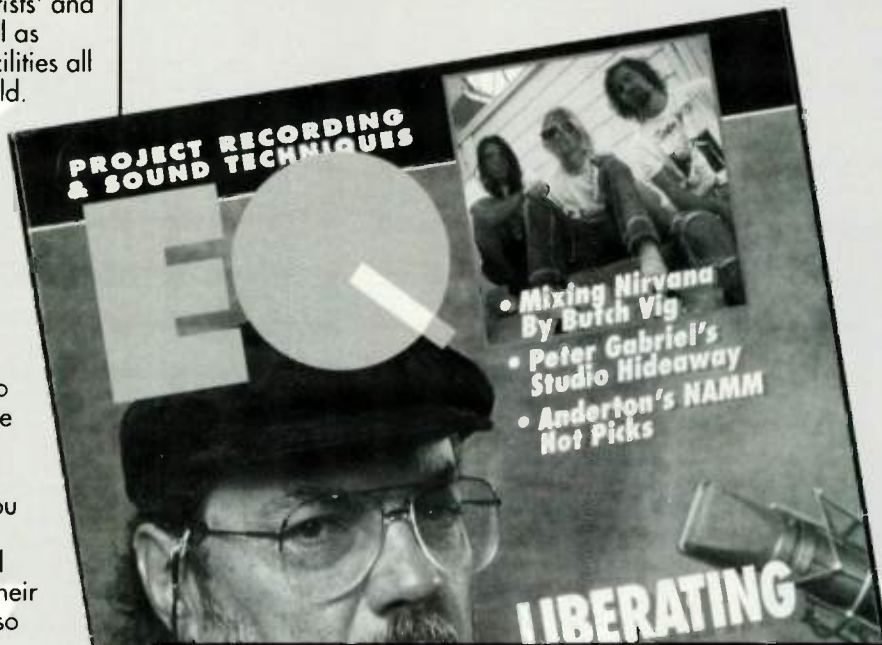
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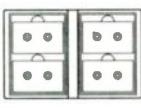
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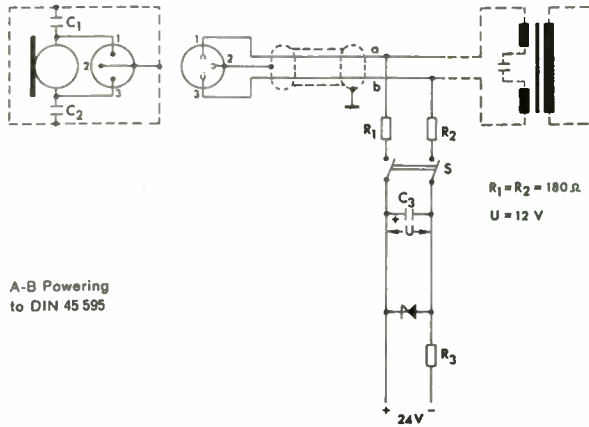
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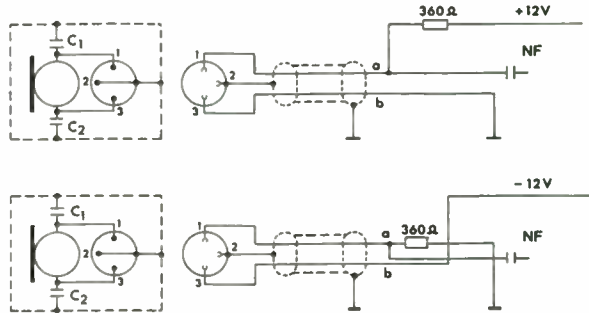
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**EQ & A**



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A-B Powering unsymmetrical connection

continued from page 19

**GETTING THE POINT**

**Q** Other than being used with a gate or compressor, how else should console insert points be used?

Sam Lester  
Goldenville, Nova Scotia

**A** Inserts are the equivalent of an access jack to various points in the signal path. Plugging into these jacks breaks the signal flow and allows you to insert a signal processor in series with the signal.

Inserts are normally taken after the equalizer. The return point varies: both prefader and postfader have their pros and cons. They are most commonly used for gain control devices such as limiters, compressors, expanders, and gates. Aux sends, which have variable levels and post-fader send options, are better suited for use with effects (reverbs, delays, etc.). Some consoles now have switched inserts so that the insert return can serve as an additional line input for the channel if gain control devices are not required.

Lewis Frisch  
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## MYSTERY MIC

**Q** I have a Neumann microphone that came from an old, portable 2-track recorder. (I know nothing else about the recorder.) The mic — the only numbers on it are "KM76" and "442" — doesn't have the standard XLR connection. What would be the wiring configuration for making a cable, and what voltage would be needed for phantom power?

Richard Vaughn  
Randolph, MA

**A** The microphone in question is a classic Neumann model KM76 from the early 1970s. "KM" is short for the German "KleinMikrofon," or small microphone, and designates a small-diameter condenser capsule. Like its popular predecessors KM56 and KM66, this model features selectable, largely frequency-independent, polar pick-up patterns — omni, cardioid, and figure eight. While this model was also available as an international version with the suffix "i," your microphone flaunts its European pedigree with the 3-pin male DIN-connector. A matching female connector should be available from most professional audio equipment dealers or distributors, particularly those who deal with European studio electronics. Note the different pin assignment when compared to XLR.

The KM76 is a member of the first generation of fully solid-state condenser studio microphones from Neumann with greatly simplified power supply requirements in comparison with previous tube models. Contemporary portable recording equipment often had stable operating voltages of approximately 12V DC available, which led to the German DIN Standard 45 495. It defines a versatile scheme for the simultaneous delivery of power to active microphones and the extraction of the audio signal, by utilizing standard 2-conductor microphone wire (even a twisted pair work) in either balanced or unbalanced configuration, and with DC-sources of either polarity versus ground. A shield around the cable serves to suppress potential interference pickup only, and will not carry any current. This method is more commonly referred to as "A-B"-powering or "T"-powering. Since there is a DC voltage differential

between the 2 pins of a microphone, caution should be exercised when attempting to connect a dynamic or ribbon microphone. Suitable in-line supplies for battery or mains power are available from the same sources as for the DIN connectors. The following drawings illustrate the simple and very adaptable "A-B"-power scheme.

A look at the electronics inside the KM76 shows a separation into three principal function blocks. A low-noise field effect transistor stage accom-

plishes the impedance match to the dual-element condenser capsule, followed by a bipolar transistor operating as a voltage-to-current converter circuit. Audio output is transformerless from a very low-source impedance. The third block consists of a DC-to-DC converter to generate the bias voltages for the capsule elements and the operating voltage for the preamplifier.

Uwe Sattler  
Technical Manager  
Neumann USA

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# Make the Most of Your Mix

I've been very fortunate in my career, having worked with some of the finest artists in many musical genres. Experience has taught me a thing or two and here are ten tips I've found to be useful. I hope you can benefit from them, as well.

1 — Number one in a mix is the balance and the EQ; the effects should come last. If you get these two factors happening, it becomes just an "add water" mix. And when it comes to the EQ, a lot of people are effective on the high and low ends, but often miss the boat on their midrange — that's where the power of the track is.

2 — Every song is different and should be approached that way. Avoid getting caught in one way of doing things. For instance, you might not want to do your typical pop ballad techniques such as an eighth-note delay on a snare or flanging the bass all the time. Try something new and different for each song.

3 — Clarity! You have to be able to

hear every single thing. Each sound is of equal importance, so as you're going through your mix you need to devote enough time to each sound — from the high-hat to the vocal. And while you're working on the instruments, keep bringing the vocal in to make sure that the mix isn't getting cluttered.

4 — Don't force something to fit. If it's not working, you probably don't need it at all. If a clavinet part is cluttering a funky guitar (since they're both within the same frequency register) you don't need both at the same time. Maybe you can mix and match them by bringing one in here, the other one there, and so on. Also, if two instruments are playing within the same range and they're doing a funky rhythm such as a slap, the two may not be tightly in rhythm with each other, and that will also cause clutter.

5 — Stay away from wide stereo reverb. It gives the mix a very two-dimensional sound. Washing an instrument in stereo reverb causes a loss of clarity.

