BON JOVI'S HOME STUDIO SANCTUARY

EQ

THE PROJECT RECORDING & SOUND MAGAZINE

AUGUST 1993

- BEHIND MTV UNPLUGGED IN A BAND VAN
- ONE-MAN MIDI BAND
- MORE GEAR FOR YOUR GIG

ROGER NICHOLS RECORDS DONALD FAGEN

& REVIEWS TASCAM'S DA-88

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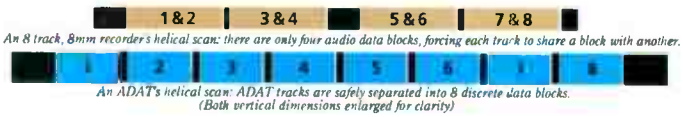


An 8 track, 8mm recorder's helical scan: there are only four audio data blocks, forcing each track to share a block with another.

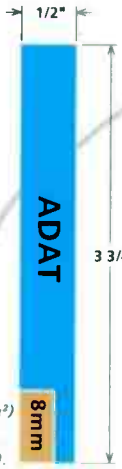
An ADAT's helical scan: ADAT tracks are safely separated into 8 discrete data blocks. (Both vertical dimensions enlarged for clarity)

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

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

Bigger is Safer

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



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

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

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

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

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

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

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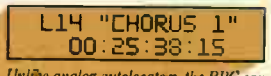

Unlike analog autolocators, the BRC can recall 400 points, storable on each ADAT tape for later recall, so you can keep your mind on the project instead of having to remember minutes, seconds and frames.

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

The ADAT Worldwide Network

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

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Tim Wilson
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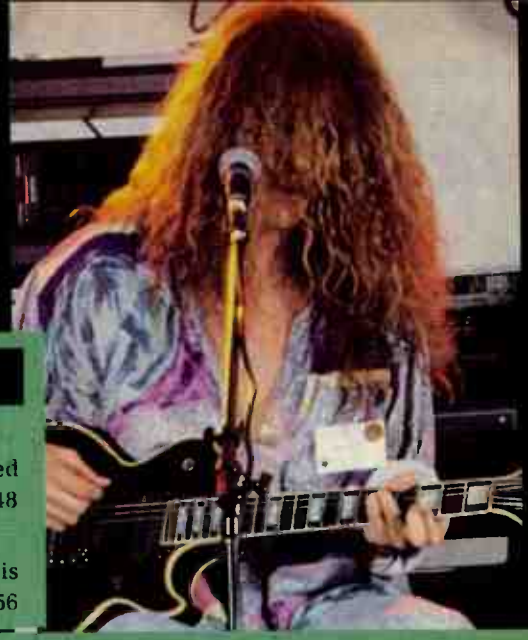

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GUILTY.

AS THE BUILDERS OF D&R mixing consoles, others have accused us of being rather zealous. Maniacally dedicated. Over the top. Passionately committed to crafting the finest consoles at any price.

We plead guilty as charged.

After all, our shameless vendetta against smeared sonics leads us to the highly unreasonable length of phase-correlating every audio stage. We're the crazed console crafters who — in our unstoppable desire to eliminate RFI and other noise — starground every circuit on every console, with the aid of a custom-welded steel chassis.

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And yes, we're the ones responsible for "high-def" EQs, floating subgroups, and other pioneering features which show so little regard for ordinary designs.

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You might think life could be lonely when you're guilty of a passionate pursuit for perfection. But along the way, we've met thousands of others who understand our intolerance for anything short of excellence. They are the thousands who have asked us to handcraft them a D&R.

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MASTERING BY THE MASTER

Just a few comments on Craig Anderton's MI Insider column "Roll Your Own Digital Masters [June 1993]."

While everything Craig said was accurate, I wanted *EQ* readers to be clear that Craig was speaking about what mastering one can do if one owns a home studio and is *not* going to send the tape to a professional mastering studio but rather directly to the CD plant. Please don't confuse the two. If you are going to have a real mastering facility work on your project, some of his suggestions may not apply.

For instance, Craig recommends the use of "normalization," which I believe is a Sound Tools term for multiplying the level of each selected cut until the maximum peak equals 0 dB on a digital meter. I would not recommend this step or *any other step* that is not a cloning process if your tape is going to a mastering house because digital tape level and EQ controls are not perfect. Once you level change your tape or EQ your tape from its original state, *there is no way to go back exactly to the original state!* Mastering "on top of" someone else's mastering is always a bad idea — especially in the digital domain. Lowering the level of your tape 1 dB and then copying it back up 1 dB will *not* yield the same numbers as leaving it alone. Let the mastering house do *all* of the level correcting and equalization. In addition, merely maximizing the level of each song to digital zero may produce a horrendously unbalanced final master. A good mastering engineer tries to get the *apparent* or average levels uniform. The instantaneous peaks created by "normalization" are the *last* thing a good mastering engineer would want to match up.

Bob Ludwig
Chairman of the Board
Gateway Mastering Studios, Inc.
Portland, ME

PAN HANDLER

Thank you for the April 1993 issue of your excellent magazine that was sent to me in response to my enquiry via the PAN "MIDI Support" service. Expect to see a subscription winging its way across the Atlantic in the near future.

There is one minor point I'd like to clear up with you, though, in the "Review Short" on the Yamaha TG-100. When discussing the TG-100's additional (i.e., non-GM) voices, David Huber states that, "The other voices can only be accessed when piggybacking the TG-100 onto Yamaha's Disk Orchestra and Clavinova series of instruments." This is not the case, since these additional voices are easily accessible from the front panel of the module, either as part of the "Disk Orchestra" or C/M patch sets, the individual voices in each bank being selected by MIDI program change messages.

One further piece of information that may be of interest to *EQ* readers is that there are a number of "Public Domain" software packages available from Yamaha to allow TG-100 owners who also own computers to access the inner secrets of the sound module, allowing configuration and editing of the voices (or patches). In the UK, the software is available free of charge from Yamaha (simply send in a blank disk), so I imagine that Yamaha Corp. of America offers a similar deal. There are packages available for Windows PCs (WinTiGer), the Atari ST (Tony), and the Apple Macintosh. The software is also available for downloading from PAN if you have a modem connected to your computer.

Keep up the good work.

Brian Heywood
POKE Records
St Albans, United Kingdom

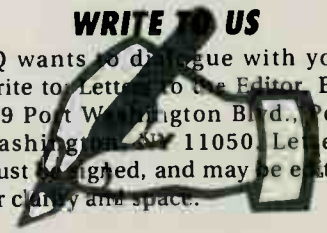
GALE WARNING

This is a response to Steve West's letter in the May/June issue of *EQ*.

I happen to enjoy my subscription to *EQ* and I feel that it is quite possibly *the* most informative magazine of its kind available to engineers and artists alike.

While you may disagree, it's my opinion that the magazine's objective

WRITE TO US



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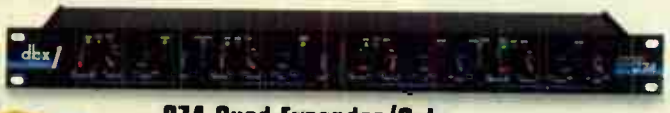

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REAR WINDOW

Q *The "Studio Design by the Numbers" article [April 1993] could not have come at a better time. I am in the early stages of having a studio/practice room built in an existing room. There is a three-foot square window on one side wall, well behind the main mix listening position. What can I do to work around it — without replacing it with a splayed angled window?*

Romulo M. Colmenar
Homestead, FL

A In both control rooms and studios, windows can be a wonderful architectural feature, since natural light can make this kind of environment a much more comfortable place to work. They can present some acoustical problems, however, and their size, type, placement, and construction has to be carefully integrated into the room design.

Windows are an acoustically "hard" surface at most frequencies. Like any other sound-reflective finish, if you think of the window as a mirror and your speakers as a light bulb, anywhere you can see the light bulb (speaker) in the mirror (window) there will be reflections that will combine with the direct sound and cause coloration and smearing. In your case, the window is far enough back in the room to avoid this kind of problem.

Angling the window as you mentioned won't really do much in terms of redirecting the reflected sound, but it could help break up parallelism between the window and the opposite wall (assuming the wall is acoustically hard as well). Two flat, parallel, hard surfaces can support "flutter echo" between them. In your room, that's not where your speakers are, though, so you probably won't notice any flutter except when talking while standing between them. Adding absorptive treatments to the opposite wall would also eliminate the flutter echo, but it would be detrimental to the left/right symmetry of the room, and even that far back in the room may adversely affect stereo imaging.

Finally, while it may not be necessary to do anything to the window to make it work with the room acoustics in the studio, it will probably be a weak link in the sound isolation from noise at the exterior of the building. If there's noise outside from traffic, air conditioner compressors, or whatever, you may want to add a second interior window to beef up the sound attenuation through this opening.

Richard Schrag
Consultant
Russ Berger Design Group, Inc.

PROGRAMMING PROBLEMS

Q *I need the specific System Exclusive (Sys. Ex) commands (F0, 43,...F7) necessary to save my programs and the four program change tables in my Yamaha SPX90II. I already have the SPX90's "General Sys. Ex format," but that is useless by itself. I don't have a computer, so a librarian program isn't an option. I'll even accept the Sys. Ex commands in binary or decimal notation and translate them to hexadecimal. (The SPX90II's Internal Switch #105 has been thrown to change MIDI Thru to MIDI Out.) Help! My batteries are running down.*

Mike Mahar
Troy, NY

A The SPX90II does include the internal switch that converts the MIDI Thru port to a MIDI Out port that you refer to in your question. Although you've already thrown it, the switch has been provided to allow a service technician to save the program contents of the unit prior to servicing. Opening the SPX90II to throw this switch does not void the warranty, but any damage done during this procedure will not be covered. Yamaha recommends that only qualified service personnel open the unit to set this switch.

All that having been said, the Yamaha Electronic Service Division provides technical support and documentation for all Yamaha electronic products. In the case of the SPX90II, the unit itself does not initiate the MIDI bulk dump commands, and it is not accomplished with just one command string. You must list each memory location with the corresponding hex command before you can dump that memory. The commands you require are contained in document CSM-681, which is available for 77¢ from the Yamaha Parts Department at 714-522-9011.

Regarding the battery, it is soldered on a double-sided circuit board. As a result, Yamaha highly recommends that you have an authorized technician perform the change. Once the battery is replaced, you can look forward to another 5 to 7 years of operating your SPX90II before you have to replace the battery again.

Peter Chaikin
Product Manager, Recording Products
Yamaha Professional
Audio Department

CAPPS OFF

Q *I am a studio musician-producer-songwriter who suscribes, and very much enjoys,* EQ *magazine. I purchased an old tube microphone, a Capps condenser mic, model CM 2011 (power supply: model CM 3003). Can anybody help me with information and access to parts and literature?*

Seth Glassman
Seth Glassman Music
Pound Ridge, NY

A The primary business of Capps and Co. was disk-mastering sapphire styli. Capps began operations in the 1940s and closed its doors in the mid-1980s. The microphone in question was one of several omnidirectional mics made by Capps in the '50s. It was made in relatively small quantities and, while it sounded like most other capacitor mics, was never very popular. The model CM2011A is black and was what we now call a semi-pro model. It was made for high-impedance inputs (47k ohms or greater). The low-impedance professional models were gray, 50-250 ohms. If the CM2011A is operated into an input of less than 47k ohms, headroom will be lost and distortion beginning at low sound pressure levels will result.

The component parts (with the exception of the capsule) were all standard and bought from jobber stock. The mic can be repaired, preferably by someone well experi-

World Radio History

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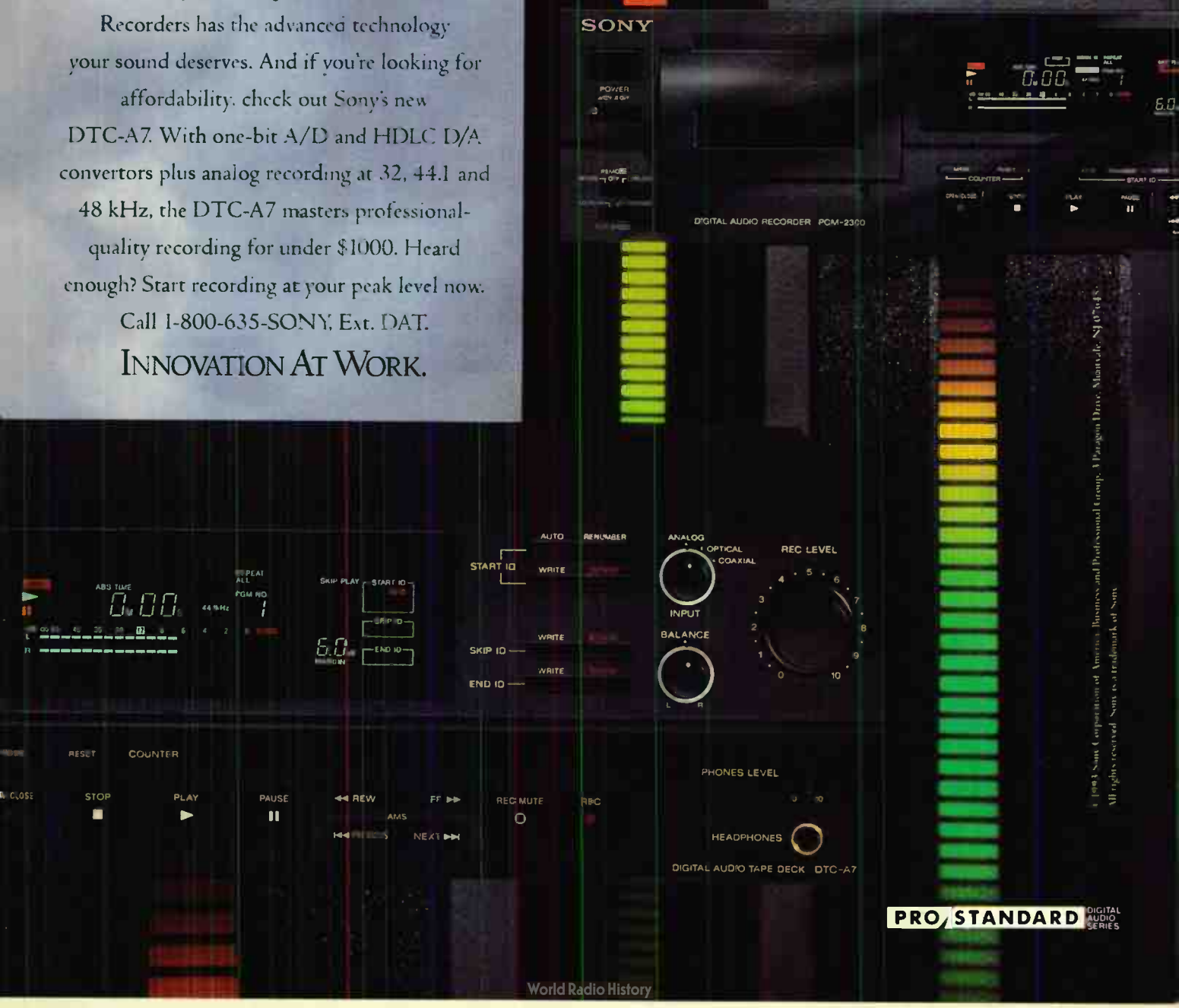

PRO STANDARD DIGITAL AUDIO SERIES

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World Radio History

The Seriou

The TASCAM DA-88 The Digital Multitrack Deck For Serious Production

It's true. The first machine designed specifically for low cost digital multitrack production is now available. And it comes to you from the world multitrack leader, TASCAM. It's simply the most advanced, well thought out and heavy duty digital 8-track deck you can buy. The best part is, it's incredibly affordable.

The DA-88 is built for production. The integrity of TASCAM's design is evident in every facet of the deck. From its look and feel — to its exceptional sound, unsurpassed features and expansion capability.

Goes Faster, Lasts Longer And Takes A Beating

While we admit that it's an elegant looking machine, it's tough to see its finest asset. The tape transport. Designed and manufactured by TASCAM specifically for the DA-88, it's fast, accurate and solid. And that's what counts in production — in personal studios, project studios or in those demanding high-end facilities.

You'll notice it uses superior Hi 8mm tape, giving you a full 108 minutes of record time. What's more, the transport is lightning fast and yet so quiet you'll barely hear it blaze through a tape.

We didn't stop there. Because production environments are notorious for constant, if not abusive, shuttling, punching, 24-hour operation — you get the idea — the transport was designed and built to take a beating.

Even more impressive is the transport's responsiveness. Take a look at the front panel. Notice the shuttle wheel? Turn it just a bit and the tape moves at one fourth the normal play speed. Turn it all the way and it flies at 8 times faster. Do it all night if you want. It's quick, smooth and it's precise. Need to get to a location quickly? Accurately? Shuttle a bit and you're there. The location is easily viewed on the DA-88's 8-digit absolute time display — in hours, minutes, seconds and frames. With the optional SY-88 sync card it displays timecode and offset, too.

Adding the optional SY-88 synchronizer card is as easy as changing a Nintendo® cartridge. With it you're SMPTE and MIDI compatible. And no matter how many DA-88s you have locked up, you need only one sync card. Other optional accessories include AES/EBU and SDIF2 digital interfaces allowing the digital audio signal to be converted for direct-digital interfacing with digital consoles, signal processors and recording equipment.

You Already Know How To Operate It

Unlike other digital multitrack decks, the DA-88 works logically and is simple to operate. Like your analog deck. All functions are familiar and easily operated from the front of the deck.

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World Radio History

s Machine

Take punching-in and out, for example. You have three easy ways to do it. You can punch-in and out of single tracks on the fly. Just hit the track button at the punch-in point. Hit it again to punch-out. You can use the optional foot switch, if you like.

Or, for multiple tracks, simply select the track numbers you want to punch, push play, and when you're ready, hit record to punch-in, play to punch-out.

Finally, for those frame accurate punch-ins, you've got auto punch-in and out. In this mode you can rehearse your part prior to committing it to tape.

No matter which way you choose, your punch-in and out is seamless and glitch free due to TASCAM's sophisticated variable digital crossfade technology.

That's not all, you also can set your pitch (± 6%), sample rates (44.1 or 48K), as well as crossfade and track delay times. All from the front of the DA-88.

Complete Synchronicity

There's more. Add the optional SY-88 synchronizer card to just one of your DA-88s and you've got full SMPTE/EBU chase synchronization. The best part is, you can record time-code without sacrificing one of your audio tracks. You also get video sync input, an RS-422 port to allow control of the DA-88 from a video editor, and MIDI ports for MIDI machine control.

A Digital Recording System That Grows With You

The DA-88 is truly part of a digital recording system. Start with 8 tracks today — add more tomorrow.

Adding tracks is as simple as adding machines — up to16 for a total of 128 tracks. They interconnect with one simple cable, and no matter how many DA-88s you have, they'll all lock up in less than 2 seconds.

Controlling multiple machines is made simple with the optional RC-848 remote. With it you can auto locate and catch 99 cue points on the fly. It comes complete with shuttle wheel, jog dial, RS-422 and parallel ports, and it controls other digital and analog machines, too.