6 — Don't ever let a listener get bored. One of the most important

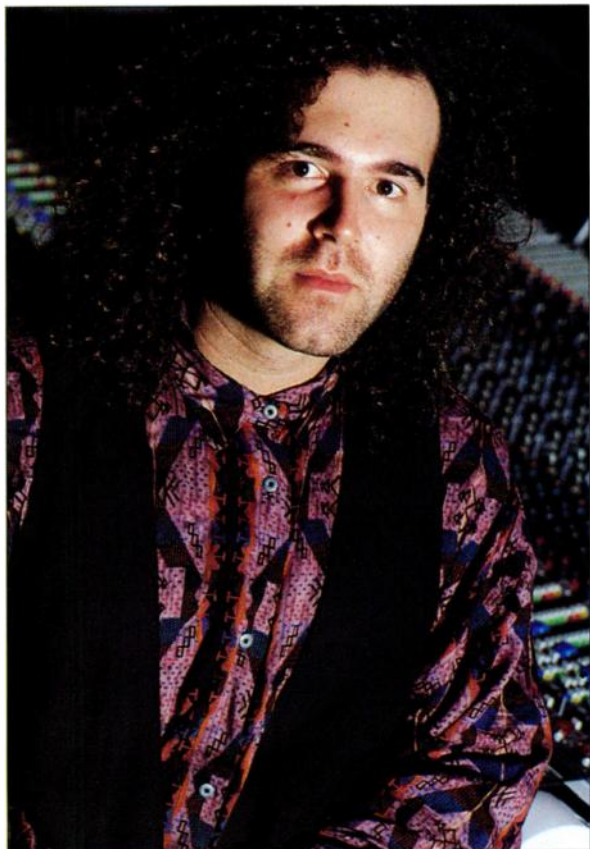
factors in maintaining interest is the dynamics and how you use them to make the track breathe. For instance, accenting a certain guitar riff, or even just a particular chord between a vocal line, can add breath to a track. Or bringing up a pad and cross-fading it into a synth line. As the pad's coming down, the synth line is coming up, and then you're right back into the vocal. Such techniques help to keep it interesting.

7 — One thing I do quite often that may sound surprising is constantly keep changing the lead vocal sound. This can have a hypnotic effect. Of course it has to be done *very* subtly. On Roger Daltry's new album, while I was laying down the lead vocals, I would picture him singing live on a stage and I would imagine how he might turn away from the mic at certain points and I would simulate that. For instance, I'd bring up a short reverb and a slap-back delay, then I'd fade his vocal back and bring the effects up.

8 — Don't let your outboard gear manipulate you. If you're not sure what you want, or don't know how to get what you're hearing in your head, you can start spending a lot of time letting the gear take over.

9 — Mix with your ears — not with your eyes. Don't worry about the meters. Push the gear to its limits, because that's the way to bring down your noise and get the best signal-to-noise ratio. If you're pushing the input as hard as you can, you can bring the returns down. And if it goes in the red, that's okay — because it's not overloading as long so you don't hear it overloading.

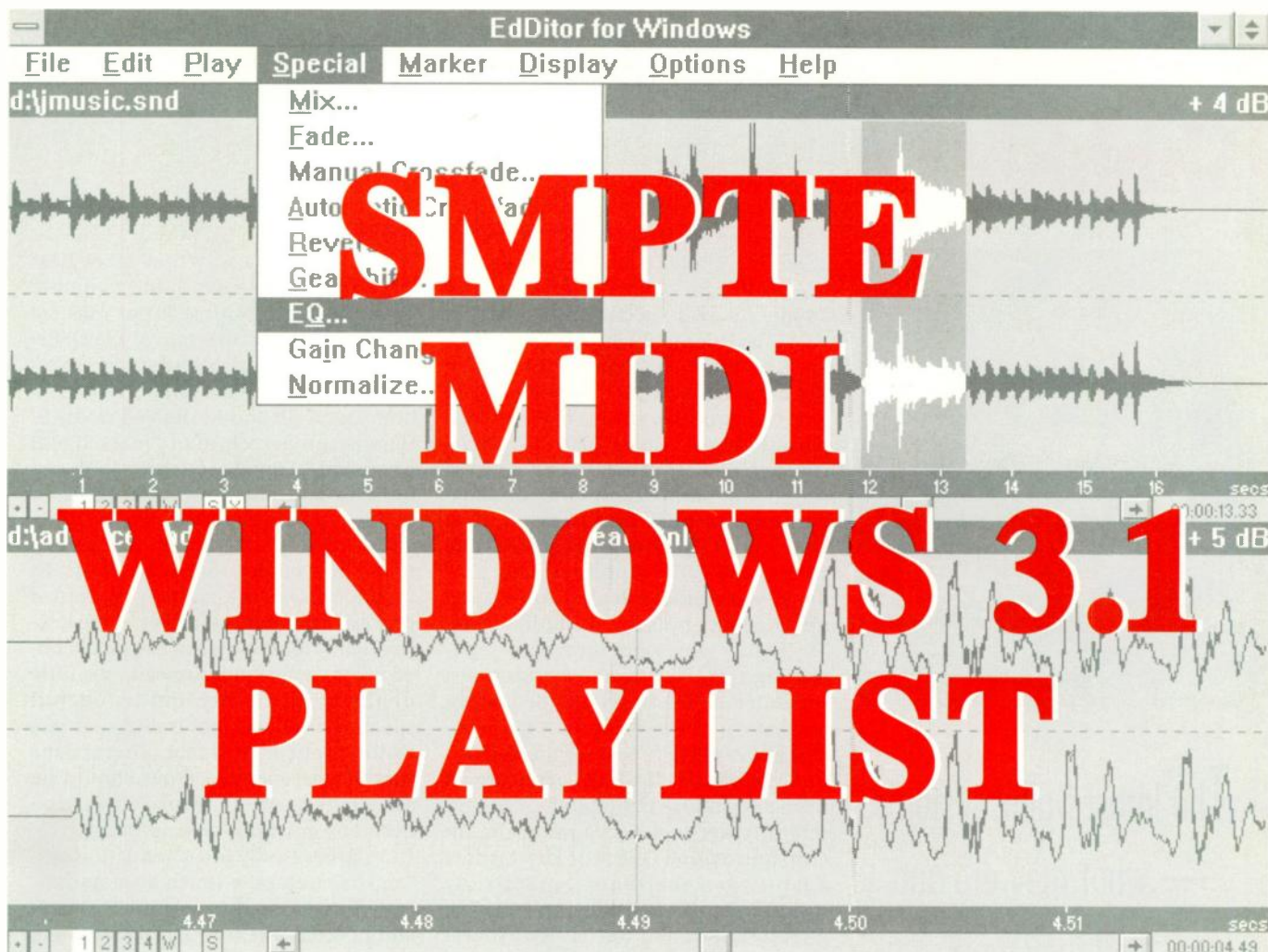
10 — Don't be afraid to take a chance. You never know when you might do something that you think is a mistake and have something good come out of it. I've never been afraid to make mistakes and some of my best discoveries have come out of them.



## Ten tips on making masterful mixes

BY JONATHAN  
"JONNIE MOST"  
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# Shhhhh!



Photo by Peter Monroe

## The latest Dolby systems — what they are and how they work

BY LEN FELDMAN

In my last column we began talking about Dr. Ray Dolby's latest contributions to noise reduction — his Dolby SR System and its consumer version, Dolby S. I ended that column by noting how effectively Dolby SR increases dynamic range — as much as 24 dB at high frequencies and 10 dB at low frequencies.

### HOW DOLBY SR WORKS

Like the human hearing system, Dolby SR responds to changing amplitudes in various regions of the frequency spectrum of an audio signal, rather than to instantaneous variations in the overall signal waveform. During recording, the primary action is to apply the highest usable additional gain to those spectral or frequency regions that contain low- and medium-level signal components. During playback, an exact complementary attenuation is applied. To accomplish this sophisticated and dynamically

changing signal processing routine, the Dolby SR circuit continuously adapts its own spectral transmission characteristics to those of the signal.

The more sophisticated Dolby SR process from which Dolby S was derived employs three level thresholds at -30 dB, -48 dB, and -62 dB. As the signal level drops below each of these, a separate gain control stage comes into play in a process that Dolby calls "action staggering." The sum of the actions of the stages produces the overall effect of the system on low-level noise and nonlinearity. The higher two stages operate in separate high- and low-frequency sections, separated at 800 Hz, while the lowest-level stage operates only at frequencies above 800 Hz. Each of the five frequency bands of SR incorporates a fixed and sliding-band filter. These filters interact to achieve an optimum configuration. Overall, the circuit adaptively constructs a practically infinite set of spectral transmission characteristics to optimally protect the program signals being recorded.

The circuit can be thought of as a microcomputer that is programmed with relevant information about the properties of analog recording and human hearing and that continuously adapts itself to the spectral content of the signal. The output of this processing circuitry can be thought of as a three-dimensional function of time, frequency, and the changing spectral properties of the signal it protects. While the system is similar in many respects to a Dolby C-type noise reduction encoder, it differs in several important respects. Spectral skewing is provided at low as well as at high frequencies to improve tape overload characteristics in those critical areas.

High- and low-level processing stages are used for high-frequency signals, as with C-type noise reduction systems, but both stages have fixed and "sliding-band" operation. A low-frequency band has been added to provide noise reduction in the low-frequency range and to spectrally balance the encoded signal to improve compatibility. All of these stages are controlled by a sophisticated "modulation con-

trol" circuit in a way that takes best advantage of the available dynamic range for a given program or musical selection. A block diagram of the Dolby S-type processing is shown in fig. 1.

One of the fundamental ideas in both Dolby SR and its derived Dolby S-type is the principle of "least signal treatment." Signal processing is always held to the minimum required to obtain an ideal recording. This approach results in fewer audible artifacts than might otherwise occur. In fact, because of the carefully controlled processing and the addition of the low-frequency fixed band, an S-type encoded signal, while compressed, has little dynamic instability and its overall spectral balance is not unlike that of a Dolby B-encoded signal. That means that S-type encoded tapes should be able to be successfully played with no decoding or with B-type decoding.

Earlier Dolby noise reduction systems treated tape noise as a statistically fluctuating but essentially level-stable phenomenon. In fact, though, the recording process on tape can cause the noise to increase in the presence of a signal (modulation noise), and very high signal levels can momentarily cause tape saturation or clipping, adding nonlinearities to the noise that appear as spurious harmonics and intermodulation products. By examining the effect of noise in the frequency domain instead of in the time domain, Dolby was able to indicate the existence of a means of further improving the recording process — one that had apparently been unnoticed until then.

The signal processing task for analog recording is redefined by Dolby as the treatment of those spectral or frequency regions not occupied by the signal, and not subject to masking, in such a way as to protect the signal from any form of noise or nonlinearity. Dolby Spectral Recording, from which S-type is derived, is a realization of these new possibilities for signal processing. Figures 1A, 1B, and 1C will help illustrate its action in simplified form. In these figures, a curve traces the increased gain applied to a low-level signal by the



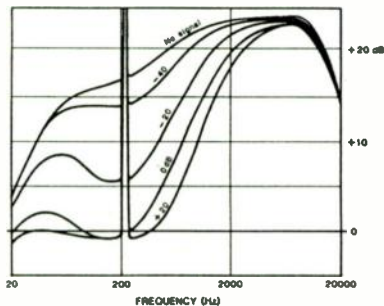


Figure 1A

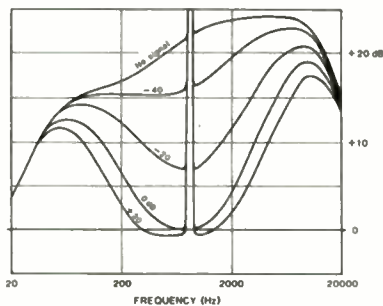


Figure 1B

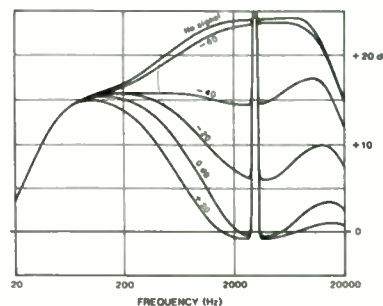


Figure 1C

Dolby SR processing in the presence of a higher-level signal. The increased gain shown by the curves is, of course, equivalent to the reduction in noise and nonlinearity achieved by the complementary decoder of the system. In fig. 1A, the higher-level signal's frequency is 200 Hz. In fig. 1B, the high-level test tone has been shifted to 800 Hz. Notice that the Dolby SR circuit has adapted to the new signal conditions by altering its own spectral transmission characteristics. More low-level gain has been applied in the low-frequency region while less gain has been applied at the frequency of the test signal and at higher frequencies. Finally, in fig. 1C, the test tone for the higher-level signal has now been shifted to 3000 Hz. Now, the Dolby SR circuit shows another spectral transmission pattern, revealing further noise reduction improvement (higher gain of low-level signals) at low frequencies. While these illustrations relate to the professional Dolby SR system, much the same approach is used in the already-available consumer Dolby S-type system.

Dolby has discussed the development of appropriate integrated circuits with major IC manufacturers and samples are available by now. The consumer version of the system has already been introduced by some manufacturers, and my own initial tests indicate that the dynamic range achieved with this system rivals that of 16-bit all-digital recording and playback systems. If Dolby S indeed proves to be as capable of capturing the dynamic range and noise-free character of digital compact discs on ordinary analog cassette tapes as DAT has shown itself to be, we wonder if in fact there is room for Dolby S cassettes in the increasingly crowded world of consumer music formats. **EQ**



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EQ FEBRUARY 199

# DCC & MD: The Next Best Thing(s)?

With two new formats entering the market, what will stay and what will go?

BY MARTIN POLON



I have been asked recently by just about everybody but my dog about the future impact of the Digital Compact Cassette (DCC) and the MiniDisc (MD) — and I concluded that the only reason my dog didn't ask me was that I don't have one. The issue that is energizing the personal and project studio universe — not to mention the rest of the studio audio community — is whether there is a potential for record companies and record consumers to accept what is, in theory, a technologically "inferior" standard for digital audio; albeit in the home, the car, or during recreation. And then what follows, at least in the nightmares of many in the music community, is the classic "bad" drives out "good." "Hasta la vista, baby," to the CD, as the Terminator would say — or, if you prefer: Is the DCC or the MD going to be the new Terminator?

The DCC operates with thin-film heads similar to those used in computer hard drives and achieves 24-bit precision via 32 coding sub-bands. The MD system utilizes a 200°C laser to produce the Kerr effect, yielding a magneto-optical recording. Both the DCC and the MD digitize the incom-

ing signal if it is in the analog domain. The systems then quantize again to apply the Precision Adaptive Sub-band Coding (PASC) for the DCC, or the Adaptive Transform Acoustic Coding (ATRAC) for the MD. These coding protocols utilize the psychoacoustic principle of the masking effect to remove those portions of the recordable spectrum that will be essentially inaudible to the human ear. Thusly, both systems reduce the amount of audio data to be recorded — the DCC by 75 percent and the MD by 80 percent.

Both systems use relatively large (for the size of the product) semiconductor memory "caches" to buffer the playback data stream from the possible disruptive effects of physical impact on the unit. Both systems have commonalities with their predecessor systems. The DCC is able to play analog cassettes owing to the use of an extra analog head and essentially shared physical tape dimensions. Prerecorded MD software has virtual premastering and pressing commonalities with the compact disc.

Does the 75 to 80 percent reduction in the data stream throw out some of the musical "baby" with the masked "wash water"? The effect of the increased quantization noise inherent in digital recording on reduced-size formats is also of concern. Designers of the two systems insist that the masking process actually reduces audible quantization artifacts to listening levels equal to or better than the CD. There is no question that both of the new formats offer transportable playback superiority over the CD. The CD cannot record. And the physical convenience of the MD's size would certainly ease the consumer's music collection storage problem. But it is equally clear that the new systems provide a listening experience "nearly of the quality" of the compact disc. And in this business, "nearly" may not be good enough!

In other segments of the record industry, the challenges posed by the adoption of a new format or formats

is equally intimidating. The process of dividing existing store stocks to accommodate selections on digital compact cassette and MiniDisc could mean a diminishment in compact disc and analog cassette titles by as much as 50 percent in record retail locations. "Reel" world translation: more copies of fewer titles in multiple formats to fewer customers. The music duplication community is also facing a significant risk in embracing one or both of the new formats before a clear indication exists in the consumer marketplace as to which one will survive! A considerable investment in a compact disc-like duplicating plant for MiniDisc and in expensive technology for digital compact cassette is, at best, a speculative use of capital.

It seems hard to believe, but both low-bit-rate coding systems already have adherents in the studio community. At the AES show in San Francisco, the idea of a "Pro-DCC" met with enthusiastic response from some attendees. Is this part of a "brain damage can be beautiful" movement in recording? Or is it just a savvy play by studio operators eager to offer their musician and producing clients DCC as after-session "take out." And what of other small studio recording systems that offer "full capture" at the same price point as the low-bit-rate systems. Can DAT and Dolby S compete with the "masking mass market monsters?"

For the answer to these and other related questions on MD and DCC, stay tuned to this column. In the meantime consider this: With new formats already on the market, can low-cost MD and DCC semipro, portable multitrack recorders be far behind?

Martin Polon is the principal of Boston-based Polon Research International (PRI). PRI forecasts the electronic entertainment industry for the financial community. Polon is a 14-year veteran of service to the Audio Engineering Society (AES) as a national officer.

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## MOVIN' ON UP

*continued from page 87*

and expect it to play back perfectly on a Kurzweil sample without some editing of either the sequence or the sample. If you've spent a lot of time tweaking your sequences so they articulate effectively and convincingly on your own MIDI rig, bring your rig to the mix session — removing noise takes considerably less time than adding musicality. And as with outboard processing, some studios do not include MIDI instruments in the regular room rate.