Listen To The Rest

Of course, the sound quality is stunning. With a flat frequency response from 20Hz to 20kHz and dynamic range greater than 92dB, it delivers the performance you expect in digital recording.

So get to your authorized TASCAM dealer now. Check it out. Touch it. And listen to it. Once you do you'll know why the TASCAM DA-88 is the serious machine for digital production. The TASCAM DA-88 is the choice of studios worldwide. And at only $4,499, it should be your choice.

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EDITED BY DAVE BRODY

VIDEO FOR AUDIO

Most major studios have video lock-up equipment. Some have video tie lines in every room in the complex. So while recording basic tracks, I videotape the live room — specifically the drummer. I use an ordinary consumer camcorder into a 3/4-inch U-matic deck. There will be a track of SMPTE on the multitrack for board automation anyway, so you have the means to lock picture to audio.

Why, you ask? Well, for years I've been looking for the ultimate cue method for overdubbing musicians. With video you can watch the original basic tracks as if it were happening all at once. This is an incredible help from first basic through last overdub. And there are some other pluses. It's a great help for the drummer to see what he or she is doing right or wrong (it's common for athletes to video their games, right?). You will also have footage of the original keepers for future compilations. If you have a musician who lags behind, you can nudge the video ahead a few frames. I used this idea on the last MUCKY PUP album (I wrote and produced the last four) and if you need technical info on the idea you can fax me c/o World Management, 908-747-3357.

Chris Milnes,
Showplace Studios, New Jersey

[*EDITOR'S NOTE: Some lock-up systems don't like (or even allow you) to slave video transports to audio decks; the video must be the "master." This is not necessarily a problem, so long as you achieve a "hard sync" (usually called "framelock"). If, on the other hand, the audio transport is slewing around a bit while you're recording (chasing at sub-frame resolution but giving you a Lock-light), well, let's just say you may get a chorusing effect you didn't plan on.*]

MIDI + VIDEO

If you're running an integrated MIDI sequencer/Digital Audio Recorder (Studio Vision or Digital Performer for example), try driving your computer with SMPTE recorded on the video tape of a live performance such as Chris Milnes describes above. [Creating the chart in the sequencer may be a little tricky; you may want to capture SMPTE codes of the downbeats of significant sections (verse, chorus, etc.) to make your life easier when working with the parts "offline" (not locked to video).]

This will, among other things, allow you to watch the drummer and other musicians as you "playwrite" synth parts and samples to your sequencer. You'll find you pick up visual cues that will help you anticipate dynamics and phrasings much more easily than listening to the track and trying to remember how the flow goes. It's like playing live, but with the ability to punch-in, quantize, and otherwise massage your performance.

BODY LANGUAGE

If you're driving your sequencer with video (as in the Tip above) and your setup is equipped with a wideband SMPTE reader (or better still, if it can digest VITC [vertical interval timecode]) you can figure out the precise number of clock pulses between major beats to totally lock a sequencer part to the feel of the live performance. Just subtract the code of the earlier beat from the code of the latter to give you the duration between them. Remember that there are 30 frames per second, and convert frames to a decimal fraction of a second. Now multiply by the number of clock ticks your sequencer uses (480, 240, etc.). Things will get a little trickier if you're using drop frame SMPTE — you'll probably want a timecode calculator. EQ

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EQ PRODUCT VIEWS

AND THE PITCH

The C2P2 "Constantly Changing Polyphonic Pitch" is a brand new family of instruments that provide the musician with fundamental abilities that are absent from all other families of instruments. The C2P2 plays "soft" instruments that are created by the musician or composer. A soft instrument consists of a set of basic pitch values assigned to key controllers, and a corresponding set of pitch intervals assigned to sliding finger levers or fret controllers. Natural passages such as portamento chord transitions, inversions, opening and closing fans, and compound chord modulations are possible. For further information, contact Corrigan Marketing, 114 Lakewood Circle, Smyrna, TN 37167. Tel: 615-355-8756. Circle EQ free lit. #101.

MICRO'S SCOPE

Micro Technology Unlimited has released MicroEditor 2.1, a $79 upgrade of the Windows-based software for MTU's MicroSound hard-disk audio-recording, editing, and mixing system for AT computers. The new version features the ability to overlap, mix, and play up to 50 stereo segments at any point without bouncing, allowing mixed projects up to three hours long with non-destructive edits and over 1000 segments from up to 27 recorded master files. Multiple mode video and SMPTE support varispeed sync-locks even to video or analog tape. Full 8/16-bit Multimedia Sound Device driver is provided, mixing up to 50 stereo segments at any point from 16-bit Wave files, and supporting 8 kHz to 48 kHz sample rates and networking. For complete details, contact Micro Technology Unlimited. Tel: 919-870-0344. Fax: 919-870-7163. Circle EQ free lit. #102.

MOUNT A MIXER

The new M-1264 rack-mount mixer from TOA Electronics is a true stereo-matrix mixer that occupies 2U of space. By itself, the M-1264 can serve as a single mono or stereo mixer, or it can perform as five independent mono mixers. It offers five sets of outputs, each with its own level controls, stereo main, stereo group, mono aux, stereo cue/monitor, and a sum output that provides a mono mix of the main stereo output. The cue/monitor can be used for monitoring the stereo output, or it can serve as an independent mixer by assigning inputs only to the cue bus, or it can function as a left/right mono cue that can be used to prelisten to any combination of inputs. Of the 11 inputs provided, six are balanced mono mic/line inputs, four are unbalanced stereo/mono mic/line inputs, and one is a stereo/mono sub input that feeds the stereo-mixing bus. For more information, contact TOA Electronics, Inc., 601 Gateway Blvd., Suite 300, South San Francisco, CA 94080. Tel: 415-588-2538. Circle EQ free lit. #103.

SOLO LISTENING

The new MS-3 from Gold Line is a unique three-channel personal monitor mixer. It features three inputs hard-wired to three "Thru" outputs, allowing any incoming signal to be passed along completely untouched. As you play, a monitor/cue send from the mixing console can be blended with your original source signal, letting you create your own personal mix while simultaneously passing your signals untouched to the mixing consoles, monitors, and the other cues. Additionally, several multisend units can be daisy-chained. The MS-3 has selectable mono or stereo modes, and can be addressed via 1/4-inch or XLR connectors for all interface functions. Balanced or unbalanced operation is standard, and is optimized for -10 dB or +4 dB levels. For additional information, contact Gold Line, Box 500, West Redding, CT 06896. Tel: 203-939-2588. Circle EQ free lit. #104.

World Radio History

A REAL SWINGING GATE

Dbx has introduced the 266 dual compressor/gate, which is a member of the Project 1 line and delivers dbx sound and new performance features at $299 retail. The U.S.-manufactured 266 features two fully independent channels of com-

pression and gating that can be master/slave coupled for stereo operation, patented dbx RMS detection and VCA technology, and new attack and release circuitry that allows the unit to be tuned for different applications. Its compressor/gate takes advantage of dbx's patented VCA and RMS detection circuits. When you use the 266 compressor section's AutoDynamic attack and release controls, the center settings deliver the classic dbx sound, while the full control range will vary the voicing from slow leveling to aggressive peak limiting — you aren't restricted to using attack and release controls in "peak" limiting mode only. The gate provides a superfast attack and incorporates advanced new timing algorithms to achieve smooth, musical release characteristics. All dbx Project 1 products come with a two-year limited parts and labor warranty. For more information, contact AKG Acoustics, 1525 Alvarado Street, San Leandro, CA 94577. Tel: 206-894-3468. Circle EQ free lit. #105.

TWO FROM AKAI

The new CD3000 from Akai Professional is the first sample player to incorporate a built-in CD-ROM drive. Rather than building a sample player based around a fixed group of EPROM-based waveforms, Akai chose to take advantage of the

CD-ROM disc, which is becoming the preferred method for sound-library distribution. Set-up files can be created and stored to floppy or hard disks that can automatically load any specified programs from CD-ROMs, even from different disc partitions. The CD3000 allows you to fully edit both programs and samples, a unique feature. It has a memory capacity of 8 MB (expandable to 16) and also includes a SCSI port. In addition, the CD3000 offers direct digital recording from standard audio CDs. Akai is bundling five CD-ROM discs, which have been created by Akai, East-West, InVision Interactive, and The Hollywood Edge. Suggested retail is $3995. For more information, contact Akai Professional/Digital, 1316 East Lancaster, Fort Worth, TX 76102. Tel: 817-335-5114. Circle EQ free lit. #106.

The DR4d from Akai is an affordable multitrack hard-disk recorder, offering 4 ins and 4 outs at a list price of $1995. The DR4d is a dedicated digital audio recording and editing device rather than an add-on card for a personal computer. It is equipped with 18-bit 64x oversampling A/D converters, as well as with two channels of digital audio input/output. Up to four DR4d units can be chained together to create a 16-track system, and there is an optional remote (DL4d) that makes it easy to control all of them. A total of seven SCSI hard disks can be used (one can be an internal drive, and overflow recording across multiple disks is supported. An optional factory-installed 200 MB internal hard disk offers 32 track minutes right out of the box. For complete details, contact Akai Professional/Digital, 1316 East Lancaster, Fort Worth, TX 76102. Tel: 817-335-5114. Circle EQ free lit. #107.

HAVE YOU HEARD...

Passport Designs has just unveiled Passport Producer Pro, a real-time, interactive multimedia production tool. The new version offers producers interactivity, path-based animation, external device control, video support, and improved graphics and text capabilities...**Ibis Software** is offering Soloist. In conjunction with a Sound Blaster/compatible sound card, a microphone, and IBM PC/compatible platform, Soloist teaches the fundamental elements of music theory and progresses to advanced levels. It is designed primarily for folks who want to learn to play or to improve their playing, works with any instrument, including voice, and does not require MIDI equipment or instruments. It employs digital signal processing and retails for $59.95 ..**Opcode** has released EditOne, an inexpensive music software package for the Mac. It serves as an editor/librarian for storing, editing, and arranging synthesizer sounds and other MIDI device information. EditOne is a special version of Opcode's Galaxy Plus Editors, designed for a user who only needs an editor/librarian for a single, specific synthesizer or device. Price is $149 retail...The MS38 Lite is a new battery-powered stereo headphone amp/decoder from **Wes Dooley Audio Applications**. The unit provides flexible stereo monitoring, even when recording component MS direct to DAT. Inputs can accommodate monophonic or MS stereo sources. The unit weighs just 16 ounces and retails for under $300. The MS38 Mark II, also from Wes Dooley, is an MS stereo decoder housed in a compact, half-rack package. It's optimized for postproduction. Sum and difference insert points allow additional reverb to be added to a stereo mix without affecting mono capability. Retail price is $585. .**GEPCO International, Inc.,** has added a rack-mount custom chassis to its line of custom products. The chassis is designed to fit a standard 19-inch rack and is made of extruded aircraft aluminum. It measures 5.25 inches high by 4.25 inches deep, and 17 inches long with a front panel that measures 3.5 inches by 17 inches...**Otari Corporation** has released the CB-158 Hardware Control Panel for its ProDisk line of digital audio workstations. The CB-158 HCO speeds up the operation of the ProDisk system and reduces the learning curve. In addition to controlling ProDisk, the HCP will also provide machine control of up to four external video or audio decks. List price is $3495. Otari has also introduced the BackUp Station for its ProDisk line. It provides a low-cost solution to the time-consuming process of backing up and storing files...Calling all roadies and technicians: **Acme Staple Company** has begun shipping three new staple guns for use by professional wire and cable installation technicians. They feature a new bottom-load design that makes them easier to load, clear and clean.

World Radio History

EQ PRODUCT VIEWS

CLOSE IT UP

Built using laser technology, the new series of Slim-50 multiple bay electronic enclosures from Middle Atlantic Products is designed to handle virtually any application. Constructed using 12-gauge steel corners and 14-gauge steel tops and bottoms, the enclosures feature laser-cut 1/4-inch structural steel internal braces for added strength. Six models are offered ranging in height from 37 spaces to 44 spaces. Depth is available in measurements of 25 or 30 inches. Each model offers two pairs of 10-gauge, fully adjustable threaded rack rails and electrical knock outs positioned in three areas with 1/2-inch, 3/4-inch, 1-inch and 1 1/2-inch sizes. Custom options are available. For more information, contact Middle Atlantic Products, Inc., 8 North Corporate Drive, Riverdale, NJ 07457. Tel: 201-839-1011. Circle EQ free lit. #108.

CIRCULAR SURROUND

RSP Technologies' Circle Sound Music Surround System is the first 4-2-4 professional surround encoder for music productions. The device contains four inputs. Right, left, center, and rear information is fed from the mixer to the Circle Sound Encoder, effectively reducing the four channels down to two channels for conventional medium storage on CD or cassette. With the Circle Sound Encoder, any mixer with four assignable outputs is capable of producing surround productions. Although millions of 4-2-4–based surround decoders have been sold to consumers, until now the encoder technology required was financially out of reach to the project studio. The complete three-unit Circle Sound Music Surround encoding system retails at $2069 and allows 360-degree panning of individual instruments or sound effects. For more information, contact RSP Technologies, 2870 Technology Drive, Rochester Hills, MI. 48309. Tel: 313-853-3055. Circle EQ free lit. #109.

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and Minimum Feedback.

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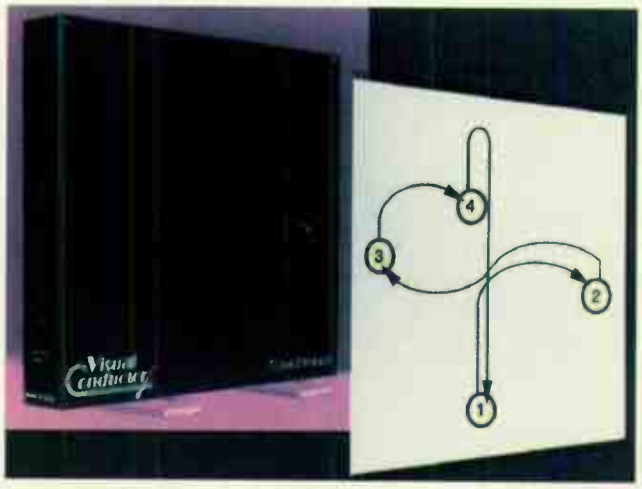
HUSH UP

The HUSH Elite is a professional, stereo, single-ended noise reduction system, combining effective real-time HUSH Systems technology with "Auto" mode for hands-free operation. "Auto" selection will put the Elite into stereo master mode and select optimum filter and expander thresholds, filter cut-off points, and release times. Noise floor changes greater than 35 dB will change these parameters automatically as the audio itself changes through the Elite's employment of an expander circuit that incorporates HUSH's VIR (Variable Integration Release) circuit. Intelligent high- and low-pass sliding dynamic filters coupled with the VIR enable the Elite to track CD and DAT to cassette or VHS, with no adjustment. Controls include master threshold, high/low filter tracking, expander tracking for user-adjustable effect, stereo master, auto/manual mode, and bypass switches. LED metering includes bandwidth for high/low band filters and gain reduction indicating the amount of expansion. For further information, contact HUSH Systems, 2870 Technology Drive, Rochester Hills, MI 48309. Tel: 313-853-3055. Circle EQ free lit. #110.

CONDUCTING YOURSELF PROPERLY



The Visual Conductor from TimeStream Technologies is a unique MIDI device that displays the beat visually, eliminating reliance on audible cues such as click tracks or metronomes. Forty-eight LEDs behind a smoked plastic 12-inch x 10 1/2-inch panel create the illusion of a single light moving in gestures that parallel a conductor's baton tip. You can program the unit to "conduct" using standard baton patterns or "bounce" on the beat. Since time is traced between beats, changing rates of speed are anticipated, making any track easier to follow. Virtually all time signatures are supported, and the hardware can be defaulted to a 4/4 baton pattern or simple bouncing ball pattern. The surface- or wall-mountable unit slaves to any sequencer or drum machine, following MIDI clocks. Conducting patterns are programmed by inserting patch or controller changes into the sequence. MIDI In and MIDI Thru ports are provided. The company is currently offering the product at an introductory price of $229, direct. For complete details, contact TimeStream Technologies, 318 Marlboro Road, Englewood, NJ 07631. Tel: 800-343-1149. Circle EQ free lit. #111.

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OUT OF THE ORDINARY

Duran Duran

"Why support somebody else's overhead when you can set up your own future by owning your own facility?"

In the early to mid-1980's, when Duran Duran's videos made up the better part of a teen's television diet, no one would have predicted that the band that delivered such stylish, yet lighthearted singles as "Hungry Like The Wolf" and "Rio" would end up producing a #1 hit song, "Ordinary World," in the age of techno, grunge, and gangsta rap. But after several defections and a handful of offshoots (Power Station, Arcadia), Duran Duran has come back with a hip new sound. And while the group, consisting of Simon LeBon, Nick Rhodes, John Taylor, and Warren Cuccurullo, has no illusions as to where their bread is buttered (Girls! Girls! Girls!), they are no longer concerned with producing music custom-made for the MTV template. In fact, the act that once heralded a hectic synth/rock revolution nearly a decade ago has found creative salvation in a very ordinary world — their project studio.

For their latest CD, *The Wedding Album*, Duran Duran set up camp in the living room of guitarist Warren Cuccurullo's house, located in the heart of London. Cuccurullo's reasons for building his own home studio for the band was clear from the outset: "Why support somebody else's overhead for the next five years by paying their daily studio rates when you can set up your own future by owning your own facility?"

"Having our own studio was very appealing," adds keyboardist and founding member Nick Rhodes. "It took away a lot of the tension of recording and let us concentrate on the music. You have the luxury of spending time creating, trying different devices and making the right decisions."

On any given day, lead singer Simon LeBon could be found laying down vocals standing in front of the couch, while the band engineered from a nearby DDA DMR12 console. "I was at one end of the room, improvising vocals, while the band sat by the console and ADATs, listening and looking on," states LeBon. "I found myself getting a bit self-conscious at first, singing in a room full of people, but I had pictures of Jimi Hendrix and Jim Morrison hung over the console to keep me inspired."

Cuccurullo, the newest member of the Duran clan, mentions that a few years ago it would have been impossible to make a rock and roll album in one's living room. While there were a great deal of computer-oriented dance bands producing homegrown songs on Fostex 8-tracks, the obstacles grew considerably when it came to recording a modern rock band of Duran Duran's nature. "In the past, if you had a guitar player in the band, you needed huge cabinets to get the right rock and roll sound," says Cuccurullo. "But then you'd face the problem of disturbing your neighbors." Duran Duran managed to record all of *The Wedding Album* without distracting any of their nearby neighbors — the hundred or so girls who stood outside the door, notwithstanding. "Now, we're using some speaker simulators that perfectly complement the home environment," adds Rhodes. "The whole stage is set up in the living room, and I play guitar through my stereo. It's a very low-tech, laid-back environment, but we have enough equipment in here to fill a skyscraper."