### Console —

What with the aforementioned piles of outboard effects and MIDI instruments, a console with numerous inputs during mix-down is a requirement. Automation should also be a consideration if your mix is going to involve a large number of sources or require complex changes. Remember, too, that it takes time to program console automation; weigh this cost against the consistency it provides. Bear in mind that some recording consoles are known for their sonic "signature" (or lack thereof). During tracking, especially, the console itself provides an additional means of signal processing.

**Multitrack** — If you'll be recording in the commercial studio, take some time to assess your needs; do you really need 48 tracks, or can your project be easily accommodated on 24? Digital multitrack rates are considerably higher than analog, and the newer, Dolby SR-equipped analog multitracks can rival digital's fidelity. If you're just using the studio for mixing, you'll obviously be looking for a facility with the same-format multitrack as yours. (It is feasible to bring your multitrack to the studio come mixdown time, though this is not without its own logistical concerns. I know of a musician who brought his Fostex A8 to mix in a studio equipped with an MCI 536 console. Needless to say, a tuechel-to-

RCA harness is not the most common cabling to be found!)

**Mastering Deck** — This is of prime consideration if your project is to be mastered to CD for commercial release. While DAT is fast becoming popular as a mastering format, the majority of major-label CD releases are still mixed down on open-reel digital 2-track or 1/2-inch analog tape, or sometimes direct to Sony PCM-1630.

**People** — A good staff can make the difference between an efficiently completed project and a nightmare. Staff engineers have daily experience with all the in-house equipment and with any idiosyncrasies of the room; experience = familiarity = efficiency. A

maintenance staff ensures that those racks full of toys will (more likely) be working properly. And bright, creative people can bring new insights and objective ideas to your project. Look for people sympathetic to your style of music. Ask for references — and this goes for the facility itself as well as for personnel.

With a little preparation, the move to a commercial studio can occur smoothly and effortlessly. Remember, the studio's enhanced capabilities are there to provide more choices, and these choices have one purpose: to help your ears achieve what your mind has imagined.

**When bringing your  
multitrack masters to  
another facility for mixing  
or overdubs,  
the most important  
preparation is  
documentation.**

### **EAR MATCH ANSWERS** (FROM PAGE 40)

- 1 — Les Paul  
(August 1991)
- 2 — Ric Ocasek  
(December 1991)
- 3 — Stanley Clark  
(January 1992)
- 4 — Don Was  
(February 1991)
- 5 — Craig Anderton  
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- 6 — Bruce Swedien  
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- 7 — Dave Edmunds  
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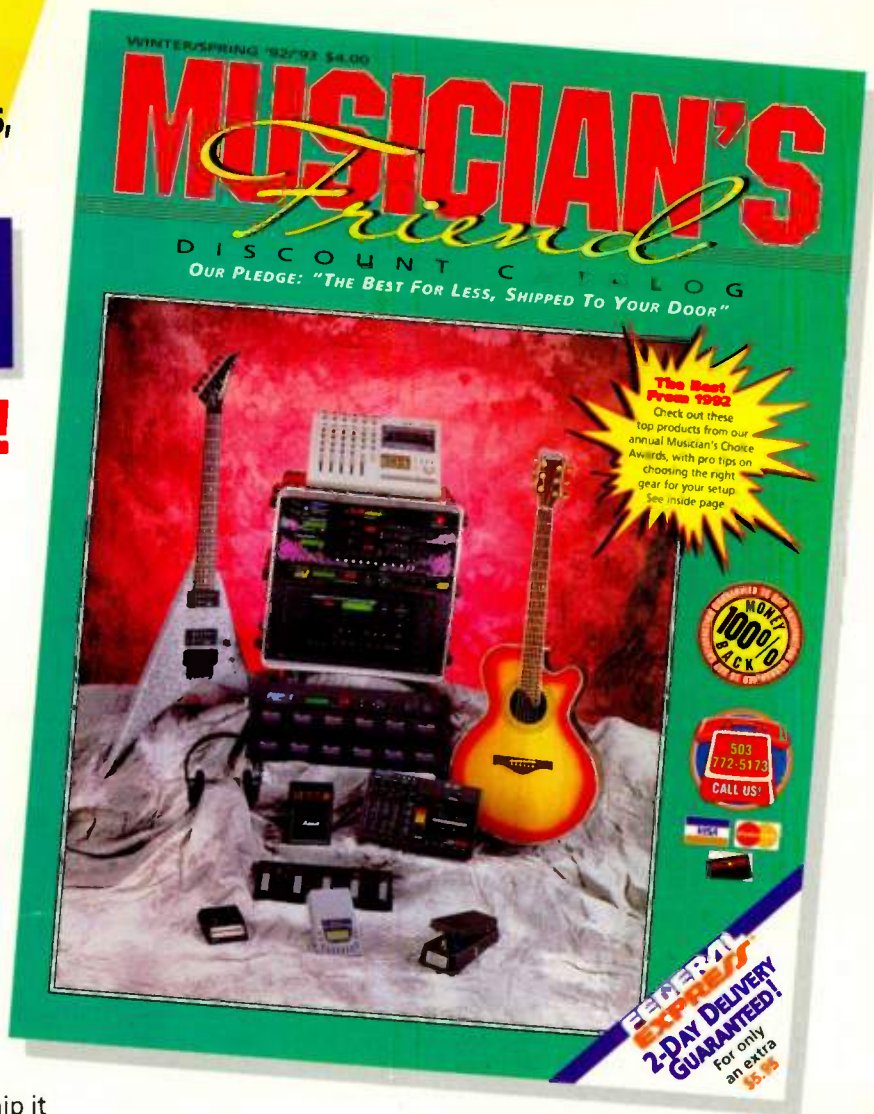
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## Aphex Exciter Model 104 Type C<sup>2</sup>



**MANUFACTURER:** Aphex Systems Ltd., 11068 Randall St., Sun Valley, CA 91352. Tel: 818-767-2929.

**APPLICATION:** Adds sheen and bottom to mixes, and, less conveniently, to individual instruments.

**SUMMARY:** The high end delivers the famous Aphex sound, but seems a little smoother. The bass boost increases the apparent amount of bass without significantly raising overall levels.

**STRENGTHS:** Relatively easy to use and set up. Does what it says it can do. Really does add sparkle and depth to masters. Bass boost is tailor-made for many of today's musical styles.

**WEAKNESSES:** Not intended for use as an effects-loop device, making it difficult to apply the effect selectively to different instruments in a mix. Bypass switch removes just the effect, not the entire device, from the signal path.

**PRICE:** \$349

**EQ FREE LIT. #:** 113

MOST ENGINEERS ARE familiar with the Aphex process that made its debut back in the '70s. Essentially a blend of high-pass filtering and distortion, the process mixes a very low-level amount of processed sound in with the unprocessed program material, contributing a high-frequency sheen and clarity that can really bring a recording to life.

Now Aphex has devised a companion bass-enhancing circuit, and has built both tools into a single box. Like the treble enhancer, the bass version works by messing with our ears and minds instead of just using an EQ boost.

Although there are many "exciter" devices on the market, some quite effective, the Aphex approach is unique. So how does their new box perform? Let's find out.

The Model 104 Type C<sup>2</sup> is a two-channel, 1 rack-space unit with duplicate sets of controls for each channel. A rear-panel switch sets the operating level (-10 or +4). The inputs and outputs are 1/4" phone jacks, but with an interesting twist: the inputs are balanced at +4 and "pseudo-balanced" at -10. The manual tells how to take advantage of this in unbalanced systems by using twisted-pair shielded cables to help reduce the chance of ground loops. You can, however, also use standard patch cords.

Both channel outputs are "pseudo-balanced" (i.e., the line-to-ground impedance for both lines is equal so that a subsequent balanced stage can maintain a high common mode rejection, but only one line carries the signal). The tradeoff is a slight level drop

when driving low-impedance outputs (i.e., 600 ohms). Since many project studio devices have relatively high impedance inputs, this hardly seems important.

Controls for the high-frequency processor are Tune (sets the frequency where the effect starts kicking in, from 800 Hz to 6 kHz) and Mix (determines the effect's prominence). There's also a switch for "normal" or "high" harmonic content; the latter has more of an attitude.

Two Big Bottom controls modify the bass content envelope. Overhang increases the low-end sustain (an LED glows to indicate when the sustaining action is taking place). Girth sets the prominence of the bass enhancement.

Common to both sections is a bypass switch with associated LED. Power comes from a 24V "wall wart."

Acoustic instruments such as vocals and guitars benefit greatly from the high-frequency Aphex process, and the process can also help to offset the generation loss with cassette duplication. A lesser-known application is that of synthesizing a "virtual higher octave" with low-sample-rate digital instruments and signal processors. The bass processor adds another layer of sonic enhancement that is both effective and useful for a variety of sounds.