One of the songs on the new album, "Come Undone," actually owes its entire existence to the project studio the band has come to know and love so well. "I plugged in my Zoom 9030 and began playing some minor guitar keys that sounded very strange, very underwater," Cuccurullo recounts. "Nick came over to work on some cover songs, but after hearing this groove, we felt strongly about it as a potential single. The problem was that the final tracks were due in less than a week." Both Rhodes and Cuccurullo agree that it was their studio that gave them the freedom to flesh out the song, record it in time, and include the song in the album. The song has since gone Top 10 on Billboard's pop charts.

—Jon Varman

DURAN DURAN rock into the nineties with their project studio.

World Radio History

THE EQ 5-MINUTE INTERVIEW: RUDY VAN GELDER

PHOTO BY PETER MONROE

When *EQ* contacted Rudy Van Gelder, engineer for some of the greatest jazz recordings in the history of the genre, he hesitantly agreed to be interviewed, but laid down some firm ground rules. In fact, Van Gelder, who is being inducted into the TEC Hall of Fame at the AES this fall, explained, "I think you have a pretty good magazine. But I don't want this to sound stupid, as so many historical articles do. I won't talk about my techniques and I won't respond to ridiculous questions such as, 'What was John Coltrane like?'" So we took it from there.

EQ: Do you feel that records of great historical significance are being made today?

Van Gelder: There are some, yes, but not in the quantity that they were in the past.

EQ: To what do you attribute the lesser quantity?

Van Gelder: The problem I have with answering that is that it involves a frank and honest discussion about the people who are making the records, the producers, those who are making the decisions, who they are, and what they're doing, as opposed to the people who were making the records back in, say, the '60s. Their motivations and where they stand in relation to whose money is being spent [may be different]. During that time the small companies who made those records were owned by people who loved the music and had faith in it.

EQ: As far as jazz is concerned, where do you hope the record business progresses to?

Van Gelder: What I would like to see is an environment where small companies can compete on a quality level, technically, with the large companies. That's sort of the situation I've always tried to achieve. And I'd like it to be a situation where producers can maintain a profitable company without having to resort to making the kinds of music that they really don't care to do. The answer to that would be either greater sales to the public, or financial backing from large companies or institutions who would be acting from an altruistic standpoint. And I think that eliminates the major [record] companies.

EQ: Do you feel that the records you've made over the years have had an impact on the records being made today, either technically, artistically, or in any other way?

Van Gelder: Yes.

EQ: Can you get a little more specific?

Van Gelder: No, not on that. I can only tell you that I hear from a lot of musicians, almost on a daily basis, that the records I've made with them are their best. And it's very, very satisfying.

EQ: Is there anything that comes to mind that you might want to add?

Van Gelder: Some musicians expect to come here and have me record the way I did in the '60s. And that's not what I do. I'm constantly changing what I'm doing. My effort in this business is an evolving one, even though a lot of people really feel that the '60s records are what they like to hear and that I helped the musicians of that time to communicate. But those same musicians come here today and I don't look at that as an opportunity to record as I did in the '60s.

EQ: So you're constantly evolving?

Van Gelder: Absolutely.

—David Jacobs

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SAMPLE MAN

Tony McAnany

"We do instrument creation. We do not lift prerecorded sections from a record."

TONY MCANANY (center) with sample sources Claude Gaudette (left) and Phil Ramone.

Tony McAnany may have more recordings to his credit than any other single producer — including some of the biggest names in the business. Then why haven't you heard of him? Hey, why isn't he on the cover of this magazine?

McAnany's credits are not for songs, they're for samples. In fact, McAnany is credited with bringing Ensoniq to a whole new level of sound development, thanks to his creation of the Signature Series, a host of programs consisting of recorded sounds from famous people. By approaching and persuading such notables as Nile Rodgers, Craig Anderton, and Paul Jackson Jr. to come into the studio for sound-sampling sessions, McAnany helped to dispel the nasty stigma attached to the art of sampling. At the same time, he helped to open up a new and profitable market for talented musicians eager to integrate their sounds into a whole new realm.

"I began this in order to legitimize sampling," says McAnany, who now works as director of A&R at Angel Records. "When I first started out as a second engineer at a studio, a producer came in and lifted samples from a recording session that some of my trumpet heroes performed on. That really soured me as to what sampling was all about. So when I was put in charge of sound development at Ensoniq, one of my edicts was to make people recognize

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sampling as a positive force. It isn't an art if people get ripped off."

One of the most common errors people make about McAnany's work is comparing his sampling to the type of sampling associated with the rap industry. Says McAnany, "We do instrument creation. And if we need a drum loop we generally record it from scratch and then sample it." How can you tell a good sample from a bad one? "It's pretty simple," he says. "Just use your ears. If it sounds bad, then it is."

When McAnany arrived at Ensoniq, there existed what amounted to a decent-sized library of sounds for the now-classic Mirage sampler. By the time he left, which was only recently, Ensoniq had amassed a spectacular array of samples garnered from the best sources in the business. When it came time to create some vocal samples, McAnany summoned the talents of Maurice White, singer for the '70s funk unit, Earth, Wind & Fire. "I called him up and asked him if he'd like to try a sampling date and he was like 'What's that?' And at this time, which was the late '80s, sampling had a bad name. But he came in, and we used the same engineer and the same microphones he used on his record "Heritage" [Lionshare Recording]. We recorded him chromatically throughout his entire range, and tripled it. The final product was extremely successful." McAnany has also orchestrated successful sample sessions with synthesist and composer Claude Gaudette ("Wind Beneath My Wings"), Jason Miles, and his mentor and inspiration, Phil Ramone.

"It was amazing to have the opportunity to work with Phil. We did the most comprehensive sampling session for strings that was ever done. Phil loved the samples so much that he actually used those strings for a movie."

So after all is said and done, is there a starter kit that McAnany can recommend to students of the sampling trade? "Get your ASR-10, which already comes with great sounds," he says. "And ask the dealer for the Jason Miles Signature Series, the Richard Souther, and the David Hentschel. Then branch out and get your Joey DeFrancesco organs, your Marcus Miller basses, your Miami Sound Machine horns..." In the wonderful world of sampling, the options are endless. —*Jon Varman*

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Garden State Sanctuary

STUDIO NAME: Sanctuary Studio
LOCATION: Rumson, New Jersey
MAIN MEN: Jon Bon Jovi, owner; Obie O'Brien, design engineer
CREDITS: "Levon" from the *Two Rooms* album (recording and mixing); Rick Vito's *King of Hearts* solo album; Bon Jovi's *Keep the Faith* demos
CONSOLE: DDA DCM-232 40-input, 80-return, 32-bus automated desk
RECORDERS: Otari MX-80 24-track; Studer A-80 1/2-inch, 2-track; Panasonic DAT
MONITORS: Yamaha NS-10; Tannoy SGM 10B's
AMPLIFIERS: Yamaha PC 1002 [3] and PC 2002 [2]
MICROPHONES: Neumann 87 [2], 84 [2], and 47 FET; AKG 414 [2] and 451 [2]; Sennheiser 441 [2] and 421 [6]; Shure SM57 [6]; RCA DX-77 [2]
OUTBOARD GEAR: *EQs* — Neve 1091, API 550 [2], Pultec EQH-2 and MEQ-5; *Reverb* — Yamaha Rev 5 [2] and SPX90II [4], Lexicon PCM-70; EMT 140-S tube stereo plate; *Delays* — Lexicon DCM42, Bel BD80; *Gates* — Drawmer DS 201 dual gate [2], Aphex Dual Gate Expander [2]; *Compressor/Limiter* — UREI 1176 [2] and LA-3A [2], Drawmer 190 stereo tube comp/lim; *Harmonizers* — Eventide H3000SE; *Samplers* — FORAT
EQUIPMENT NOTES: O'Brien states: I love the DDA console. It's just like my Harley — it looks good and sounds great, plus it works all the time. Another plus about the DDA is the service. I called them up, told them what I needed, and told them that it had to happen in two weeks and they didn't even blink an eye.

Nothing sounds like an EMT plate. I had bought it used at just the right time — right before they became popular again and the prices went up.
STUDIO NOTES: Concludes O'Brien: It is a colossal pain in the ass to build a studio in a basement. About halfway through I had the crew calling me up, saying "I hate you," and hanging up. But the whole crew was great. The main guys were Al Campbell, who was the foreman, Nick DiDia, and Frankie Long. Since then, Nick has been engineering out in L.A. for bands like Soul Asylum and Danzig. He also did the new Pearl Jam record. Frankie is part of a band called Bloody Stools. Both Nick and Frankie have said they will never build another studio. EQ

ANOTHER GRATUITOUS CELEBRITY CUT OUT BROUGHT TO YOU BY *EQ* MAGAZINE (Anybody remember Madonna?): Obie O'Brien and "Jon Bon Jovi"

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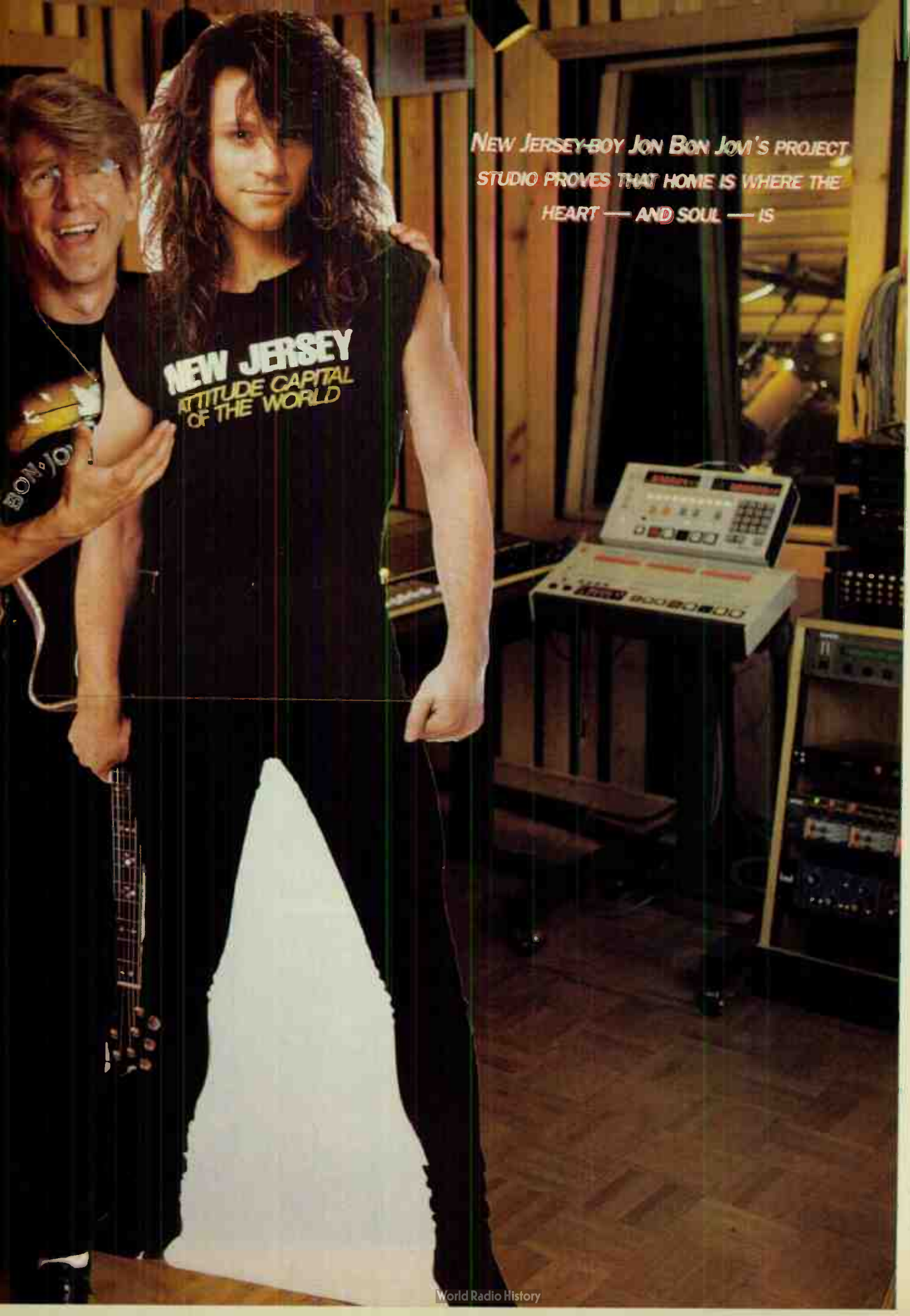

NEW JERSEY-BOY JON BON JOVI'S PROJECT STUDIO PROVES THAT HOME IS WHERE THE HEART — AND SOUL — IS

Photo by Julian Jaime

World Radio History

The Wendy Carlos Interview

Talking with the famed composer on the changes in project recording and electronic music

BY CRAIG ANDERTON

You probably know that Wendy Carlos recorded the bestselling classical album of all time, *Switched-On Bach*; did the soundtracks for *Clockwork Orange*, *The Shining*, and *Tron*; and recently released *Switched-On Bach 2000*, a deep, complex, and expressive 25th anniversary remake of *SOB* that benefits from 25 years of both technological progress and Wendy's artistic progress. What you may not know is that Wendy can hack code, keeps a soldering iron ready in the studio for the many mods she does for her gear, is very involved with restoring soundtracks for classic films, chases eclipses around the world — and is one of the brightest people you'll ever meet.

Rather than conduct a traditional interview where my questions would take up a lot of space (you want to know about her, not me!), I've excerpted the "greatest hits" of over two hours of casual conversation, loosely organized into various topics.

Why SOB 2000 took much longer to make than SOB, despite the digital age of "labor-saving" devices: One reason is that when you're doing a project like this, you always find yourself needing a voice you don't have, so you have to stop and rebuild it. Yet it's much harder to program synthesizers today. Look at what you're forced to use: a rotary knob/slider/buttons that all control the same parameter at the same time. You can't even control two or more parameters simultaneously.

I usually worked 12 hours minimum to 16 maximum every day, and sometimes wouldn't even be aware of what day it was. Starting a session and just picking up where I left off was difficult, though, because every third day or so I'd have to troubleshoot some new major bug — was it one of the MIDI Time Pieces, the Mac II fx, peripheral equipment — I had more damn creative bugs! It was exasperating, because troubleshooting kills the pacing. The creative part would have to go on the back burner while the analytical side got involved.

Recording on the Akai ADAM: I was nervous about buying an ADAM — I had wanted a Sony digital multitrack, but couldn't afford it. Now I'm glad I couldn't get the Sony. The ADAM is small, has a neat locator box, and 12 tracks is more than enough for this kind of work when you have MIDI available as well. During *SOB 2000* I maintained the heads and used good quality tape, and didn't have a single ADAM-related problem.

I did modify the analog I/O, however. The Japanese insist on designing transformerless circuits in their audio gear, and it's a grave injustice that a myth of inferiority has been promulgated about transformers. I made a transformer-based box to interface the 12-track to my unbalanced console, and the sound is much better. The only transformerless box I've heard that sounds very good is Digidesign's Pro Tools interface.

Unbalanced gear vs. balanced gear: I've been using unbalanced gear since 1967, and never had a problem with it because I do it right. One copper penny attaches to the back of the card rack in the console; this goes to the aluminum screen underneath the carpet, which grounds to all the aluminum foil-backed Sheetrock that turns this whole studio room into a Faraday cage [Wendy lives in the middle of New York City and is bombarded with RFI 24 hours a day]. Everything grounds only at one point—there are no ground loops anywhere, the power line comes in properly, and all the audio is +4. The computer and MIDI cords are off on one side of each rack and separate from the audio.

There's another secret to making this work: outputs should have very low impedance, inputs should have quite high impedance — 5 to 10k or more. You should never draw current from an output, just pick off a voltage.

Why Wendy likes tape: I'm a little old-fashioned. I cut my teeth on multitracks and I like the idea of a medium that doesn't crash — my temperament isn't suited for the more fussy nature of computerdom. Everything ends up on the 12-track, and it's mixed from there. Sometimes I do need to premix, but *SOB 2000* didn't require that.

Wendy's minimalist homemade console: There are no equalizers on the inputs, only on the busses; the mixer is basically a passive console with the fewest possible number of gain stages. I'm using Spectrasonic preamp cards that are quite old now — but they still sound a whole lot better than the op amp consoles I've used. I've rebuilt the mixer three times; it's clean, quiet, and has very little distortion. Yet it's a small console by today's standards and has very few bells and whistles. It certainly doesn't look like anything on the cover of *Studio Sound*.

Thoughts on the Swiss Army knife of audio: I think I'm an equal opportunity engineer and will use any gear if it does the job properly, except that I tend to be very prejudiced against boxes that give you a compressor, limiter, phaser, expander, denoiser,

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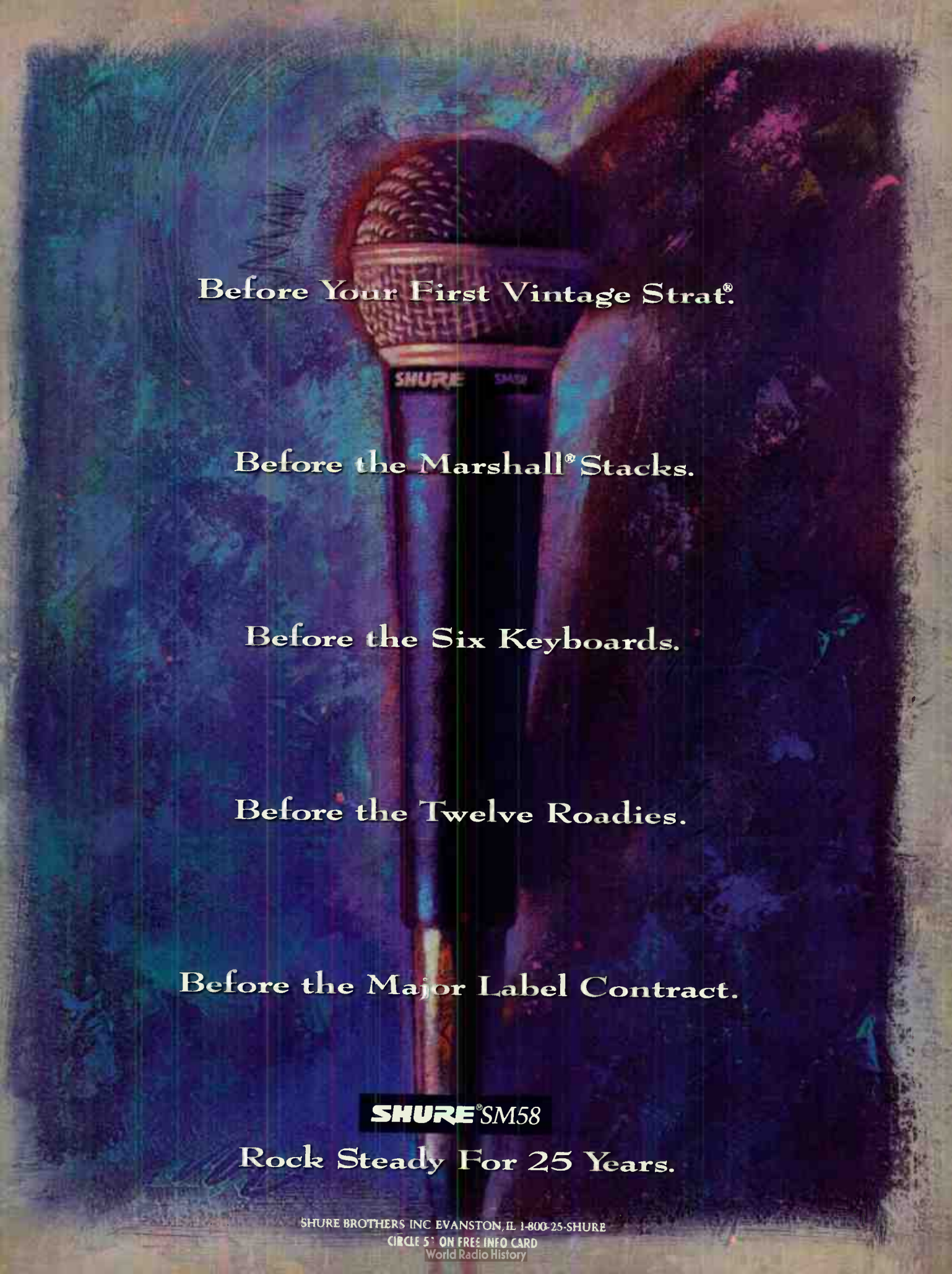

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delay, reverb, and microwave oven for $400. When you're working on something and need a tool, you reach for a good screwdriver or hammer, not a Swiss Army knife — you use that only when you're camping or on vacation. There's a lot of good, inexpensive single-purpose equipment, and that's mostly what I use.