Since the Model 104 is well-suited to individual tracks as well as to mixed masters, it's unfortunate that the 104 is designed as an in-line effects device rather than as one that solos the effect, allowing you to feed it from an aux buss and return the effect output



# IN REVIEW

to the console. When adding the Aphex effect to a mix, this precludes adding different degrees of processing for different tracks. Clearly, Aphex expects you to insert the Model 104 between your mixer out and two-track input, or to buy more than one if you want to affect individual instruments.

There's a very ironic reason why this can be a problem: Many sound designers add a little bit of Aphex processing to their samples, and mixing these down through another stage of Aphex can give a shrill sound. One workaround is to patch the Model 104 into individual tracks when recording, and then either not use it during mix-down or add a slight amount of overall processing. A better option is a relatively simple hardware mod that lets you defeat the dry signal and solo the effect.

Finally, note that there aren't any presets — you're going to have to

actually play with the knobs to find the sound that works best for a given context. If you get a tinny or bloated sound, you'll know you've turned the knobs up too far. Those who have had the most success with the Aphex process use it subtly, the way you'd use fine spices in a gourmet dish.

Those who like the Aphex effect will find the Model 104's high-frequency enhancement to be just as effective, yet somewhat silkier, than its predecessors. But the real news is the low-end enhancement.

I expected the Model 104 to gain its bass effect by sacrificing tightness or increasing level, but, surprisingly, the tight low end remains tight; it just sounds...well, bigger. The effect seems to be achieved by increasing the amount of bass during low-level passages, which makes the whole track feel bassier. A side benefit is that you can

pick out bass melody notes more clearly. Nor is there a significant increase in level; at what sounded like the right degree of enhancement, the meters only nudged one or two dB higher.

For those doing techno/rave or other dance music, this box is a god-send. In the battle to see who can put the loudest bass in a vinyl groove, the Model 104 gives you a powerful advantage — at least, until everyone else finds out about it! But there are few signal sources that wouldn't benefit from what the Model 104 has to offer. I was delighted, for example, at what it did with a country-rock tune. Just remember that the Model 104 should enhance, not overwhelm.

Kudos to Aphex, not just for bringing its bread-and-butter effect into the '90s, but by upping the ante by doing for the low end what it has been doing for the high end all these years. —Craig Anderton

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## TOBY SCOTT

continued from page 36

the doors are open. There is a relaxed, casual atmosphere that no pro studio can re-create."

Another difference between the two, according to Scott, is experimentation. There was more experimentation on *Human Touch* because Bruce's producers and keyboardist Roy Bittan were there to comment and contribute their ideas. "When it's just the two of us in the project studio," continues Scott, "there's not a lot of outside influence and the sessions tend to be a lot faster and more focused."

Regardless of which type of studio is used, Scott's approach is to record the vocal or instrument as best as he possibly can, under the most comfortable of circumstances. Scott states, "If somebody wants to record a song, that's what the person should be allowed to do. It shouldn't be an engineering contest — it shouldn't be a contest at all."

As an example, Scott gives the recording of a vocal overdub: "I never have the vocalist face me or anyone else. A studio is a foreign environment compared to where performers usually play.

The minute they walk into a studio and microphones are stuck in front of them, the last thing a performer needs to hear is me going, 'stand right here on this X, don't move, keep your chin up, and don't look at those guys in the control room who are staring at you.' That has to be very disconcerting to an artist."

So how is it working with the Boss in the studio? "Bruce is especially easy to work with in the studio," answers Scott. "I put a mic in front of him, he says 'fine,' and we go with it. Bruce has a variety of singing styles, but I never knew which one he was going to use until we were already started, so I used the same miking technique for each song."

On *Human Touch*, Scott did experiment with several different microphones. For some songs a Telefunken 251 was used, while a Shure SM57 was used for others, and Neumann U67's and U87's for still others.

For the different guitar sounds that Springsteen uses, Scott and Springsteen came up with a setup that allows for a good deal of flexibility. They start by plugging his guitar into a [Scholz] Rockman. From there it goes into a 100-watt Boogie head. From the Boogie head, it goes into a Speaker Simulator, which provides an electronic simulation of what

a mic in front of a speaker sounds like. "With the Simulator, the guitars don't sound anymore as though they are going directly into the board," explains Scott.

The sounds are varied by changing the order of the gear. Sometimes they'll use guitar sounds that are Rockman direct, or maybe they'll plug into the Boogie direct and not even use the Rockman. Maybe they'll put the guitar through the Boogie first, and then the Rockman.

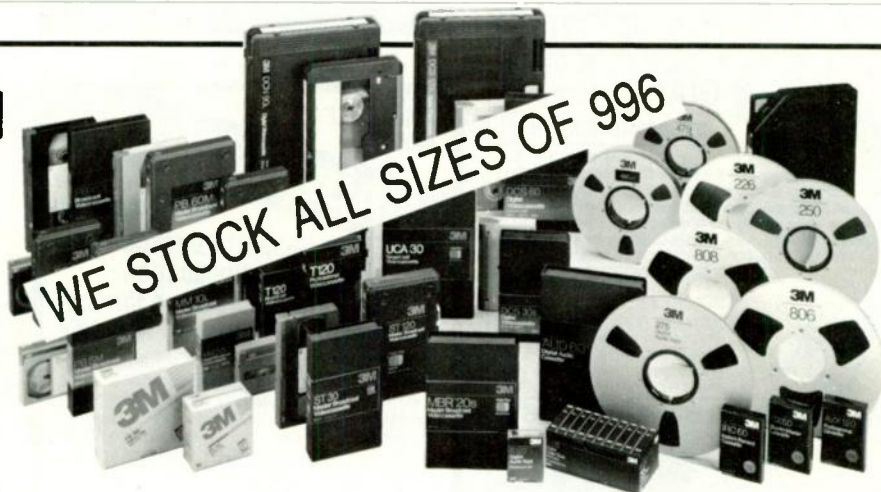
For six of the songs on *Human Touch*, Scott used a speaker cabinet that was miked with two microphones — either an SM57 or Sennheiser 421, and a U87 or U67 — that were placed at varying distances away from the speaker, depending upon the sound that Scott wanted. Once he got the Speaker Simulator, however, he stopped using the speaker because the Simulator would do the same job and he wouldn't have to figure out a way to isolate the sounds they wanted from the noise of the speaker.

With both albums finished and Springsteen out on tour, Scott has packed up the project studio and is meeting with his Boss in the big cities. So if you're in the stands, make plenty of noise — you may just be recorded in Springsteen's project studio. —Tony Savona

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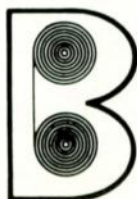


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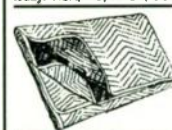
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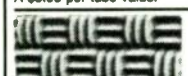
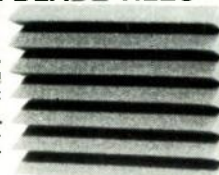
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## Fostex DCM100 & MIXTAB



**MANUFACTURER:** Fostex Corporation of America, 15431 Blackburn Ave., Norwalk, CA 90650. Tel: 310-921-1112.

**APPLICATIONS:** Automated mixing in MIDI Studios, remote-controlled mixing in sound reinforcement, multimedia, and A/V applications.

**SUMMARY:** Diminutive line-level mixer that with enough features to find a wide variety of applications where preset levels are required.

**STRENGTHS:** Very small size, excellent stereo tracking of controls, and instant recall of previous settings make this a powerful mixer for the price.

**WEAKNESSES:** Resolution of controls is coarse. Quick movement of the controls causes zipper noise and level jumps, setting it apart from its analog equivalents.

**PRICE:** \$549 (MIXTAB), \$799 (DCM100) **EQ FREE LIT. #:** 114

WE LIVE IN AN age where the physical size and complexity of a device may bear no resemblance to the work that it will perform. The new Fostex MIXTAB exemplifies this. The diminutive MIXTAB (Mixer Tablet) can sit comfortably on your lap, and yet is capable of mixing up to 30 stereo line-level audio sources. This is certainly a breakthrough in low-cost audio control. There are caveats, of course, but the basic ability to mix all of these sources remotely does offer some tremendous possibilities to the enterprising audio person.

Functionally, the DCM100 and MIXTAB combine into a basic mixer having eight stereo or mono inputs. These include: a postfader Aux Send, switchable between two stereo Aux busses; shelving EQ ( $\pm 15$  dB at 10 kHz and 100 Hz); pan/balance control; channel muting; and a short (45mm) throw fader. There are two stereo Aux Returns with the same EQ and another short throw fader as the Stereo Master. Where this mixer departs from its conventional counterparts is that the mixer controls are separate from the audio interface. This allows systems that use one MIXTAB to control up to three DCM100's, expanding the number of inputs without changing the size of the control panel. The MIXTAB remains completely independent of the audio signals and can be

positioned anywhere a MIDI link can reach the DCM100.

The Fostex DCM100 is a single-rack-unit high, with all of the interface connections on the rear panel. Audio signals are connected to the unbalanced phone jacks. Additional unbalanced phone jacks provide for cascading two more DCM100's, or even conventional mixer outputs, without using up inputs or Aux returns on the DCM100. There is also the usual trio of MIDI connectors for receiving and sending control information from the MIXTAB.

The front panel of the DCM100 has eight knobs for setting the input gain between -30 dB to 0 dB (these would be set once and rarely touched again after optimizing the gain for each source). There is also a volume knob for the front panel headphone jack and the stereo output level meter, consisting of five LEDs per channel to indicate levels between -10 dB and +6 dB. There is no provision for monitoring or metering the auxiliary send outputs.

The audio signal path is clean and Fostex is conservative in its specifications. Frequency response, signal-to-noise, and headroom measured very well for a product in this price range, meeting or exceeding the published specifications.

The division of tasks into audio interface and control panel is where

the real power of this combination is realized. The MIXTAB uses MIDI Controller messages for each of its front panel controls, which include: a knob for controlling the density of controller data sent to the DCM100; switches to select among up to three DCM100's; the mode of the MIXTAB; and the buttons for accessing, storing, and recalling the settings of all MIXTAB controls except the DCM and mode selectors. The DCM100 does not digitize the audio; instead, it uses digitally controlled attenuators. This provides very good audio performance, but the dynamic resolution of the unit is restricted in hardware to 2 dB per control step. This makes dynamic automation possible, but limits its application to mixing types of sounds where the stair-step quality of fader, pan, and EQ adjustments is not as noticeable, such as with drums, rather than solo flutes.

MIDI offers complete control over the DCM100. This protocol is so common and widely used that many of the tools, such as computer sequencing programs, are much more sophisticated and easier to use than many of the expensive console automation software packages. DCM100 users can edit their automated mixes with ease and can even draw the levels and fader moves on a computer screen when using one of the more sophisticated sequencing software packages.

A complete selection of faders and knobs on the computer screen emulate the functions of the MIXTAB within Steinberg's Cubase Sequencer. The controls have been preprogrammed for the DCM100 and could be used in place of the MIXTAB, if desired, as well as recorded into a sequence for dynamic automation. This mixer map is available on request from Steinberg-Jones (17700 Raymer St., Suite 1001, Northridge, CA 91325; tel: 818-993-4091) or Fostex.

The DCM100 can be controlled by practically any music sequencer program. I was sent a copy of the very

# I N R E V I E W

sophisticated Cakewalk Professional for Windows from Twelve Tone Systems, Inc. (P.O. Box 760, Watertown, MA 02272-0760; tel: 800-234-1171 or 617-926-2480). Cakewalk does not directly support the MIXTAB, but does offer features such as on-screen fader controls that can be mapped to any MIDI controller, including the Undefined MIDI Controllers used by Fostex for the DCM100. Just minutes after loading Cakewalk onto my PC, I was mapping out the on-screen faders for the DCM100. I created a fully working control system for a single MIXTAB channel — EQ and Aux sends, masters, and returns included — in less than ten minutes. Dynamic automation was done by moving the on-screen faders in Cakewalk or those on the MIXTAB, interchangeably. With a few more minutes work I had built a very short sequence that reset every control to a default value.

The applications for the DCM100 may only be limited by the lack of switches for prefader aux sends. The ability to recall audio levels and EQ settings can be used in a wide variety of audio work. The most obvious application is in the MIDI Project Studio, where the output of the multitrack

tape recorder would be mixed. The MIXTAB and DCM100 would provide an excellent 8-track monitor mixer, and also allow the automation of the final mix, using SMPTE timecode and a sequencer. When used in conjunction with the MIDI Machine Control, introduced by Fostex last year, the DCM100 allows the entire mixing process to be controlled from the computer.

The DCM100 is also ideally suited to submixing synths, samplers, and onboard effects units in both the studio and live performance. The changing audio levels produced by different synth patches could be fine-tuned with the MIXTAB and then memorized, to be recalled with the patch via a MIDI program change message. This can provide better signal-to-noise than mixing with MIDI Volume and there'll be no more grabbing the fader every time the wrong patch is called up!

There are many applications in live sound where getting a conventional mixer into the best seat in the house is impossible. The MIXTAB may be sufficient to set specific levels and EQ from that seat during rehearsal. Then the sound operator could go back to the sound booth and simply recall the MIXTAB settings during the show.

Recording short sequences of the MIDI data for recall on demand during the show would also allow dynamic automation, cued to specific scenes of the play and able to be recalled as separate groups of events. Prerecorded sound effects could also use a timecode track to trigger dynamic level settings during the run of a show.

The installed sound system is perhaps an area where a DCM100 could find the most varied use. From a corporate boardroom A/V system to a university lecture hall or a large-scale paging system, mixers of this type can be used. The open nature of MIDI control signals allows the creative system designer to use the DCM100 in applications where a control panel, such as those by AMX, can be programmed to suit the application. A stand-alone DCM100 is also ideal where sound levels are preset with the MIXTAB during the system setup and are not adjusted by the end user.

Those involved with applications that require a series of preset audio levels may not be bothered by the lack of dynamic resolution, and will find that the other aspects of the audio performance offer an incredible value for the price. —Wade McGregor

The DCM100 does not digitize the audio; instead, it uses digitally controlled attenuators.



## JLCooper MCS



"The MCS was specifically designed as a remote controller for multimedia audio, visual, and MIDI production."

JIM COOPER'S LATEST addition to his family of controllers is the Media Control Station (or MCS for short). The MCS (\$270) was specifically designed as a remote controller for multimedia audio, visual, and MIDI production. Its simple control layout includes five buttons for controlling standard transport functions (play, record, etc.). In addition there are a Shift button and an Option button that, when pressed in various combinations with the transport buttons, let you have quick and easy remote control over twenty command functions. Add a weighted scrub wheel to the right of these buttons and you have the gist of this simple and rather cool box.

The MCS is available in a Mac version that plugs into the ADB port chain, or in an IBM version that uses an RS-232 port. As of this writing, only the Mac version is shipping, as writing drivers for the vast number of IBM programs has been presenting a problem. Now that front-running digital audio and sequencing programs are appearing for Windows 3.1, however, you can expect this to change in the near future.

The MCS includes four preprogrammed control setups that can be called up to control Digidesign's Sound Tools, MOTU's Performer, and

Adobe's new Premiere (for creating digital multimedia movies), as well as a template for controlling many of the basic Mac function keys (F-keys).

Of these four presets, the button assignments on the last two can be edited using a graphic application program that's included with the package. It's easy to operate; just use the application to select what key-stroke combination on the MCS is to be edited, and then press the associated commands on the Mac that are to be executed. Once all the command buttons have been edited, the new settings can be downloaded to the MCS, and you're in biz.

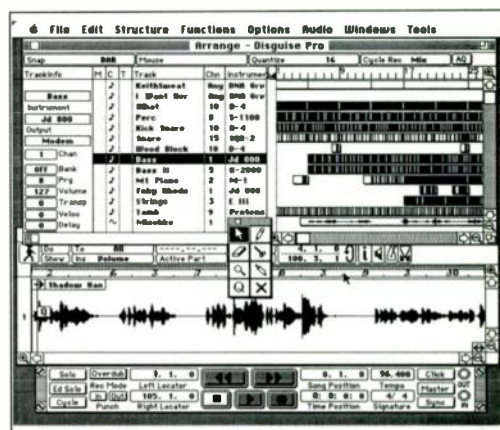
From a user's standpoint, I found the Media Control Station to be a simple, no-frills box that would be great for those who need (or feel that they need) a basic transport remote. Although I don't have a problem with basic keyboard commands, once my fingers got used to the new key arrangement, they were cookin' in no time.

On the minus side: I didn't care for the jog wheel's responsiveness. When using Sound Tools in the jog mode, I had to turn the wheel fairly fast just to get the cursor to scrub at a snail's pace. Getting it to scrub on a 50 MHz Mac at a reasonable speed just wasn't possible. Shuttling over a waveform wasn't great either. Zeroing in on a beginning point was really difficult, since the wheel would almost always overshoot the area that I wanted to mark. In this mode, changing wheel directions quickly would also often cause the MCS to freak out — sending the scrub bar sailing off in random directions. (Although I have been informed by the manufacturer that this is a bug that has been fixed.) Improving this wheel's responsiveness (at least when using Sound Tools) or allowing the user to alter its response would turn this otherwise nicely designed remote controller into an even more useful addition for most multimedia production systems.