One of the motives for doing SOB 2000: I wanted to make people more aware of alternative tunings. If we don't use the great resource of alternative tunings that manufacturers have permitted us, they'll eventually vanish.

I did an interview on National Public Radio where they compared things like the last few seconds of the "Jesu" from the first album, with the new version, and it's clear that the first version is much rougher sounding and fluttery because of the even-tempered tuning vs. the mean-tone tuning that I used on the new version. It's plain as day. The only reason we tolerate equal temperament is because we've had nothing but — it's like our own body odor, we're used to it.

Tuning comes into play when people attempt to make synthesized orchestras; a real orchestra generally does not use pure equal temperament. The harp and the piano will try to, woodwinds are a variation of some equal temperament and some just intonation, brass is definitely just intoned in several keys since they're playing natural harmonics. Strings are tuned in fifths, so they're Pythagorean, and string players tend to favor just intonation when they're holding chords for any length of time, without knowing it (as do a cappella singers).

Mixture ranks on a good classical pipe organ are tuned justly, since equal-tempered overtones vibrate badly. It's a very heterogeneous mix of tunings we live with, and our notation developed more out of mean tone; C# and Db are not the same pitches except when we reference them to pianos. Tuning is a field that's open to experimentation—I don't know what I'm doing completely; I'm experimenting just like anyone else at this point.

The virtues of tempo changes: With sequencers, you can "conduct" the tempo — put in the ritards and pick the tempos — at the end of the composition process, which is wonderful. It makes the music feel more alive. I don't normally tap in the tempo; I use trial-and-error, working with one piece for an afternoon until the whole thing feels right. It takes longer than tempo tapping, but is more accurate.

Changes in synthesizers over the last 25 years: There haven't been enough of them! Kurzweil's 150 FS was heading in the right direction, but then they went to the usual big sample engine with a bunch of processors on it. If I want to bake a cake, I'd like to start out with my own flour and yeast — I don't want to start with a Betty Crocker package, add a little cocoa powder, and call it my own.

Two-oscillator FM synthesis alone is lousy. What I'd like to see is the combination of quite a few oscillators with complex frequency modulation available between all of them where you can define your own

continued on page 112

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Perception of Doors

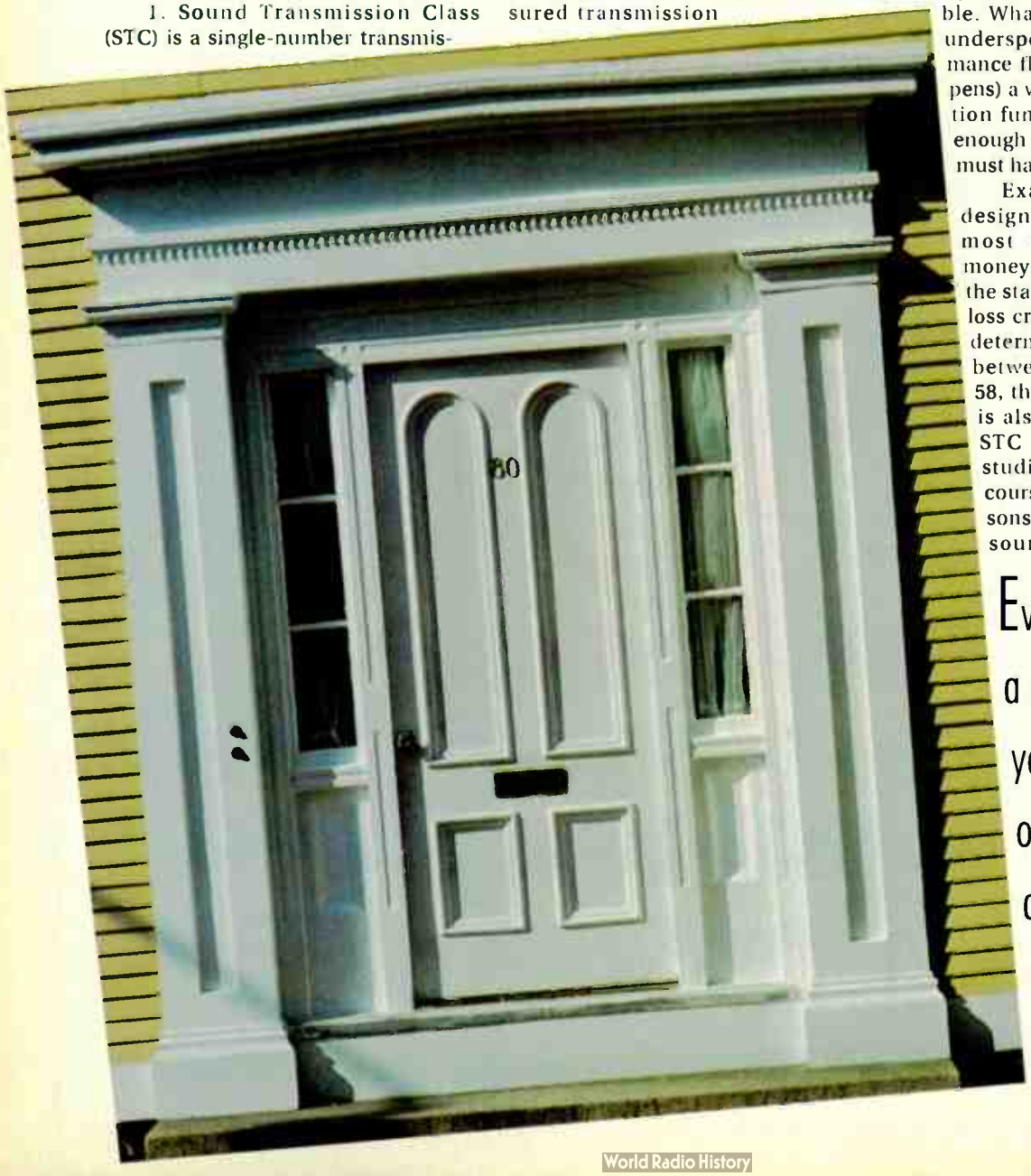
The studio door is one of the more complex and expensive components in the recording studio architectural vocabulary. These door assemblies come in all shapes and sizes, degrees of installation complexity, and budget ranges. One thing is certain: you can't have a studio without one. In fact, if you really think about it, the studio door is where every project begins and ends.

To understand the studio door, you first need a basic understanding of two technical concepts:

1. Sound Transmission Class (STC) is a single-number transmission rating calculated in accordance with ASTM classification E413. It is obtained by adjusting actual measured transmission losses in the sixteen 1/3-octave bands from 125 Hz to 4000 Hz. A reference contour and other averaging algorithms integrate these measurements and generate the single-number STC rating. In general, the higher the STC number the better the full-frequency transmission performance of the door. (Note: This is not always true, but in general it is. [see fig. 1, showing a typical STC curve].)

2. Design STC values for studio boundaries (a floor/wall/ceiling — and all openings — system) should always be as carefully defined as possible. What is at stake if a value is underspecified is either a performance flaw or (as frequently happens) a waste of valuable construction funds. It is simply not good enough to say that all studio doors must have a rating of STC 56.

Exact transmission loss design criteria are usually the most efficient way to save money. Doors need never exceed the static boundary transmission loss criteria. For example, if it is determined that the STC rating between two rooms should be 58, then a door with that rating is also required. This type of STC value (typical for many studio wall boundaries) is, of course, one of the primary reasons why double doors and/or sound locks are common in



Every studio needs a door, but how do you make sure that only people enter and exit — not sound

BY JOHN STORYK

World Radio History

high-performance studios with high transmission loss requirements. [Note: we will discuss transmission loss values and sound locks in a future article.]

STUDIO DOOR TYPES

There are two families of studio doors frequently used in today's studio architecture:

1. Individually fabricated wood doors with applied acoustic seals. Often this is, in fact, two wood doors

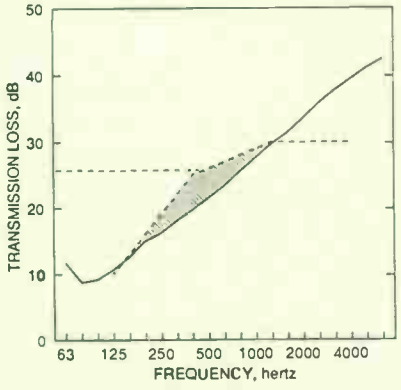


Figure 1: STC curve by Cyril Harris, Acoustical Measurements and Noise Control

attached to each other in one form or another.

2. Manufactured door and frame. Typically this is a metal door with integrated seals and related hardware.

Both types work according to the same two fundamental design principles:

1. An increase in mass increases transmission loss and, subsequently, the STC rating.

2. Since doors, by definition, move (usually around a hinge), there must be some sort of mechanism for sealing the spaces between the moving mass (the door) and the nonmoving mass (the jamb and sills attached to the wall and floor).

There are advantages and disadvantages to each type.

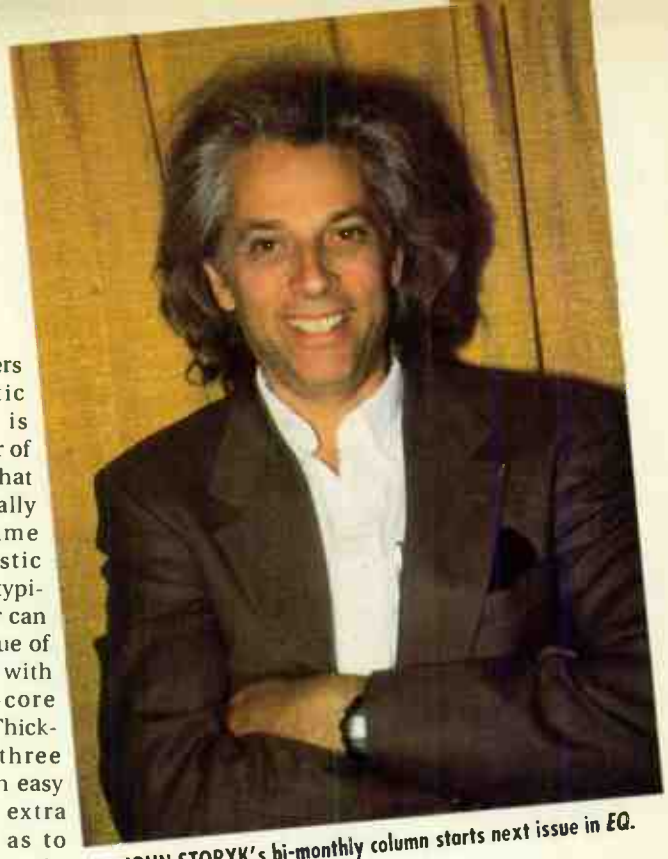
FABRICATED WOOD STUDIO DOORS

The Door Slabs. There are many varieties of this type of studio door. It has been a part of studio construction for at least 50 years — simply because there were no manufacturers of metal acoustic doors. A door slab is basically a wood door of specified thickness that is hinged conventually in a solid wood frame with applied acoustic stops and sills. The typical studio wood door can approach an STC value of about 45 or 46 only with extra-thick, solid-core wood construction. Thicknesses of two to three inches are typical. An easy way to create this extra thickness, as well as to increase transmission loss value, is literally to attach two solid wood-core door slabs together with a decoupling material such as 1/4-inch neoprene or 1/4-inch pegboard as a solid septum boundary. (See figs. 2 & 3 - showing this type of multiple-slab wood door in typical studio partitions.)

Tip: Wood doors must be sealed on all surfaces, which means presealing prior to assembling. Failure to do this will increase the risk of door warpage. Pay special attention to the tops and bottoms of doors!

Several companies, including Weyerhauser, offer premanufactured "acoustic doors." These are generally slabs only (no frames or hardware) and are usually no more or less costly (and effective) than extra-massive, solid-core wood door slabs. Other than finish, price, etc., there is very little secret to all of this: more mass equals higher STC, if the seals are good.

Extra-thick wood doors will naturally weigh quite a bit — often as much as 150 to 200 pounds more than a standard-size door. My experience is that hinging works better by simply adding a fourth hinge. Any quality 3 1/2-inch pin hinge will work; simply add an extra one.



JOHN STORYK's bi-monthly column starts next issue in EQ.

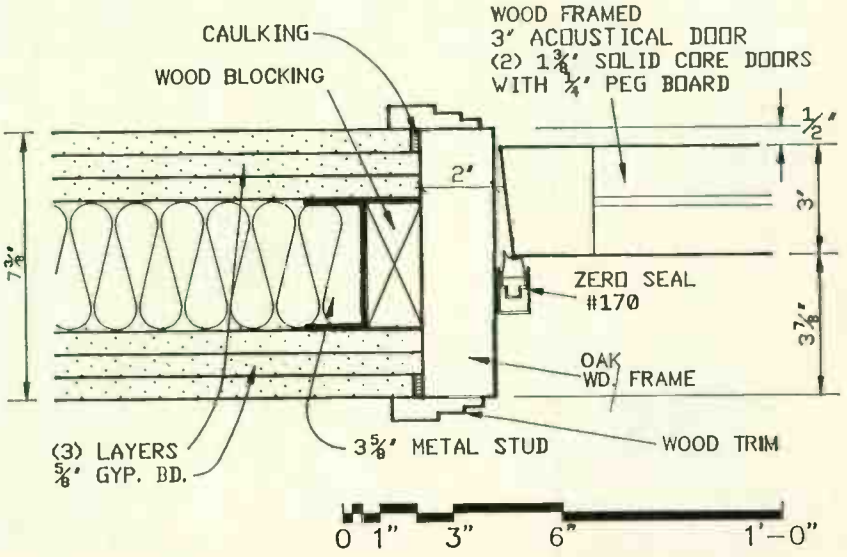


Figure 2: A typical studio double-slab wood door with interior decoupling boundary. Note the surface-applied acoustic seal on a flush wood frame in a single-stud acoustic partition.

World Radio History

ALL ABOUT HARDWARE

If you have a door you will need some sort of hardware. Hardware by definition is not acoustic, but there are some pointers in this area as well.

1. The less hardware the better.

2. If you have specified a manufactured metal door that uses a cam-lift hinge, then you will not need a closer. Closers are hard to adjust. A non-lifting door will demand a closer if you want the door to close. Often, in order to make the door activate the drop seal and develop a good fit, the closer has to be set at a very strong position, creating problems simply in pulling the door. After time, when the seals become maladjusted (and they will), the closer appears to close the door, but doesn't really do the job.

3. In general, I try to avoid closers on non cam-lift doors.

4. Try to avoid latching door hardware. Instead (on wood doors) use two adjustable roller latches at 1/3 top and bottom locations. These will also allow you to adjust the exact strike location after setting the door, as well as later on. If you need to lock the room, install a dead bolt. The fewer the holes in the door and frame assembly, the better.

5. Remember: ANSI Handicapped Standards require levers or pulls. These have been quite common in studios for years.

The Door Seals. The weakest part of all studio doors is generally the seals. This is certainly the case with custom-fabricated wood doors. The primary difference between wood door systems and completely fabricated metal door systems is that wood door require a separately added jamb- and sill-sealing system. Wood doors (and jambs) receive surface applications of the acoustic door seals. There are two major manufacturers of these in the U.S.: Zero International and Pemko. Their products are quite similar, although my experience is that Zero's adjustable door jambs have more adjustment play than those of Pemko (see fig. 4, showing Zero adjustable acoustical jamb seal). Wood doors move, no matter what you do — so having this extra adjustment play can be quite useful two years after installation.

There are a variety of seals, some more efficient than others. Economy would have you match the correctly rated seal with the correctly specified door, or (in theory) you would be wasting money. I typically will overspecify the seals. They are always the weak link in the sound transmission chain. A four-sided seal would of course be best, but this is rarely possible since it would require a bump of some sort at the bottom of the door, in the floor. This has resulted in the invention of the drop-seal. The drop seal is a full-width metal housing (flush or recessed, mounted at the bottom of the door) that contains a mechanically activated seal that falls as the door reaches its closed position.

Most drop seals are activated by an adjustable extender rod that catches the jamb on the hinge side. Adjusting the extension of this rod (typically accomplished by simply turning it one direction or the other) will adjust the amount of "drop." For the most part these seals work successfully, although, by their mechanical nature, they are typically the first part of the door system that will need replacing — or certainly adjusting. Too tight a seal will simply not work, as the seal will have fallen before the complete closing rotation of the door. A balance must be established between a great seal and a properly functioning door. A little field trial and error will accomplish the correct setting. Drop seals will not work correctly if they are not dropping on some sort of solid and plane threshold (saddle). Typically these are wood or metal.

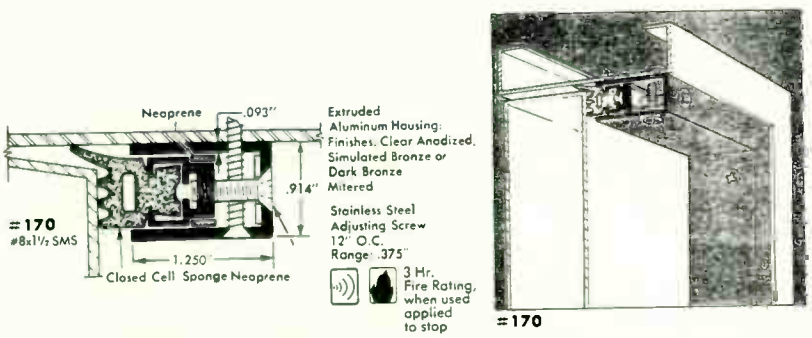


Figure 4: Profile and isometric sketch of a high performance adjustable on-site mounted acoustical seal manufactured by Zero or Pemko. The adjusting screws are very important as the wood doors move with use.