—David Miles Huber

Contact JLCooper at 12500 Beatrice St., Los Angeles, CA 90066; tel: 310-213-3064. EQ free lit. #115.

## Cubase Audio



"Although the user interface remains the same, a lot has been added to what was an already feature-laden program."

TODAY'S POWERFUL COMPUTER systems can handle pretty much any studio task, from mixing to signal processing to recording. Steinberg's Cubase Audio (\$795) is the latest Macintosh program to combine MIDI sequencing and hard disk recording.

This is not just a simple upgrade to the popular Cubase sequencer, either. Although the user interface remains basically the same (in many regards, audio tracks are treated just like MIDI tracks), a lot has been added to what was an already feature-laden program.

Cubase Audio allows you to add an unlimited number of virtual audio tracks to your MIDI sequence. You can then perform many popular MIDI editing operations (such as quantization and cut/copy/paste) on those audio events. Although the maximum number of audio channels you'll hear simultaneously is a function of your installed hardware (the program currently supports Digidesign's Sound Tools I and II, Pro Tools, and Audio-media), a clever system of "lanes"



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# REVIEW SHORTS

allows you to easily create composite tracks from multiple takes. A Monitor window allows you to directly record audio from within the program (there's a level bar meter and even a clipping indicator that shows the number of overloaded samples), or you can import prerecorded Sound Designer or Sound Designer II format soundfiles into an audio "Pool."

Like other programs of this ilk, Cubase Audio allows you to set up pointers to specific soundfile areas (here called "segments"). Thus, if you have several bars of drums recorded, you can identify just one snare hit as a segment and use that sample repeatedly in your MIDI sequence. If you're importing Sound Designer files, these segments can correspond with the "regions" that are used in SD playlists.

An Audio Editor window provides

graphic editing capabilities. Although it lacks many of the features found in dedicated waveform editors (such as scrub editing or digital signal processing operations), it does allow you to truncate segments or to move them backward or forward in time. A nice touch here is a movable "Q" point, which allows you to quantize a segment from a point other than its start. This could be useful if, for example, a segment contains five beats of audio and you want the second beat to fall on the downbeat of a bar. You can also add volume events to selected segments; in conjunction with an onscreen mixer, you can automate level and panning during audio playback.

When used in scoring applications, Cubase Audio can synchronize to MIDI timecode and can also write SMPTE (using an unusual implemen-

tation, where a SMPTE square wave soundfile is actually written to disk). There's also a function that allows calibration to tape so as to compensate for any possible slippage.

In this era of sometimes-prematurely-released programs, Cubase Audio is remarkably stable and reliable. My only complaints are that you cannot import standard AIFF (Audio Interchange File Format) files, and that the user interface sometimes deviates from the Mac norm. But these are relatively minor niggles; the bottom line is that Cubase Audio provides an excellent single-family home for both hard disk recording and MIDI sequencing.

—Howard Massey

Contact Steinberg-Jones at 17700 Raymer St., Suite 1001, Northridge, CA 91325; tel: 818-993-4091. EQ free lit. #116.

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CIRCLE 69 ON FREE INFO CARD

## L.A. REID

continued from page 52

own track and then the group sang together live while an MPC-60 drum machine and a Forat F-16 sampler kept the backbeat. There wasn't really any set way for recording the song. It's just an old-time R&B tune that sticks to the basics and never lets up on the harmony.

### WHITNEY & BOBBY

Working with Whitney Houston on "I'm Your Baby Tonight" was an incredible experience. She cuts songs so fast, your head is spinning by the time she's done. Some people have given her a bad rap by painting her in a pop picture, but that's not the real Whitney. She's a very real artist, and she has the soul to prove it.

Bobby Brown is a different type of artist entirely. One day, he can come in and not feel it at all, while on others, he'll simply blow you away. I came in contact with Bobby just as he was maturing out of his key role in New Edition. By that

point we had already made a few dents in the pop charts with songs like "Rock Steady" (The Whispers, '87) and "Girlfriend" (Pebbles, '87), but we had no idea of just how big we'd hit with Bobby Brown at the mic.

Now it's five years later, and a lot of time has passed since Bobby put out his last album, *Don't Be Cruel*. This time around, Bobby's sound is a lot thicker than it was back in the late '80s. The song "Humpin' Around," for instance, with its operatic voices and hard-hitting drums, is a lot different from songs like "Every Little Step" and "Don't Be Cruel." It's not that we're using different equipment, because everything we have is still the same — old Yamaha REV-5's, Eventide 3000's, Focusrite EQs, etc. I guess we've just been influenced by some of the younger producers who are making waves around us.

We tried not to EQ Bobby too much, because our main goal when working with an entertainer is to capture a person's essence and build the music around that. Babyface and I prefer to EQ the music so that it fits the voice, rather than EQ

the voice to fit the music. If we had a miking philosophy, it would probably be: Don't mess with the natural sound of a singer's voice. We have several mics that have been customized for great sound, including an AKG tube, a Neumann U47, and a real old U87.

### LOOK MA! NO COMPUTERS

Essentially, LaCoco is a vintage studio with everything harking back to the old school of sound. Whether it's vintage microphones we're dealing with or a brand new guitar, it is an analog operation all the way. We don't sample beats or use loops, and computers are only necessary when a song's lyrics have to be written down and stored.

The reason we're not that into the high tech is because we try to concentrate on great lyrics and awesome grooves. If we spent all our time paying attention to technical tricks, than we'd never get around to the melody, which is the most important aspect of a song. After all, the melody is what we all pick up on when we're listening to a song. And isn't that what loving music is all about — being a good listener? **EQ**



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## ACROSS THE BOARD

continued from page 130


trusty Brooke Siren direct boxes. The SIM machine says it is flat as a pancake from DC to Light.

Another Box that has saved my life more than once is the FCN-1 digital format converter from Digital Domain in New York. This is the box that strips off all the flags from the incoming digital audio stream and sets new flags to whatever you want. The input can be any format AES/EBU, SPDIF, IEC 958, PDQ Bach; it doesn't care. The physical interface doesn't matter, either: balanced 1.5v, unbalanced .5v, or optical.

The Sony 48-track digital and the Sony PCM 3204 digital two-track don't like getting digital input from the Fostex D20 DAT machine or the Akai DD-1000 optical disk recorder. After inserting the FCN-1 box, everything is hunky dory. Bob Katz (Digital Domain) should drill a great hole right through the middle of the FCN-1, because for me it is a "Life Saver."

There are many questions that I will be pondering between now and my next column. Here is one of them:

Where do guitar solos go when you erase them? Is there some other dimension filled with all of the great things that have been erased over the years?

Oh, yes, I almost forgot. While all of you have probably already given up on your New Year's resolution, I have not. My resolution for 1993 has to be 20 bits or better. 

## SON OF SIM

continued from page 62

right guitar amp and have Walter be too wiped out to play the solo. We also didn't want to decide later that the guitar amp sound wasn't quite right, and get stuck with what we recorded. We chose to record the guitar direct and to run it out through an amp later, after more of the other overdubs were done.

I ran the guitar signal out through an amp. In the control room we listened to a mixture of the direct signal and the microphone in front of the amp. Both signals sounded the way we wanted by themselves, but sounded phasey when mixed together. Flip-

ping the phase button didn't work because the signals weren't 180 degrees out, they were something less.

SIM to the rescue. Using the delay finder, I fed the direct signal into the reference input and the mic return from the amp into the measurement input. Bingo! SIM told me that the mic signal was 1.48 milliseconds behind the direct signal — just enough of a delay to cause problems in the high-frequency range. I have tried to use a dual trace scope to find the delay, but it is too hard when the signal is not repetitive.

Now that I know the delay, I can move the amp recording earlier to make it coincident with the direct signal. I could have laid the amp track off to timecode DAT, dialed in the correct offset, and bounced it back — but I chose to use the "digital advance out" feature of the Sony 3348 to move the amp track earlier. I just selected 1.48 millisecond advance out (047hex) and bounced it to another track. The whole process, including measurement, took 15 minutes.

The same problem exists when recording the amp and direct sounds together, when there is a delay because of the speed of sound through the air. Once you measure the delay, you can also run the direct signal through a digital delay to null out the time difference. Just this little difference makes the guitar sound a lot better.

### NOW WHAT?

Oh, by the way. Steve St. Croix says that his cat is one of his favorite pieces of test equipment in the studio. He says that if his cat leaves the control room, then something is wrong with the sound. I SIMed my cat. She has a hair ball around 12 kittyHertz. My wife has an affect on the sound when she is in the control room. I SIMed her. It turns out she has acute phase on the top, a couple of humps in the upper midrange, and a nice round bottom end.

I have to go now, I'm late for an appointment with my doctor. I'm having a SIM machine permanently grafted to my hip. Do you think anyone will notice?

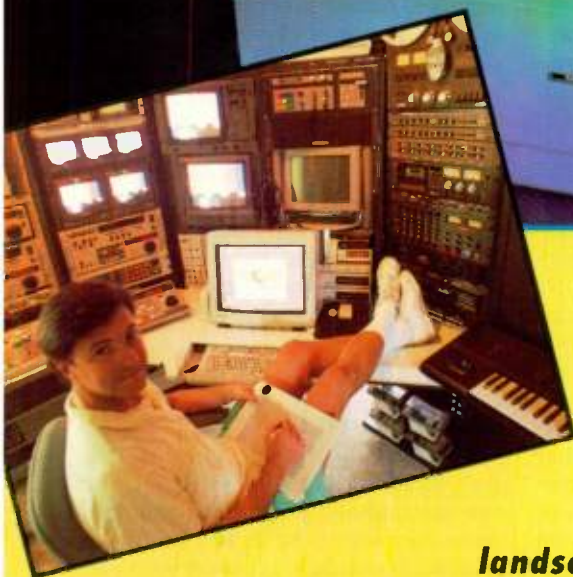
For more information on the SIM System II, contact Meyer Sound Labs at 2832 San Pablo Avenue, Berkeley, CA 94702; tel: 510-486-1166. Or circle EQ free lit. #117.

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# More Digital Digressions



Photo by Ed Colver

Find out what's  
happening in the digital  
domain before your peers  
laugh at you

BY ROGER NICHOLS

Guess who's coming to DINR. Give up? It's Digidesign Intelligent Noise Reduction. Digidesign was the first company to make hard disk-based digital audio editing available to the masses. Sound Tools is a household word to just about everyone with a MIDI studio. Now they have an add-on software package for their system that will do digital domain noise reduction. Yup, you can take the ground buzz out of that guitar part, the air conditioner rumble out of the vocal track, or even the tape hiss off the answering

machine tape that you wanted to use as a sample. Now you don't have to have the big bucks to go somewhere else and have it done. I will be getting DINR for my Sound Tools system and you'll be reading about it in detail next month.

Life is good! Today I walked into Nobody Beats The Wiz stereo store on Third Avenue in New York. Staring me right in the face as I walked in was the Sony MiniDisc recorder and a pile of prerecorded and blank disks to choose from. I put on the headphones and listened to Michael Jackson's "Black and White." As with the DCC, you could tell that it wasn't full CD quality, but *it was close enough!* The MiniDisc player was a little larger than I expected, about the same size as the first CD Walkman that Sony came out with about ten years ago. I guess that in a few years the player will be down to the size of a pack of cigarettes. After looking at the laser-writable disc and fondling the unit for a few minutes, I had to have one. It is just one of those things that you must own. As a matter of fact, if *you* don't have one by the time the next issue of *EQ* comes out, you can't read my column. So there!

## RADIO, RADIO

FM is dead! Well, as far as I am concerned it is. There have been a few companies over the years who have toyed with the idea of broadcasting digital audio into your home. A company named CompuSonics was going to build a digital audio recorder that stored compressed program material on high-density floppy disks. They were going to install a network that would enable you to call up with your credit card and order the album of your choice. The audio would be downloaded to your recorder/player and bingo! WGBH, the PBS station in Boston, used to broadcast Sony PCM-F1-encoded concerts via satellite. If you had a satellite dish and an F1, then you could listen to CD-quality broadcasts. Unfortunately, WGBH stopped the F1 broadcasts about two years ago.

CompuSonics was too far ahead of its time. Digital compression and

transmission technology was ten years away from what CompuSonics needed. The fact that F1-format machines were discontinued in favor of DAT, added to the high price of satellite dishes, contributed to the demise of F1 broadcasts.

Enter DMX (Digital Music eXpress). A company named International Cablecasting Technology has been broadcasting CD-quality digital signals to cable companies for over a year now. They have thirty channels of 16-bit audio covering just about every musical format you could imagine, including Chinese operas. They plan to add 30 more channels in the coming year.

The signal is carried digitally all the way to your house. You get a separate cable box (made by Scientific Atlanta) for tuning in the different channels of audio. The box has a remote control with a display that reads out the name of the artist, song, record company, and *Billboard* chart position (unless it happens to be the Eskimo channel). There are no DJs and no commercials. I might have to buy an old elevator car to listen in before I feel comfortable with commercial-free, DJ-less music.

DMX currently has over 100,000 subscribers in 41 states. More than 300 cable companies are offering the service. They haven't sold decoders to satellite dish owners yet, but may start doing so in the coming year. Maybe there is room in there for the 24-hour Steely Dan channel.

## MORE BITS OF INFO

Another couple of quick items before I split: I had the chance to use Bryston's new microphone preamp for a month (until they sent a 300 lb. bruiser to get it back). It was right up there with the Massenburg mic pre. It is a two-channel box with metering. Both channels have a variable high-pass filter, phase switch, mic impedance of 50 or 150 ohms, peak or average metering, phantom on/off, and an instrument input so you don't have to use a direct box. It is the first instrument input I have heard that I like as well as my old

*continued on page 128*

# John Arrias and DIC//DAT...

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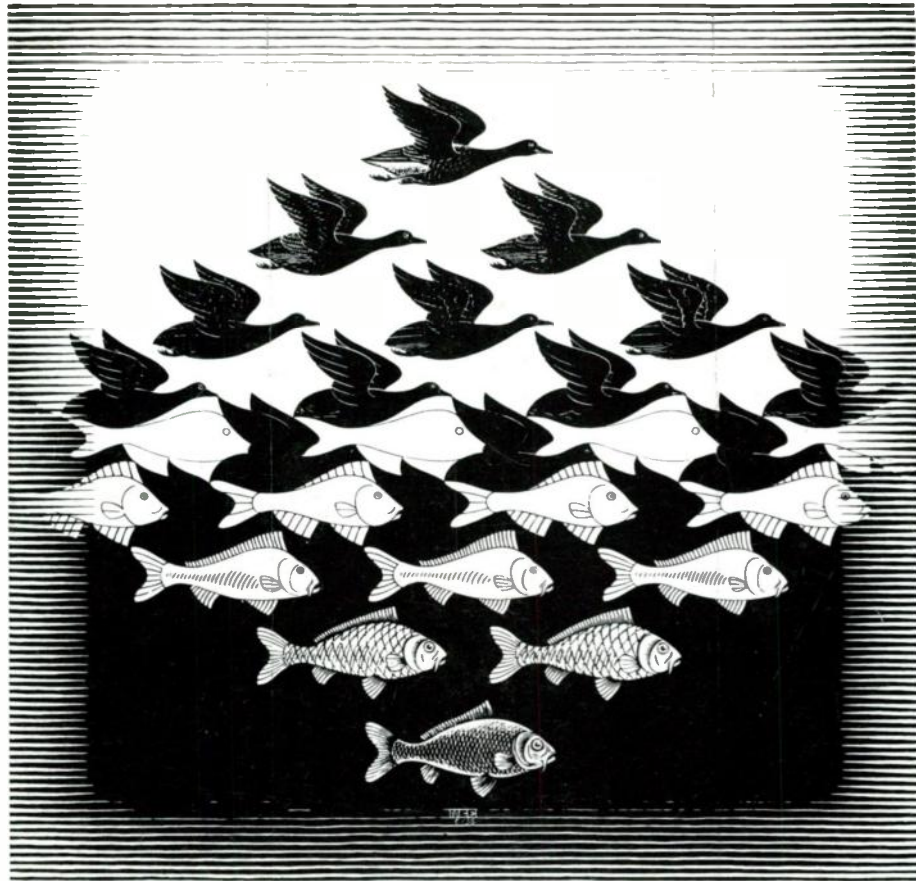
MQ's proprietary metal particle technology is enhanced with a formulation finish that reduces friction in the tape to head interface. Combined with its dust-busting design, the MQ cassette virtually eliminates environmental contamination that leads to recording errors and tape jamming.

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



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

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

This is exactly why our engineers strive to produce studio monitors that deliver sound with unfailing accuracy. And, why they create components designed to work in perfect harmony

with each other. In the laboratory, they work with quantifiable parameters that do have a definite impact on what you may or may not hear.

*Distortion*, which effects clarity, articulation, imaging and, most importantly, listener fatigue.

*Frequency Response*, which measures a loudspeaker's ability to uniformly reproduce sound. *Power Handling*, the ability of a

loudspeaker system to handle the wide dynamic range typical of the digital domain. And, finally, *Dispersion*, which determines how the system's energy balance changes as your listening position moves off axis.

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Models pictured (L-R)  
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