METAL DOOR SYSTEMS

Several companies sell premanufactured door and frame assemblies that are typically constructed of metal. As with wood doors, the slab itself works because of mass. Additionally, the metal fabrication process allows the manufacturer to fill some of the void with acoustical dampening material. The door slab becomes more efficient (particularly at lower frequencies in less thickness). Typical door thickness for STC ratings in the high 40s and low 50s (similar to those of the 3-inch wood doors) is less than 2 inches. This is a great advantage — the 3- to 4-inch typical width that we mentioned earlier does not apply to most metal acoustic doors.

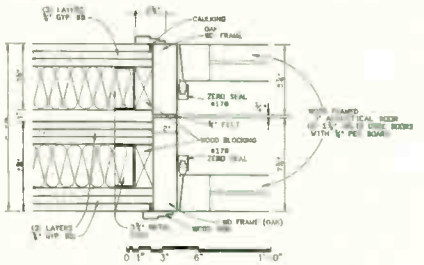


Figure 3: Two double-slab wood acoustic doors (similar to fig. 2) in a more complex double-stud studio partition. Separation of walls is maintained throughout the entire construction of the door frame by the use of industrial 1/4-inch felt.

Several companies make similar products, but they are not exactly the same. Industrial Acoustics Company (IAC), Krieger Steel Products, and Overly Manufacturing all make metal acoustic doors. Of the three, IAC and Krieger offer cam-lift hinges. This is a brilliant invention that essentially makes the door work like a four-sided access panel! The physical design of the hinge develops a rise as the door is opened. Conversely (and more important), when the door closes it falls and settles at the bottom sill. There is no mechanical drop seal, which means no mechanism to break or be adjusted over time.

Since the doors are metal, an

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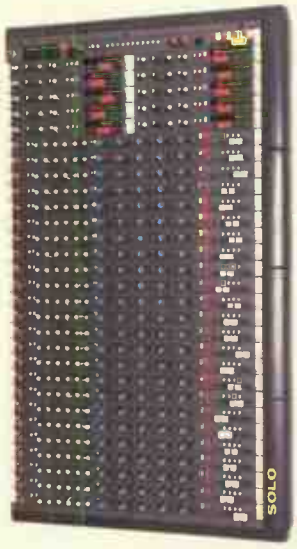

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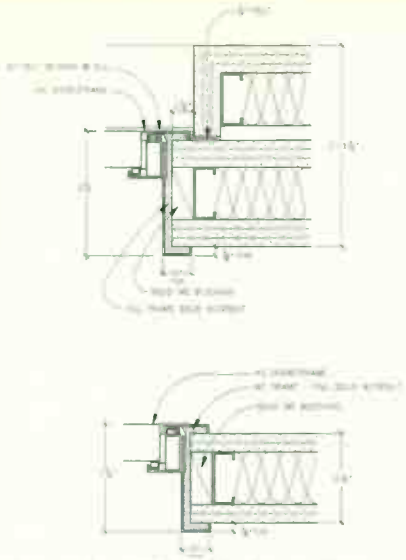

Figure 5: Door jamb details showing IAC frames and doors in two types of studio wall partitions. Note the double seals; both magnetic. The interior of the frame should be filled with dry grout or other solid packing material. Be careful of using expanding foams — they can actually bend the frames.

additional sealing principle can be employed in the jambs: magnetism. A magnetic seal is similar to the seal on refrigerators, and combined with a cam-lift hinge, is extremely effective. (See fig. 5, showing a profile of a double magnetic seal in an IAC acoustic door assembly.)

Naturally, metal doors don't warp with temperature and humidity changes. They typically have very high fire ratings. However, they also cost more — almost twice as much as an equivalent wood version. Odd sizes also become very hard to get and very expensive in metal.

Not all of these manufacturers deliver their products in the same state of readiness for installation. IAC, for example, delivers a completely fabricated unit in two slip-frame assemblies. They are installed after the walls are created. Installation is quite easy, taking about two hours per frame. Overly's product is knock-down, requiring more time for assembly in the field. (As you might guess, the IAC product is a bit more expensive.) With the exception of standard sizes, these doors usually take more time to acquire than custom-built wood doors, which can be delivered in just a few days from start of construction. Surface-applied seals are usually in stock.

TIP OF THE MONTH CLUB

Most wood studio doors are 3 inches thick. When you analyze the exact clear opening of a 3-inch-thick door with applied surface jamb stops, you will see that a 3-foot-wide door simply does not give you enough clearance for certain items. This is the reason why so many wood studio doors are 3 feet 4 inches wide. Years ago, a certain studio owner argued with me for hours about this and changed all the doors from 3 feet 3 inches to 3 feet. Though he won the argument, he had to forfeit a very lucrative and prestigious session simply because he could not get the timpani drums in the room! EQ

Architect John Storyk, principal designer for Walters-Storyk Design Group, Inc., has designed more than 500 studios and media facilities throughout the world. He has headed the Studio Design and Acoustics Course and has taught for over 10 years at Full Sail.

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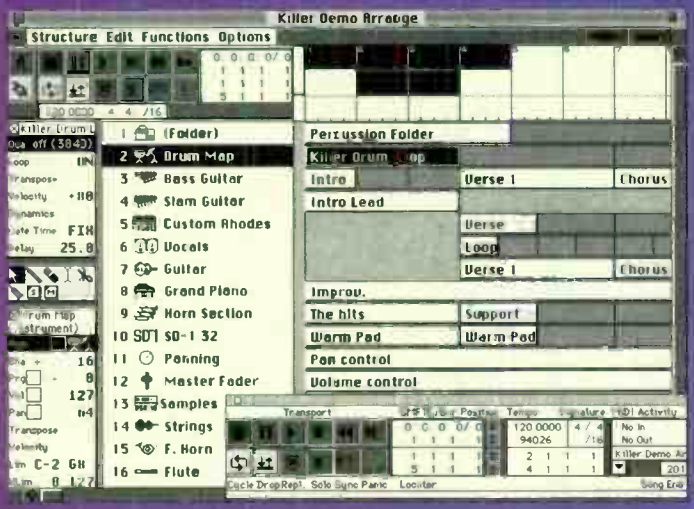

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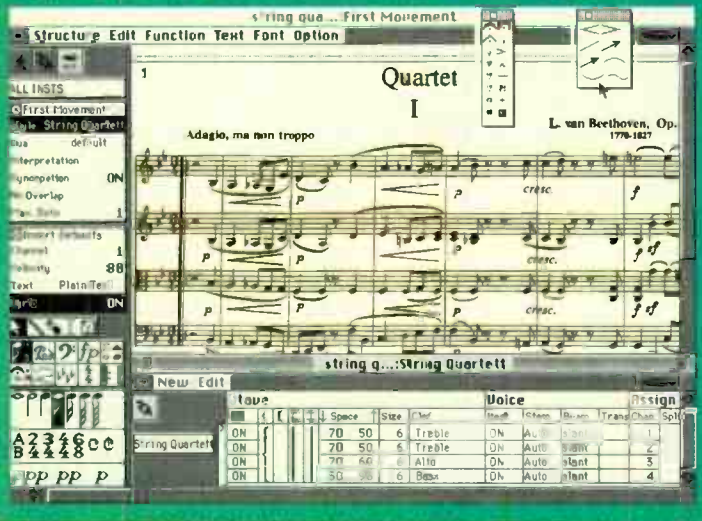

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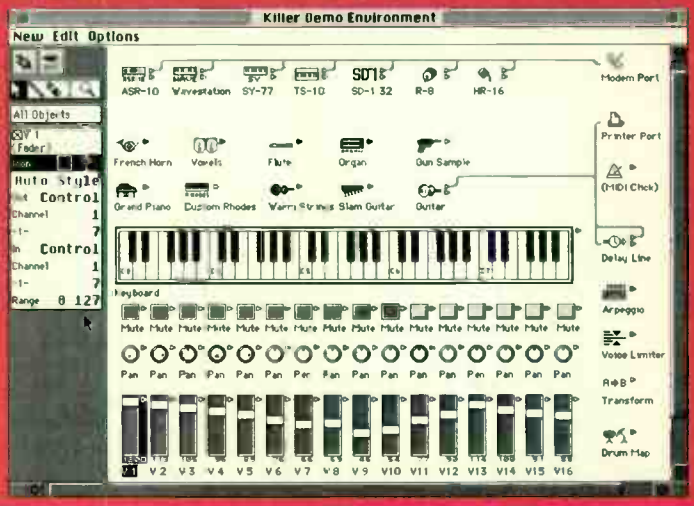

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Funk and the Art of Recording

In the name of truth in advertising, allow me to come clean right from the downbeat. You are reading the words of a digital Mr. Magoo, a MIDI moron, a mere scratcher-at-the-surface of the fathomless mysteries of modern music production techniques.

Whew. Got that off my chest. But now, having unburdened myself, let me add that I've done quite well, thank you, in a musical marketplace that sometimes values the unquantized, warts-and-all primitivism that is the hallmark of my style. Funk over function, shall we say?

Miles Davis, in an interview I did with him in my former life as a jazz writer, tersely turned aside one of my polysyllabic, tortuous queries with an answer that was as sensible as it was pithy: "What's music," he said, "but a little technique and a little feeling?"

It's easy to think of exemplars of excess, those whose tracks are so clean you could eat a meal off them, or of singers who "feel" so much you'd like to con them into joining some kind of Emotions Anonymous outfit. Far fewer are those who achieve a "perfect balance between passion and detachment," which is how critic Barry Ulanov once defined the blues.

Mind you, this defense of intuition over intellect comes from the mind of someone who'd rather read the sports page or Dante than a sequencer manual. This piece in no way means to suggest that you shouldn't use every beautiful feature that Studio Vision or Pro Tools has to offer. But let me give you a glimpse at my rude beginnings in this technical wilderness.

Back when I was making the transition from journalism to songwriting, my sole preoccupation was in finding the *mot juste*, in writing songs charged with care for the language; for truth, justice, and the un-American way. I was, after all, no musical prodigy, just another deluded-by-grandeur type who'd obligatorily studied and quit all the major instruments in the orchestra.

But now that my partner, the ubiquitous Mr. Don Was, and I were making a living at music, I began to acquire and tinker with any and every

A self-proclaimed MIDI Moron talks about creativity in the technical age and on the technical edge

BY DAVID WAS

DAVID WAS tells how to keep the technology from inhibiting the

World Radio History

gadget I could lay my hands on, from the lowly Mattel "Synsonics" drum machine to the Macintosh IIfx that is now the brain trust of my system. But, again, let's remember that I either mis- or underused any piece of gear I've ever owned.

For instance, when I used to program grooves on my first sequencer, Korg's Poly 800, after a few weeks I found that everything I wrote tended to sound stiff and predictable. In a word, it was a true reflection of my then diminished creative capacity. I didn't know a shuffle from a polka, a minor blues from a heart attack.

The remedy to such a musical myopia wasn't to be found in the manual. I simply turned the volume *off* when I was step-sequencing a drum or a bass groove. Hit any note, enter a rest of random length, hit a flurry of notes, then more rests, ad infinitum until I used up most of the memory. Turn the volume up, hit play, and listen to a groove that only some nine-armed Martian on acid and malt liquor could have conceived or played.

tive process.

Ah, but that wasn't all. Lest you think me undisciplined, I then left the volume up and erased unwanted beats and tones on the fly, resulting in music whose random genealogy was then spliced to my intuitive sense of what's funky. I am from Detroit, after all. I'm not a total farmhand.

Which all reminds me of an experiment that Adam Smith reported in his book *Powers of Mind*. A control group of 50 stockbrokers went about their usual analytical business of predicting and forecasting while another 50 used the I Ching, tossing the sticks and referring to that book of ancient wisdom. At the end of six months, the I Ching group did as well as the price/earnings ratio boys, proving that randomness is as good as rationality. When in doubt, plow straight ahead and guess.

I suppose that Irving Berlin and George Gershwin could represent similar polar opposites. Berlin composed, according to his own reports, on the "black keys" only, but his sense of melody, while unlettered, was sublime. Gershwin, on the other hand, could arm wrestle with Debussy and Ravel on their own turf, and came up with an equally enduring pop standard. "A little technique and a little feeling..."

You might be pleased to learn that, nowadays, I keep the volume turned up while I work. I have graduated from the analog ukelele to a GB Digidesign hard disk, and will never be able to look back. Life has gotten too easy. The aid to my basically "black key" approach afforded by all these beautiful zeroes and ones has been inestimable. In the old days, I'd beat out some wacky-sounding groove and have no way to archive it except on a low-fi cassette.

Today, I am busy storing every odd stitch of my home-recorded legacy onto disk, to be edited, truncated, and recombined into actual, releasable music. That one can do this at home is testimony to those legions of designers turning sand into circuit boards and making it affordable enough for us all to make Masters in Our Own Domain.

What with Alesis ADAT and Tascam's new digital 8-track formats, the only good reason to go to a studio will be to romance the receptionists. (Oh, come on, I get to make one gratuitous sexist gibe, don't I?)

There are also times when less is better. Recently, I completed the scoring for five national car commercials and did most of the programming on my trusty Ensoniq TS-10, the user-friendliest sequencer of them all. Ba-da-bing/Ba-da-boom, I laid off to ADAT, went into a studio to overdub guitar and saxophone and called it a very thrifty enterprise.

With good signal processing equipment from AKG and a couple of Mackie 1604's able to handle all my sound modules, I get results at home that are quiet and punchy enough for ad agencies spending $10 million on a very important account.

Still and all, my Grandma Moses approach to music-making can only take one so far. I believe it pays to know all the rules that obsessive types like Mozart and Coltrane absorbed or invented. As some critic type said about James Joyce: "Whether or not you can make sense of *Finnegan's Wake*, one could never accuse him of speaking down to his audience." As they used to tell you in driver training: "Aim high in steering."

Alec Wilder, in his underappreciated history of American popular song, put it even better: he said that while the masses are usually regarded as incapable of understanding the nuances of high art, it can be shown that the songs they made into hits (let's not forget who pulls the lever in the polling booth) were rife with the type of invention that caused a riot when Stravinsky first shocked Parisians with his "Rite of Spring." It took clever Tin Pan Alley cats to wed the new with the tried-and-true, and seize the attention of a public hungry for innovation.

While pop songwriters of our era are less attuned to the ways of their long-haired cousins, it still pays to borrow from the best. Like T.S. Elliot said, it is better to steal than to imitate. If you can't say it

continued on page 111

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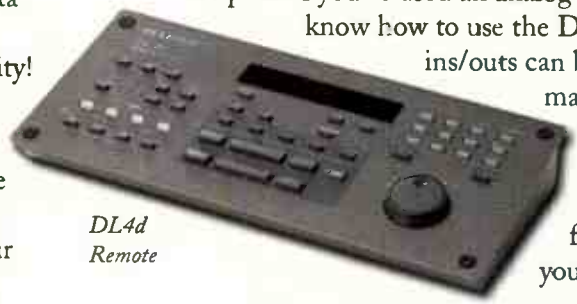

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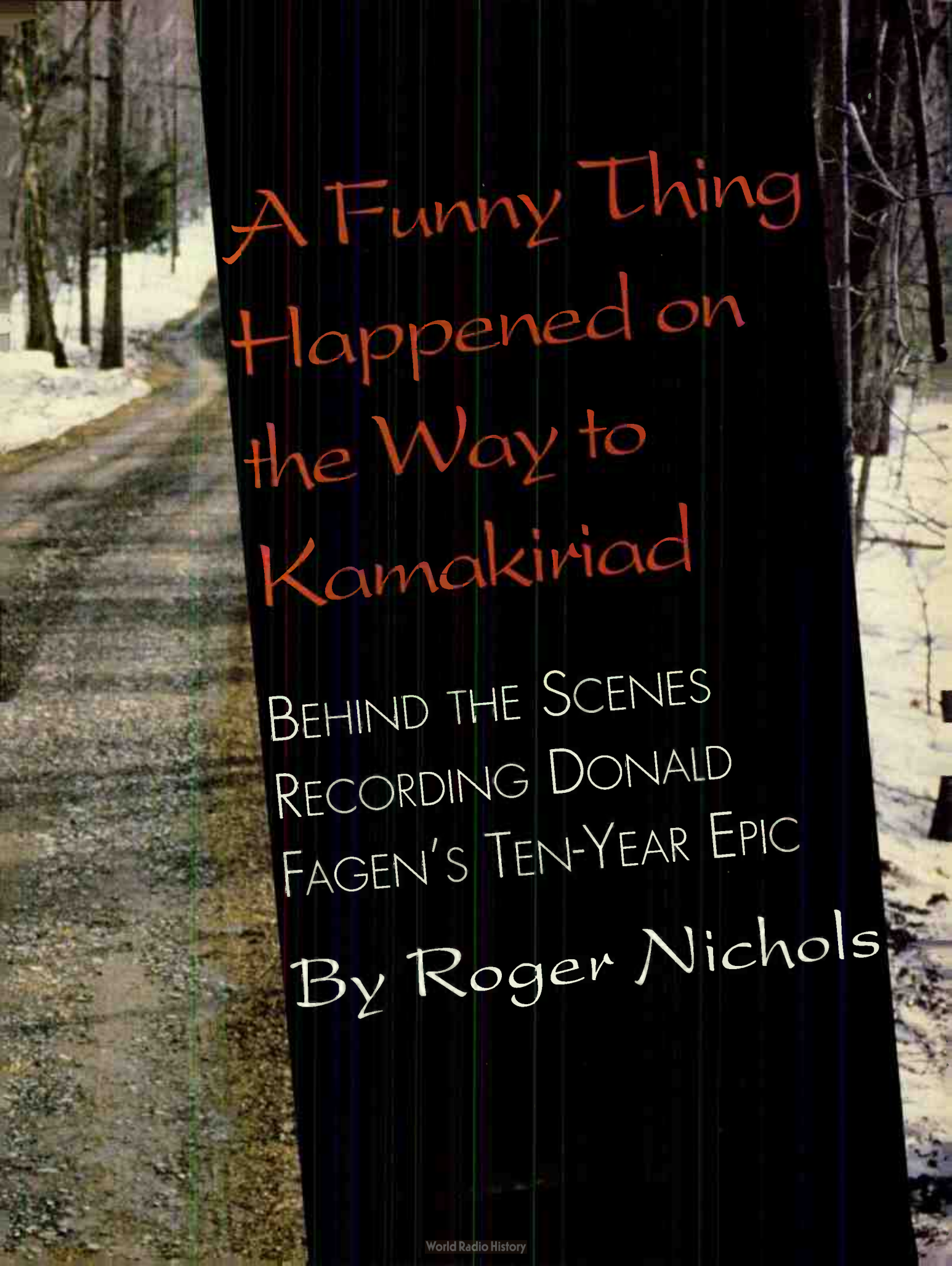

A Funny Thing Happened on the Way to Kamakiriad

Behind the Scenes Recording Donald Fagen's Ten-Year Epic

By Roger Nichols

World Radio History

Now that it is released (and Steely Dan's on tour), I can finally state that the Donald Fagen album is complete — I think. This is one of those life episodes that you need to get off your chest. I could go to a shrink, but I have you to talk to instead.

I got ready to record this album, or rather an earlier incarnation of it, in 1983. Gary Katz, the producer, called me in California to let me know that Donald would be ready to go into the studio around the first of the year (1984). I packed up my family and went back to New York to start the new project.

Shortly after New Year's Day, I called Gary to see when we were going to start recording. Gary said that Donald was having a little problem finishing the songs and that it would be a couple of weeks before we actually started. I said fine, and went on enjoying my time off. Weeks turned into months and months turned into almost a year. Finally in September, I went back to L.A. to work on another project until Donald was ready.

In 1985, Donald went into the studio to cut some tracks. Elliott Schiener cut the basic tracks and then Donald and Gary came out to L.A. to work on some of the overdubs. We worked at Jeff Porcaro's house on an API console and a 3M digital 32-track. Rick Marotta came over to do some drum overdubs and we used Wendel II to move some of the beats around. Things were finally under way. After the L.A. sessions we went to New York to do some more recording only to learn the bad news — that Donald had decided not to use any of the tunes we had cut. Back to the drawing board and some more time off.

During the break, Donald and Walter got back together and started writing new tunes. It looked like a new Steely Dan album was in the works. Everyone, including me, was chomping at the bit. Throughout 1988 and 1989, Walter would go to New York for a month to write, and then Donald would fly to Hawaii for a month to work some more. It wasn't quite working out the way it was originally planned. The project was scrapped once again.

At this point Donald decided to go it alone and went back to work writing Donald Fagen songs. Working with Walter again after ten years did add something to the project, so Donald asked Walter to produce his new album. Walter agreed and off we went.

REELING IN THE YEARS

At this point you should know that the reason that Steely Dan and Donald Fagen albums ever existed in the first place was as a testing ground for Murphy's Law. If you look in any dictionary, the definition of Murphy's Law is "Things that go wrong during Donald Fagen/Walter Becker/Roger Nichols projects."

In 1972 we were the first to use the new 3M 24-track analog machines. Did you know that during a brownout the machine will go into record on unarmed tracks as the voltage dropped? We found out the hard way. Did you know that in 1974 3M inadvertently coated some of its 2-inch analog tape with mustard instead of oxide? Neither did we, until we recorded a song on a roll of it. In 1975 the Village Recorder in L.A. filled with sewer gas while we were trying to do vocals. (Yes, it's hard to do vocals while holding your breath.) In 1976 at Cherokee Studios (the barn in Chatsworth, CA) there was a grounding problem with one of the 2-track machines. When I went to shove it out of the way, I got electrocuted; my handprint burned into the front of the machine. How about the time I got lipoid pneumonia (from bad scuba air) and had to come to work with a tank of oxygen. Then there was the night that I gave Donald a ride home in my Pantera with the two big-busted twins sitting on his lap, but I'll save that story for another time. Anyway, you get the picture about our relationship with Murphy.

That's all ancient history now. The recording for the current Donald Fagen album actually started in May 1990 at The Hit Factory in New York. I was finishing up another project, but Donald couldn't wait for me. He went into the studio with Walter and another engineer to start the recording process. That was his first mistake. Just kidding. (No I'm not.) Yes I am. (No I'm not!)

Donald had decided to record the project on his 3M digital 32-track. Someone else was actually using Donald's machine, though, in the next room at The Hit Factory, on a project that was running behind schedule. So Donald bought another 3M machine, in kit form. It had belonged to Frank Dickenson, who owned three 3M machines that he rented out. Dickenson got out of the music business (smart guy) and the machines lay around in various stages of dismemberment. They put the machine together and proceeded to record. The second day in the studio, the machine blew up. That was the end of recording for that day. The third day it happened again. They rented a Sony 48-track to continue.

Some recording actually got done; the laying down of sequences and machine drums, live drum overdubs, and other miscellaneous material. Now it was time to perform some edits between different takes and put together some loops. The edits were performed and when Donald's newly-acquired 3M machine was finally fixed, the results were transferred back to the 3M domain for additional work. This little episode took six weeks in the studio. Some forward motion, OK?

The next recording glut was in Hawaii, at Walter's studio. Walter had purchased a 3M digital 32-track. It was the machine 3M had used to test and repair cards that had died in other people's machines. 3M no longer wanted to be in the digital multitrack business, so it sold all of its spare parts to Electro Technology, Inc., a company in Menlo Park, CA. The last machine in 3M's possession was brought up to "like new" specs and sold to Walter. Buying one of these machines is not unlike purchasing war surplus land mines that failed

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to detonate in the field, so there was no reason to disarm them before passing them on to the public.

3M machines were the first generation of digital multitracks. There was no such thing as 16-bit A/D and D/A converters for audio back then, so 3M devised its own scheme of using a Burr-Brown 12-bit converter and 4 bits of an 8-bit converter as range scaling to get 16-bit resolution. That part actually worked fine. The parts that were shaky (by today's standards) were the error correction and the staggered-head recording method. Because of tape densities and data processing overhead, there wasn't much room for additional error correction schemes. Adjustments were needed regularly to keep errors to a minimum. Since 32-track 1-inch heads couldn't easily be built then, two sets of 16-track heads in a staggered configuration was the most cost-effective way to go. No doubt Murphy had a hand in the original design of this feature. The foremost feature Murphy had in mind, though, was ensuring a high probability that your tape would not easily play back on someone else's machine. But I digress.

FINE TUNING

Back to the Hawaii recording sessions. It was time to put down the basic tracks to some more tunes. This is the way it worked: First Donald would come into the studio with a basic sequence of the tune. The sequence was either on a Linn 9000 or an Akai MPC-60 (also known as an Empathy 60). The sequences would consist of kick, snare, and hat samples, DX bass, and a couple of DX-7 rhythm parts. These were basically guides for what would eventually be overdubbed by real people. So what, you say? Well not so fast, digital-delay breath, there is more.

Each sound was run through a digital delay. The kick through one, the snare through another, the bass through another, and so on. The reason for this was that Donald didn't like where the machine placed the beats in the sequence. The basic pattern was OK, but the snare could be a little later, the hi hat could be a little earlier, the off beats didn't feel right when compared with the down beats. Just little things like that. The prerequisite for the digital delays was that they had to be adjustable in tenth of a millisecond increments. The process began.

The tune cycled on the sequencer once for every grain of sand on the beaches of Maui. During this time, Donald would increment the delays to find the places where all of the beats should fall. That part wasn't actually too bad. It turns out, however, that there is more than one combination that sounds good. These "nodes" would be very difficult to sort out. The kick drum would sound good at 1.7ms, 3.3ms, 7.3ms, and 9.1ms. The snare would sound good at 2.1ms when the kick was at 3.3ms, but the snare would only sound good at 5.1ms when the kick was at 1.7ms. The permutations were astronomical.

Another variable that we ran across was that the sound of the drum would change its perceived placement. If we replaced one sound with another, we would have to redo the increments. As you can imagine, we chased our tail quite a bit during this process. This wasn't so bad during the printing of the sequences, but we never did plan on leaving the drum machine sounds on the record. They were to be replaced by real drummers.

Chris Parker (the New York drummer) flew to Hawaii to attack the drum replacement on the new tunes. The drum machine that was put down was used as a guide for Chris. His job was to add a human touch to the basic groove of the drum machine. We would record three or four passes on separate tracks and then select the best performances and comp them onto one set of tracks.

The bridges and choruses were fine on the live performance, but there was too much variation in the verses. We then took samples of the individual drums as Chris played them and used them as replacements for the drum machine sounds in the verses. This was done by sampling them into Sound Tools, editing them, and playing them back using Sample Cell. So now as you played the tune, it would be a machine playing Chris' drums in one part of the tune, and Chris playing Chris' drums in another part of the tune. It worked out great.

Oh yes, Walter's 3M machine blew up. The power supply went south, and, as Murphy so likes to do, he made it happen at five o'clock on Friday afternoon. Well, we deserved a weekend off.

DUB DUB DUB...

Basically, we would work in New York for a month, take some time off, work

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in Maui for a month, take some time off, back to New York, and so on. This was the schedule until October 1992 when we went to New York for the last time. From then on, we stayed there until we finished in March 1993.

Anyway, in New York we would record rhythm guitars, horns, background vocals, percussion, and anything else that required a pool of musicians. (Believe me, I think some of them spent a little too much time in the deep end of that pool.) While in Maui, we would concentrate on Donald's vocals, Walter's guitar solos and bass parts, and some of Donald's keyboard playing. Oh, yes, and the incrementing.

Quite often, after a few attempts at recording a _____ (fill in the blank: guitar, vocal, DX-7, Rhodes, bass, drum fills) we would have something that was 90 percent great. There were just some minor problems with it. One note out of time, a great thing that happened in the first chorus that should have happened in the second chorus, a great fill that was a little rushy, or any one of 1347 other things that can muck up an otherwise brilliant performance.

The key here is that we would rather use technology to fix a teeny flaw in something that was great, rather than settle for a technically well-executed performance that lacked that extra sparkle. For example, in a bass performance by Walter, one bass note in an open section of a tune contained one note that buzzed and was cut short. The section in question was transferred to Sound Tools and the same note from a similar section of the tune was substituted. The section was then put back where it came from.

As another example, the day that Donald was inspired to do a Rhodes overdub, there was an unacceptable buzz in the recorded signal. No matter what we did, we couldn't get rid of it. Waiting to get another rental instrument would have "killed the vibe," so we went ahead and recorded the part. The performance was great, and if enough people were talking in the control room during playback, you barely noticed the buzz. Back to Sound Tools. The whole Rhodes track was transferred to the Mac computer digitally. An add-on software tool called DINR, from Digidesign, was used to remove the buzz from the audio. It worked flawlessly with no degradation to the Rhodes sound.

Donald's 3M machine wouldn't play back one of the tapes that we had worked on in Maui. After some minor adjustments with a ball-peen hammer, we got it to work. We were getting tired of fighting with the 3Ms, so we decided to go back to the Sony 48-track. We stayed on that format for the rest of the project.

Time for background vocals. There are plenty of places in a song where the background parts are unique — that is, they only happen once in the song. Other parts of the song, like the choruses, repeat a few times. Donald and Walter are sticklers for perfection, even with background singers. During the time allotted for the backgrounds on a particular tune (infinity rings a bell), it seemed wiser to spend it on one chorus to capture the best overall performance. I would then place the parts in all the choruses.

A similar ritual was performed with rhythm guitar parts. The guitar player would play through the song, and then we would pick the best feeling section of a verse and the best feeling section of a chorus and then fly them around. Transitions and odd bars would remain the ones that were played live. After that process, if a section felt too stiff, we would substitute the live track, or get another piece from somewhere else.

For me, the horn section overdubs were the most fun. During a double session (six hours) we would work on just one tune. The

A River Runs Through It

Donald Fagen's River Sound studio played a big part in the making of *Kamakiriad*. Here's what's inside his room with a vu:

STUDIO NAME: River Sound

LOCATION: Upper East Side, New York, NY

MAIN MEN: Donald Fagen; Gary Katz

RECORDED PROJECTS: Donald Fagen; Laura Nyro; Soul Asylum; NY Rock & Soul Revue; Blues Traveler; Exodus; Roger Daltrey; Allman Brothers; Exposé; Big Head Todd; Judybats; John Scofield; Joe Lovanco; Elaine Elias; Joshua Redman

CONSOLE: Modified 40-input Neve 8078 with Flying Faders and 32-channel side car with Flying Faders

KEYBOARDS: Fender Rhodes [3]; Hohner Clavinet; Crumar drawbar organ w/Leslie; Roland FP-8 digital piano; Yamaha DX-7; Prophet 5

SAMPLERS: Akai S900; MPC-60

MONITORS: Urei 813C; Meyer HD-1; Visonik 9000; Yamaha NS-10M; Tannoy 6.5 PBM

AMPLIFIERS: Crown PSA-2

COMPUTER: Macintosh SE (4 MB RAM, 170 MB drive)

RECORDERS: 32-track 3M Digital with editor [2]; 24-track Otari MTR-90II; 2-track Studer A-820; 4-track 3M Digital

DAT MACHINES: Panasonic SV-3900 and SV-3700

OUTBOARD GEAR: AMS RMX16 and S-DMX; EMT 140 [2]; Eventide SP2016; Lexicon PCM 60, 480L, and PCM 42 [2]; Yamaha SPX1000, SPX90, and D1500; dbx 160X [2], 160XT, and 166 [2]; Summit TLA-100A tube compressors and DCL-200 stereo tube; Urei 1176LN [2]; Drawmer Gates [6]; Neve Focusrite EQ [2]; Pultec EQH; Lynx Synchronizers; Private Cue 12-channel mixers [5]; Wendel Jr. [2]

MICROPHONES: AKG; Neumann; Sennheiser; Shure; Electro-Voice

Photo by Peter Monroe

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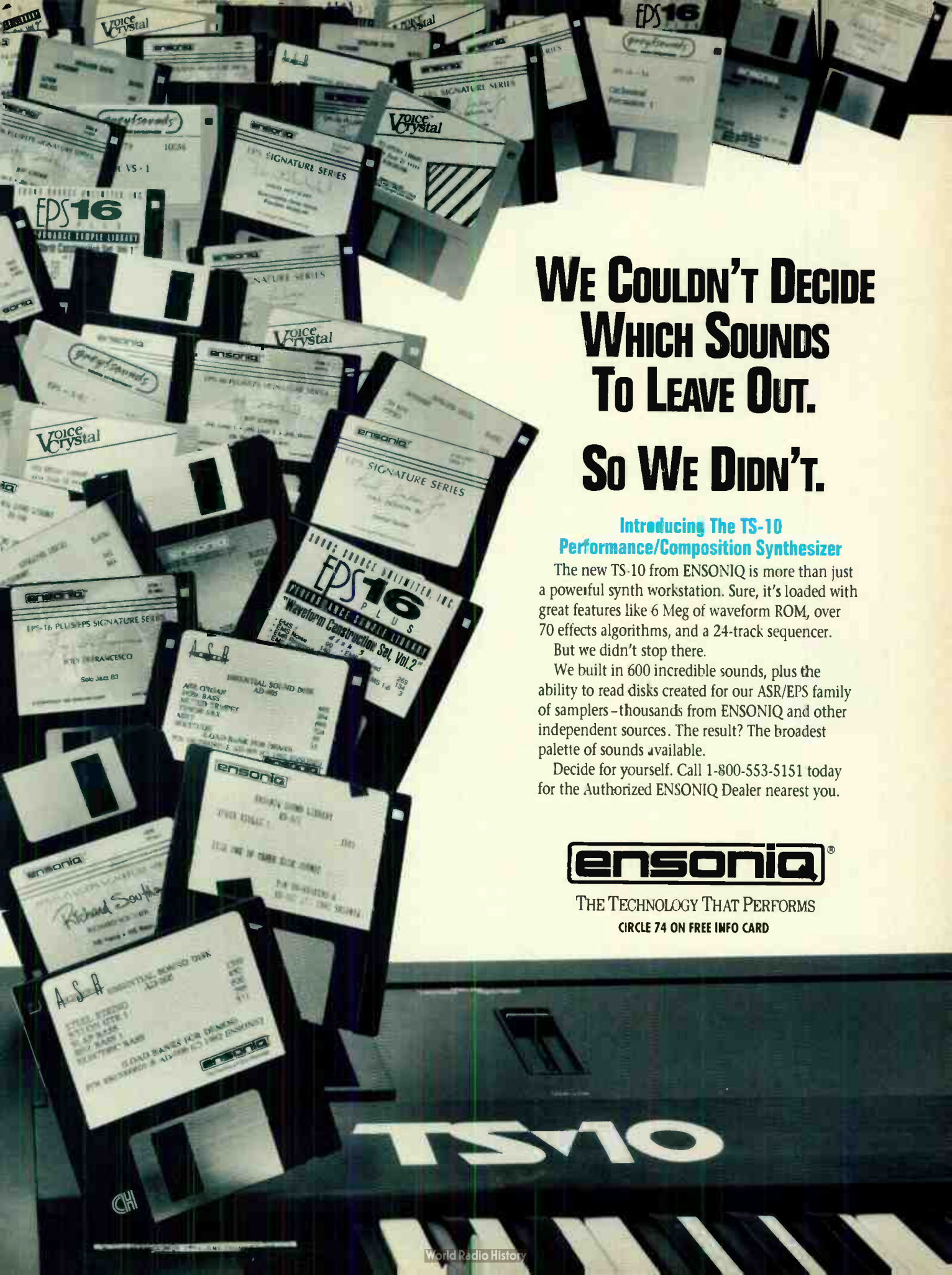

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horn section makeup would vary somewhat, but basically consisted of trumpet, alto, tenor, baritone, and trombone. There has been a tendency when recording horn sections, to double the horns. That is, record them twice and use both passes so that it sounds like twice as many horns. For some projects that works out fine, but for Donald's album, no dice.

One of the effects that shows up with double horns is a strange thickening of the sound. The reason for this is that when the same person plays the same instrument a second time, the overtone series is too identical to the original performance. It is like a voice print. If two different people played two different trumpets on the same part, the blend would be approximately 739.8 percent better sounding. We tried doubling the horns on one song, but decided quickly after the first playback that it was not to be.

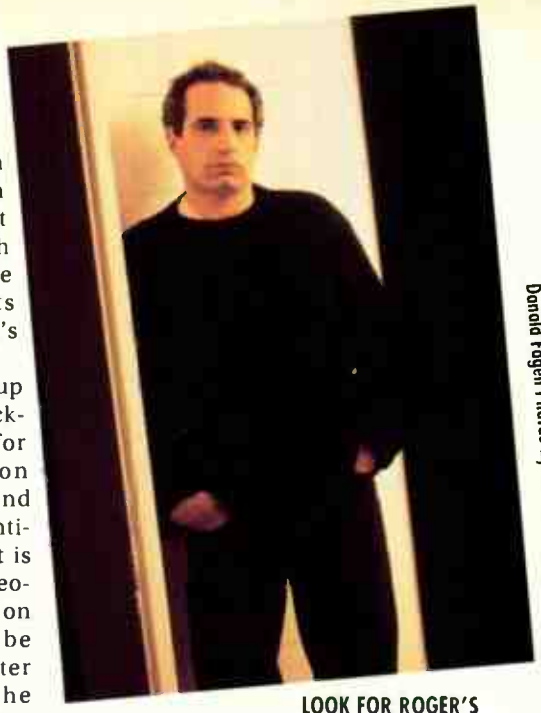
When it came time for percussion overdubs, we did it backwards. With other artists, the percussionist would come in, we would tell him where the little spots were that needed help and approximately what we thought should go there. The percussionist might try a few things, we would pick the one we liked, record it, and be done.

On Donald's album, the percussionist came in and played three or four tracks on each tune all the way through. Donald and Walter gave him some initial direction, and told him to play whatever he thought he should play. Afterwards, we would erase all of the things that didn't work. Whatever was left was the percussion part.

The vocals were the hardest part of the recording. Not because they were hard to do, but because the performances were spread out over three years. We used a TLM-170 for the vocal mic, fed through a Massenburg mic preamp and then through a Massenburg limiter set pretty close to George Massenburg's recommended vocal settings. We nailed the knobs in place and used the same setup wherever we went. The only unknown was how much Donald's voice would change as he got older, but I guess we lucked out that time.

MIX MIX MIX...

As mix time rolled around, we weren't quite done with the recording. We had started up the box canyon as far as time was concerned. Walter had musicians scheduled to start recording his solo album in Maui, and if he canceled them he wouldn't be able to get them back for months. So, we picked a day as the "point of no return," a day on which we must start mixing, no matter what, to be able to get the mixing done before everybody had to leave.



Donald Fagen Photos by Laura Levine

LOOK FOR ROGER'S comments on Steely Don live in the next issue.

When mix day came, we were back in New York and had stopped recording and started mixing. Luckily we had four of the eight tunes ready to mix. After a few days of mixing, we sat down and figured out how much recording was left to do. All that remained to be recorded were a couple of little additional background parts and some touching up of the lead vocal. We decided that the best course of action was to start working in two different studios at once. Donald would go over to Clinton Studios with a copy of the 48-track tape and work on the vocals while I mixed my butt off over at Donald's studio, River Sound.

I would work on the mix and, after Donald was done at the other studio, he would stop by and check on things. We would make a few little changes and print a DAT copy of the mix. Then Donald would take it home to listen to it. The next morning he would either come by or call in any changes that had to be made. I would make the changes and "print" the mix.

A few times I would be mixing a song that he was still working on at the other studio. I would work on

continued on page 112

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ENTER THE CHALLENGER:

TASCAM's

THE HI8 ANSWER TO THE ADAT ARRIVES

May Day! No, I'm not in distress. That was the day I got my hands on the TASCAM DA-88 digital 8-track. I took it out of the box, powered it up, and was impressed by the sign-on message. The word "TASCAM" scrolls across the level meters upon power-up in much the same way that messages scroll across the underbelly of the Goodyear blimp. Maybe this is where the aesthetic judgment module will display its "stinky mix" warnings.

I have been a happy Teac customer since 1963 when I traded my Teac 505 tape deck in for the new Teac 605 autoreverse 1/4-track stereo recorder. Someone liked it even better than I did: he robbed my house and took it. In 1968 I bought a Teac R-310 15 ips professional 2-track recorder that was modeled after the Ampex 350. I used it to do remotes. It still works fine. I think they have another winner with the DA-88. Stay tuned, and 25 years from today I'll let you know how it is

THE R

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DA-88

ND IS PUT THROUGH THE PACES

working. In the meantime, let's put this baby to the test.

PLAY TIME

The transport handles the tape very well and is faster than a striped-assed ape! Rewind time for the 120-minute tape was less than 90 seconds — not too shabby for any machine. I cycled over a 5-minute section of tape for four days, 24 hours a day with no ill effects.

The front panel contains a shuttle knob, much like the one on the Panasonic SV-3500 DAT machines. This knob will allow you to shuttle from 1/4 to 8 times normal speed with audio. This feature is great for finding a spot on the tape when you don't yet have all the numbers written down. The built-in Vari Speed allows you to

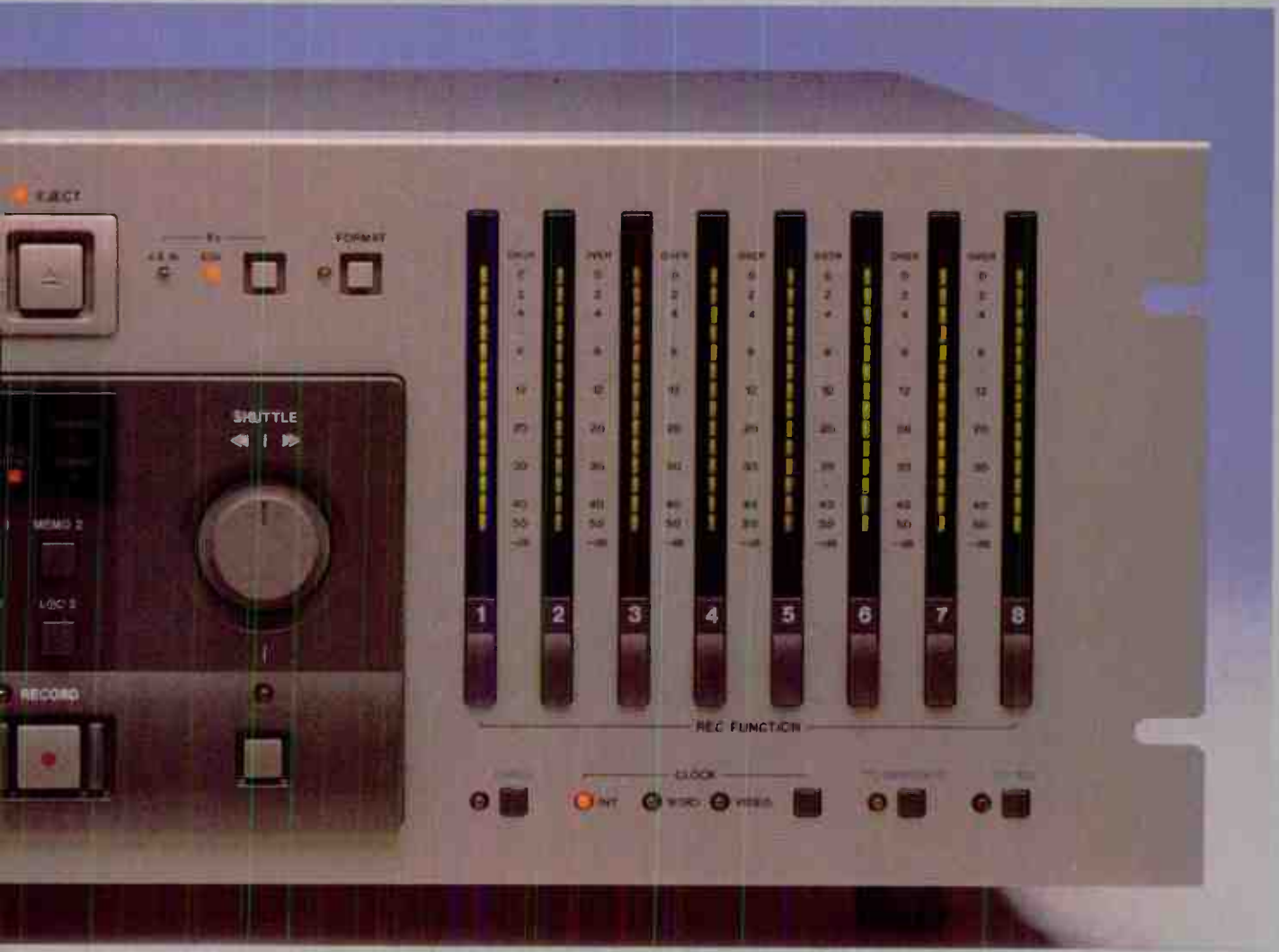

Photo by Ed Colver

GER NICHOLS REVIEW

World Radio History

Photo by Ed Colver

TAKE ME TO THE OTHER SIDE: The back of the TASCAM DA-88

change the play or record speed plus or minus 6 percent in 0.1 percent steps.

Also selectable from the front panel are crossfade time, track delay time, preroll time, punch-in and -out times, digital input, auto play, repeat play, and the time in the two locate point registers. Oh yes, let us not forget our basic transport controls like fast forward, rewind, stop, play, and record. The front panel features would not, of course, be complete without a peak level meter for each track and a hole in which to insert the tape.

The record function is engaged by just pressing the record button. It is not required that you hold play at the same time to enter record. Some people like this method of transport control, while others prefer the two-button approach — that is, hold down play and press record. Personally, I lean toward the two button approach. On some multitrack machines punch-ins are more accurate if you hold down record and then punch play to initiate record. This is because the record button is scanned in a loop with all of the other remote controls, but the stop and play buttons are wired directly. If you hold play and press record, there is more delay than if you hold record and press play. If this is your basic punching style, the TASCAM will go into record as soon as you touch the record button. I think there should be a setup feature to let you select one-button record or two-button record. Then you could make it work like the other machines you already have, if you wanted to.

After the transport is in record mode, additional tracks may be placed in record by pressing the track enable button below the level meter for the specified track. I also think that it should be a setup option to be able to hold the transport record button while depressing a channel record, before the track will actually go into record. I know that there are one-button-record professional machines, but the working environment is a little different.

The advance/delay playback feature deserves a little more discussion. This feature lets you time-correct live performances if you want to. If the guitar player rushed the first verse, move it back and bounce it to another track. OOPS — now he is laying back too much on the choruses. Advance the little bugger and bounce it right in to the comp track. This feature also makes it possible to digitally transfer to other machines and compensate for timing delays in the transfer.

The DA-88 is solidly built. It has an all-metal exterior that looks as though it's up to taking some punishment. You should not be afraid to move it around.

How does the unit sound? You're dying to know, aren't you? Nahhh, lets talk about the rear panel first.

The DA-88 is very modularized. One look at the back panel tells you that repairs should be just a board swap away. Upgrades such as 20-bit converters should be just as simple.

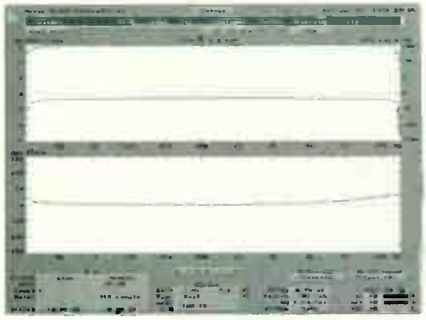

Figure 1: 48k Record/Playback. Flat to 21.4 kHz, 3 dB down at 22.6 kHz. Better than 100 dB S/N up to 10 kHz, then about 95 dB.

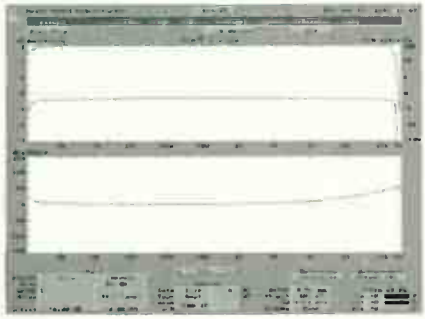

Figure 2: 44.1k Record/Playback. Flat to 19.9 kHz, 3 dB down at 21 kHz. Noise and distortion good up to 10 kHz, then drops to about 85 dB.

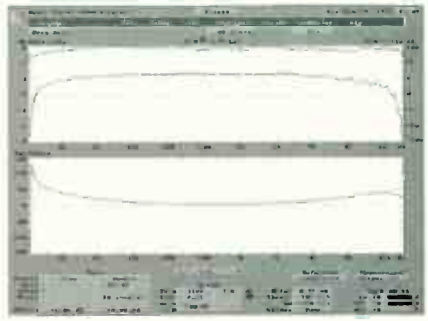

Figure 3: 48k. After bouncing analog we notice a little comb filtering at the top and the S/N+Distortion drops down to around 70 dB.

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SOUND.

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CIRCLE 47 ON FREE INFO CARD

World Radio History

PUBLISHED DA-88 SPECS

For more info, circle EQ free lit #112

Recording Time: 108 minutes using a 120 tape
Rewind Time: 80 seconds end to end for a 120 tape
Number of Tracks: Eight
A/D conversion: 16-bit linear one bit Delta Sigma x64 Delta Sigma
D/A conversion: 18-bit linear, single converter per channel x8 fs
Sample Rate: 44.1 kHz and 48 kHz
Variable Pitch: ±6%
Freq. Response: 20 Hz-20 kHz ±0.5 dB
Dynamic Range: Greater than 92 dB
Distortion: Less than 0.007% THD
Crosstalk: Better than -90 dB 1 kHz
Wow and Flutter: Unmeasurable

The bottom two plug-in boards contain the A/D and D/A converters. The analog interface to the outside world is via unbalanced RCA jacks for the semi-pro levels, or through a DB-25 connector for balanced +4 dB operation.

There is a blank panel that reserves space for the SY-88 SMPTE timecode board. All external SMPTE/MIDI synchronization will be performed through this optional board. If you have a flock of DA-88's, only one machine needs to be fitted with the SY-88 board. All of the other machines will follow along without quarrel.

The top board is the digital I/O board. It is here that communication with the outside world takes place. Word clock in and out as well as digital audio in and out reside here. If you have two DA-88's, connecting them here will allow the units to lock tighter than Grandma's dentures (that means sample accurate to you young whippersnappers). Audio can also be transferred digitally between units.

BOUNCING CHECK

OK, now we can talk about sound. Nahhh, let's take things one at a time. Let's talk about bouncing tracks analog instead.

The bouncing scenario goes like this: You want to record drums, bass, and two guitars and then mix them down to two tracks. Next you record some keyboards and then mix the whole mess again to two tracks. Now it is time for some background vocals. Record four tracks of them and then mix them in with the stereo mix onto the remaining two tracks. How about horns? Record them on four tracks and mix them in with the rest of the band as you bounce back over to two tracks. How about the lead guitar and lead vocal? Fill up the tracks and then mix it all together to two tracks and you're done. The original drums have now gone through five analog generations and I guarantee that they will still sound great.

I performed two tests on the DA-88, bouncing between tracks analog. One test was for ten generations, the other for twenty. The results were great. Without knowing which was which, someone who came into the studio and heard what was going on actually liked the 20th generation copy better than the original.

I have included a SIM graph of the results of the bouncing. The graph compares the original with the 20th generation. You can see that there is some distortion and noise build-up, but take a look at the analog bounce graph. One track was copied to another on a one-inch 24-track with Dolby S. The analog graph shows the difference between the original track and the copy. Remember, this is just one generation on the analog machine. It is what would happen, for example, if you combined vocals or guitar solos.

What does all of this mean? Well, you can bounce tracks analog on the TASCAM DA-88 until your brains drool out of your ears, and it will still sound better than one generation on any analog machine.

SOUND CHECK

Are we back to that sound question

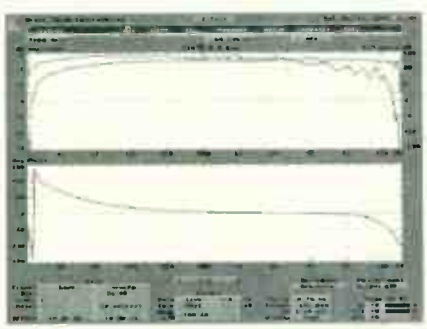

Figure 4: 48k. After 20 generations combing gets a little more pronounced and the S/N+ Distortion drops to about 55 dB.

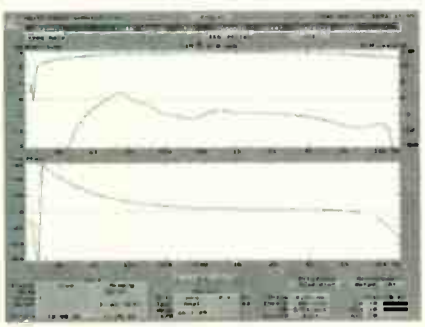

Figure 5: Ref. analog 1-inch 24-track with Dolby S. One gen. at 15 ips with Dolby on. Stinky bottom end, rolloff at around 18.3 kHz.

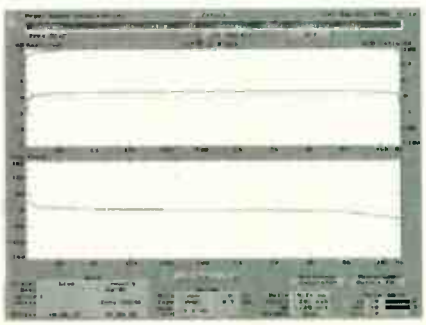

Figure 6. Sony 3324S 24-track digital machine at 48 kHz for reference. Down .5 dB at 22.6 kHz, S/N+Distortion >100 dB.

World Radio History

again? Well, I played a Sony 24-track digital tape and transferred eight of the tracks analog over to the TASCAM DA-88. I located both machines back to the start and pushed play (play only requires one button on each machine). The A/B test went great. I think the Sony machine did sound a little better, but maybe it was because the Sony cost so much more. The DA-88 sounded terrific. The low end was warm and smooth, the highs were crystal clear, not grainy. I was impressed.

I have included SIM plots of the DA-88 at both 44.1 kHz and 48 kHz sample rates. The plots show that there is less distortion and better frequency response at 48 kHz. This is to be expected. I have included a plot of the Sony 3324S for comparison. Not bad for $48,000 difference.

Options? Yes, there are options. Among them is an advanced remote, the RC-848, which gets you 99 autolocate points, an RS-422 port for controlling a video machine, a local jog/shuttle wheel, menu-selectable control for the SY-88 synchronizer, and accessory connectors for controlling TASCAM and other compatible machines. And don't forget the meter bridge. The MU-8824 remote meter will give you a look at 24 tracks at a time. The IF-88AE will interface the digital I/O of the DA-88 to any AES device. The IF-88SD performs the same function for SDIF-2 (Sony 1630) devices.

ODDS AND ENDS

Before you go rushing off to read one of my other articles in this issue (whatsamatter, can't anybody else write around here?), I'd like to offer some brief DA-88 housekeeping advice.

• The DA-88 is designed to use Hi8 video tapes. These are not standard 8mm video tapes. Make sure they say "Hi8," or they won't work. The DA-88 will use tapes that are up to 120 minutes long. Because the transport in the DA-88 runs a little faster than a video deck, the tapes don't last quite as long. The 120 tapes actually last 108 minutes. I do recommend, however, that you use shorter tapes like 60, 45, or even 30 minutes. It is simply not a smart idea to keep too much valuable material on just one tape. If a tape gets lost or eaten with just one or two songs on it you are a lot better off than if everything you ever recorded is on just one tape.

continued on page 112

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World Radio History

IN A BAND VAN

ZEBRA GOES SOLO
PAGE 74

LIVE SOUND FOR THE GIGGING MUSICIAN

ON STAGE WITH MTV UNPLUGGED

INSIDE: THE REAL TRUTH ABOUT RTAS
GETTING SLAMMED IN A VAN

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CIRCLE 46 ON FREE INFO CARD

IN A BAND VAN

MTV Rides The Acoustic Highway

■CULTURE-CLASH update: Five-man acoustic jams are hot again, folk-rock heroes are back in vogue, and acoustic guitars (once exiled to the back of the bedroom closet) have overtaken their electric counterparts as the would-be rocker's axe-of-choice. Sound like an acoustic revolution? If so, it's to MTV's credit that current interests have shifted from the dynamics of synth pop to the schematics of song composition. Hey, because of MTV the proverbial band-in-van can now be no bigger than a band-in-a-bug.

Stripped down and relaxed, MTV's *Unplugged* is more than just a live music program showcasing music sans electricity; it's a worldwide phenomenon, a proving ground of sorts where musicians gain the opportunity to separate themselves from the Milli Vanillis of the free world. Call it karma, call it irony, but MTV has distinguished itself as a major catalyst in the movement towards acoustic live sound. Live acoustic concerts are in. Acoustic-instrument miking techniques and acoustic recordings have never been more popular.

Ensuring that *Unplugged* maintains its high standard of integrity is Alex Coletti, producer of the program. As the self-proclaimed leader of the "electronic police," Coletti works closely with the show's performers, deciding what's in and what's out in terms of instrument setup. Guitars and strings are allowed to have direct inputs, in order to maintain sound control, but when it comes to mixing live drums, the kit must always be small enough so that it doesn't overpower the rest of the band. "The idea is to show something that's simple and refreshing," says Coletti. "People are tired of the overproduced, overslick type of stuff."

Unplugged-inspired CDs in the recent past include ones by Eric Clapton, Arrested Development, Mariah Carey, Neil Young, and Rod Stewart. Expect more shortly.

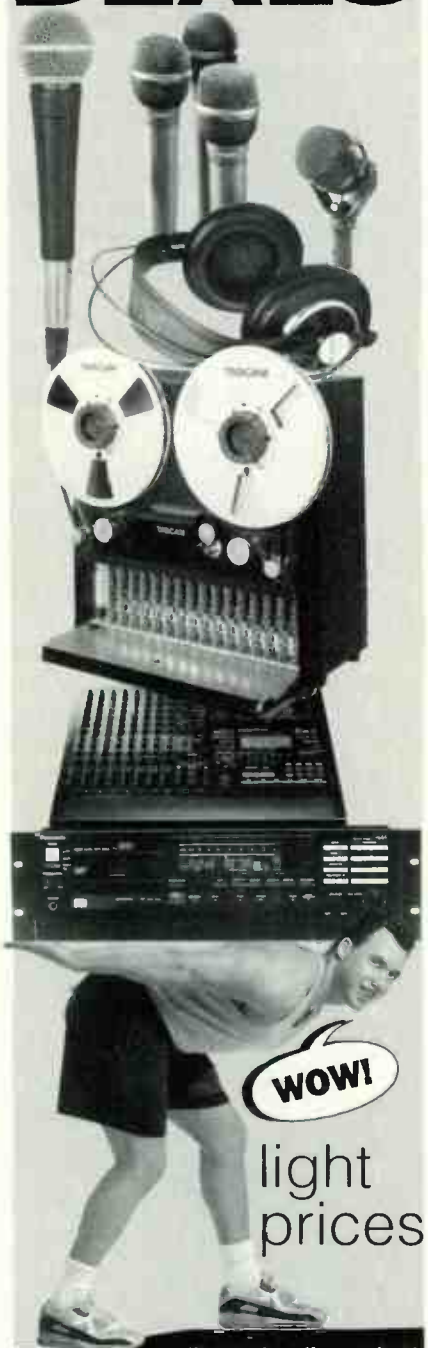
As the producer, Coletti

Some Time-Proven Tips For Taking A Live Acoustic Concert To CD

By Jon Varman

World Radio History

HEAVY DEALS



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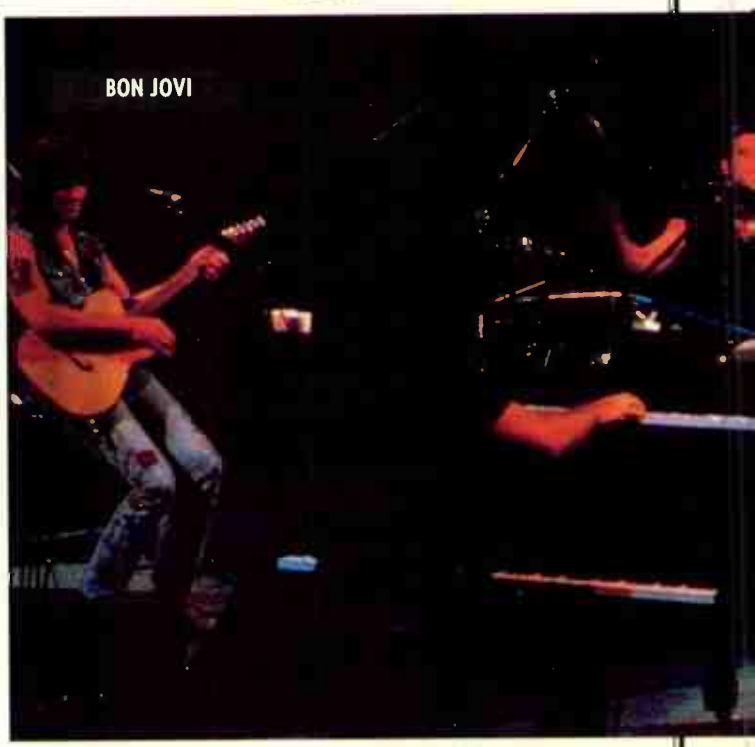
IN A BAND VAN



is able to use his own experiences as a musician to give *Unplugged* that down-home feel. "I play guitar a little bit," he says, "and when I get home to watch the show, I want to be able to learn something. I want to be able to be that close to the guitarist's hand so that I can figure out a song." With Coletti's camera honing in on the hands of such artists as Elton John, Neil Young and, the man who put *Unplugged* over the top, Paul McCartney, viewers are sure to have more than their share of eclectic music lessons.

"One of the keys to the *Unplugged* sound is ambience," continues Coletti. "We do it in a small room with about 300 very lively people consisting of a fan-based audience." He says that one of the benefits of an intimate setting is that it enables supergroups like REM or Aerosmith to actually see their audiences, which gets lost in the lights of arena-sized venues. "It's fresh for the artist because he's not doing the same old thing. It becomes a special night that he may never repeat in his career. Millions of people have seen Sting at Madison Square Garden, but only a handful of people will ever be able to say: 'I saw Sting at *Unplugged*'."

SEND IN THE TRUCKS

While the music may be mellow, the shows themselves debut with all the subtlety of a heavyweight championship bout. And especially since Clapton's Grammy sweep, the performers are all too familiar with what's at stake during this camera-cluttered cable-TV club date. "When you're in that *Unplugged* environment," Coletti says, "it's like being under a microscope. All of a sudden the little things mean a lot and you have to concentrate on how you're playing, as opposed to how you look. Being in tune becomes a lot more important."

The sound elements are reinforced by a versatile group of soundmen and mixing experts who usually find themselves operating from a nearby truck. The

World Radio History

program began in a television studio, but as the need to accommodate artists at different locations arose, it rapidly evolved into a show-in-transit. As to what company is chosen and who does the mixing, the artist comes into that decision-making process early on. Coletti says that Paul McCartney summoned an engineer from his early Beatles days, Geoff Emerick, when it came time to mix sound for his *Unplugged* acoustic revue.

The director of technical operations, Laurie Gershgorn, is the person in charge of the audio crew, a group that has a great deal of experience when it comes to mixing live bands to track. "The first thing we do," says Gershgorn, "is preplan everything from the instrumentation input sheet to the stage plots. For example, if strings are involved, we'll preorchestrate them to our liking. We can't rely on overdubbing, remixing, or any of the benefits otherwise available in postproduction. There are no second chances."

One of the tips Gershgorn gives to all upstart cable-access cowboys putting on their own acoustic music show is to use a three-way splitter — for the house, monitors, and music-mix console. "You want a three-way splitter to isolate each path as best as possible," she explains. "Make sure you've got an isolation transformer with ground lifts on each input and that the power that's feeding this is from a common ground." For monitors, Gershgorn recommends Clair Brothers systems because "what you want is the smallest, most direct monitors that also fill the band's volume requirements."

CLAPTON IS GOD

"Clapton was great," says Gershgorn, when commenting on the historic *Unplugged* episode that spawned the hit CD. Coletti is even more effusive in his praise of the rock legend. "He was terrific! When I got to rehearsal the day of the Clapton *Unplugged* session,

continued on page 86

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GETTING A GRIP ON SYSTEM CONTROL

SC-10 WILL BRING THE BAND IN THE VAN INTO THE INFORMATION AGE

BY BOB MOSES

■ **1993, 3:00 P.M.** Binky & The Limpets, a modest four-piece techno-polka band, arrives at Joe's Bar & Grill in an old beat-up Chevy van. It takes the band nearly one hour to load in. It takes another two hours to set up and soundcheck. Tonight the mix isn't quite right, but Bill the sound guy had to spend most of his time ringing feedback out of the monitors. Bill wishes he had more time to tweak the system, but the doors are about to open.

1998, 5:00 P.M. The band arrives at Joe's in the same old van, but with new equipment that operates over the AES SC-10 network. This time it only takes 20 minutes to load in. Even though the band's equipment has grown much more sophisticated, the equipment is lighter and there are fewer boxes. Setup and soundcheck take a half hour — the entire set up was saved in a network-wide snapshot last time the band performed here. The sound is exactly the same as last time, the result of several gigs worth of tweaking. Feedback went out of style after the RTA started talking to the EQs. Bill is backstage drinking beer with the band. Gosh, this SC-10 stuff sure is cool. What is it, and where did it come from?

The touring band is about to join the rest of the world in the information age. It is being propelled by the development of sophisticated communication networks that allow computers to talk to other computers. It won't be long before global networking services pump a continuous river of data into our homes and studios.

The proliferation of MIDI is ample proof that digital communications and other information technologies have a permanent home in audio systems. But MIDI is only the beginning. Originally designed to inform one keyboard which keys are pressed on another, MIDI has been subsequently adapted to control virtually every function in an audio system. Although MIDI has shown great flexibility, it is not capable of carrying audio systems into the 21st century on its own. In particular, MIDI can only carry 16 separate one-way channels of communication, only allows 7-bit data words to be exchanged, and has insufficient bandwidth to carry digital audio and other program material. What's needed is a "peer-to-peer" network, with thousands of high-speed two-way communication channels that carry arbitrary packets of data. That's where SC-10 comes in.

SC-10 is the code name for the AES subcommittee that is studying the role local area networks (LANs) will play in future audio systems. In October SC-10 will recommend a standard "application protocol" that will allow virtually any type of audio device to speak to any other on a sophisticated LAN designed especially for sound systems. This standard will hopefully overcome all the shortcomings of MIDI and add new capabilities never before possible in sound systems.

The SC-10 control and monitoring protocol is intended primarily for non-musical audio devices (signal processors, mixers, amps, and so on) — as opposed to MIDI, which communicates musical events (notes, pitch bends, etc.). A control and moni-

World Radio History

toring protocol allows a system operator (e.g., Bill, the sound engineer) to remotely control levels, mutes, EQ faders, etc., and monitor the status of VU meters, clip lights, and so on. Like MIDI, SC-10-based equipment can be preprogrammed in the studio (or garage) and then quickly set up in a club by simply recalling snapshots of settings. Devices can talk to other devices without human intervention. SC-10 will bring to the rest of the audio system what MIDI brought to musical instruments — and then some. If this sounds exciting — it is!

Communication between all the equipment in a sound system promises all kinds of revolutionary new opportunities. If an RTA can talk to an EQ, the pair can maintain a desired frequency response — automatically. If the master level control on a mixer can talk to an EQ, a "loudness" curve can be applied to the signal as level is turned down. Single button pushes can initiate automated sequences of parameter changes. Most important, the sound engineer can concentrate on the creative task of making good sound while the underlying system takes care of the routine no-brainer tasks.

Yeah, that's all well and nice, but how much does it cost? Well, it is reasonable to expect the prices of many devices to actually drop after they enter the network. This may seem counter-intuitive — after all, the ability to communicate over a LAN certainly involves the addition of sophisticated digital hardware and software. But equipment that can be remotely controlled and monitored over a network no longer requires the plethora of knobs, LEDs, and LCD displays commonly found on today's boxes. In many cases, these human-interface components are the most expensive — and space consuming — parts in an audio device. Removing them will lower the cost, size, and weight of the box. Moreover, the human interface can be concentrated in one place — for example, as a big graphical interface on a computer screen. The system is easier to operate, and you have full access to every piece of equipment from front of house!

These are not new concepts. Several proprietary control and monitoring systems have existed for years. These include Crown's IQ, Lone Wolf's MediaLink, QSC's QSControl, Crest's NexSys, and Intelix's MindNet. These systems are used routinely by many large touring shows, theme parks, stadiums, and so on. Unfortunately, these systems are incompatible with each other today, so you have to choose one manufacturer's entire product line over that of another — you can't mix and match. As MIDI demonstrated, a common standard allows every manufacturer — and consumer — to jump on the same bandwagon. You can mix and match to your heart's desire. Competition based on a single standard drives system costs down and performance up. Everyone wins.

Today, of course, no SC-10 equipment exists because the standard has

continued on page 112

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IN A BAND VAN

SLAMMED IN A VAN

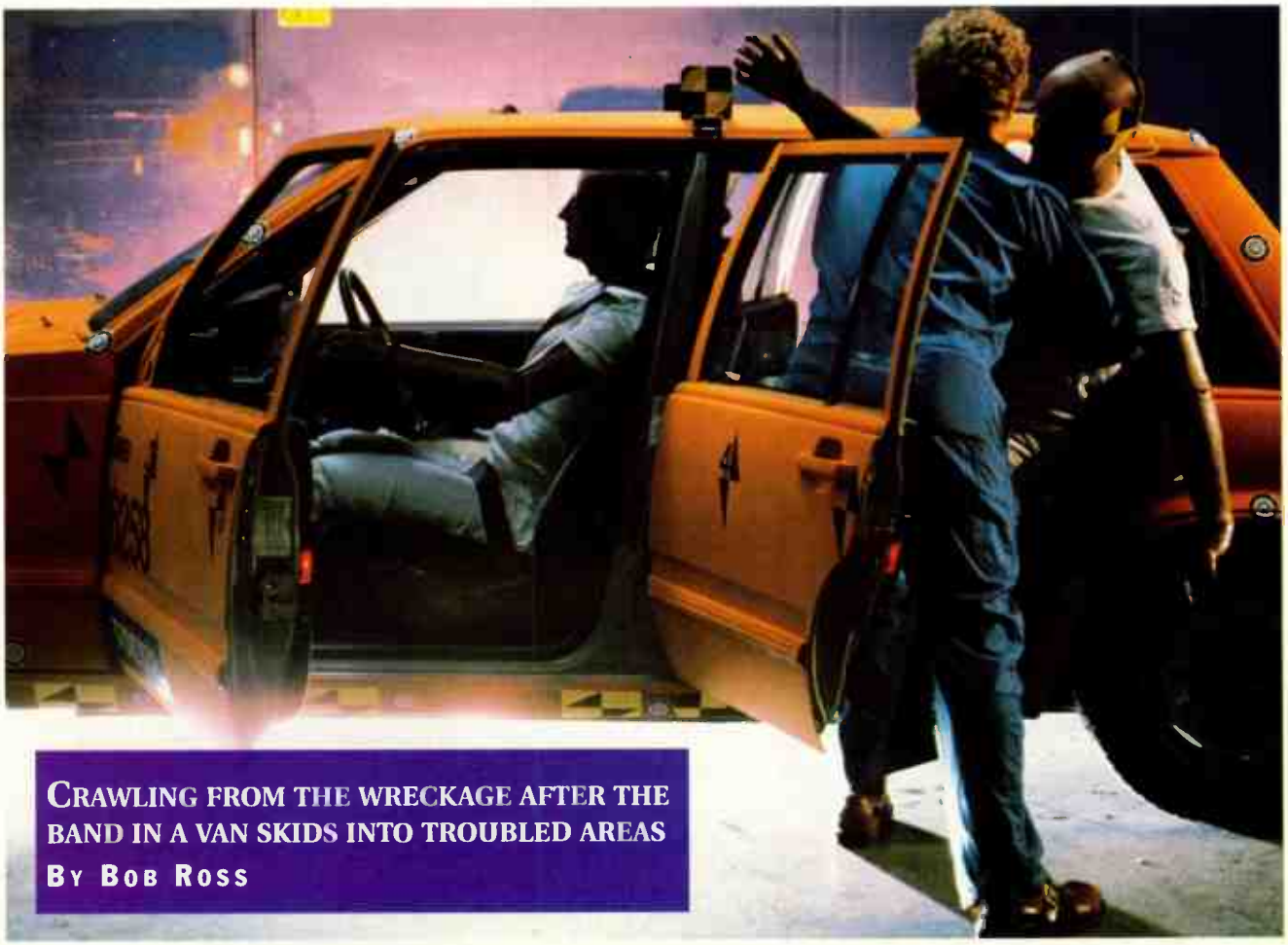
■I'VE BECOME reluctant to drive my own car to gigs anymore. I'll hitch a ride with the guitarist or the drummer. I'll bring a tiny amp and no effects just so I can squeeze into the front seat of a Gremlin. Anything so I don't have to drive. Why? Because whenever I pack my band gear into my own car, apparently I also pack a big sign that says "PLEASE HIT ME."

I don't remember packing this sign. I don't even see it in the rehearsal studio now amongst all the amps and instrument cases. But as soon as I load up for a gig my mind must go blank just long enough for me to mount that sign in plain view: "PLEASE HIT ME." And folks diligently obey.

Okay, it's only happened twice. But once would've been one too many times; two times now and I'm scared to death to drive my equipment across the street.

The first time was five years ago. I was driving my Toyota through Brooklyn. I had played a showcase the previous evening in Boston with an original pop/funk band, so my car was filled with the whole nine yards: two basses, my Chapman Stick, monster bass amp, effects, and the obligatory late-'80s pop/funk wardrobe. I was in a hurry, expecting a phone call in New York that afternoon that would confirm a two month European tour with the show *Jesus Christ Superstar*. And so, naturally, traffic was stopped dead. The Brooklyn-Queens Expressway was a three-lane parking lot; nobody was moving. Nobody, that is, except for some guy in an 18-wheeler who apparently didn't notice the traffic jam stretching for miles in front of him. I heard a muffled crunch as this 20-ton truck slammed into the last car in line, seven vehicles behind mine. Looking into my rearview mirror I could only see some slight movement, but the sound of breaking glass and crumpling metal became closer and more preponderant. And just as I was thinking "Gee, this is weird, we're all just standing still in traffic, what's the commotion?" the domino effect caught up: the Buick behind me plowed into my car with the proverbial sickening thud, and, propelled by the inertia of this out-of-control semi and the subsequent six vehicles, squashed me into the Mr. Pretzel truck directly in front of me. And kept on pushing. The entire front end of my Toyota was being jammed underneath the rear end of this panel truck, my hood was buckling, glass was popping out, and all I could think as I futilely pumped the brake pedal was "I hope my amp doesn't get trashed."

When everything had come to a halt, I got out of the car (via the right-side door; the driver's-side door had been rendered inopera-



CRAWLING FROM THE WRECKAGE AFTER THE BAND IN A VAN SKIDS INTO TROUBLED AREAS

BY BOB ROSS

World Radio History

T LAVITZ ON THE MUSICPROCESSOR

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

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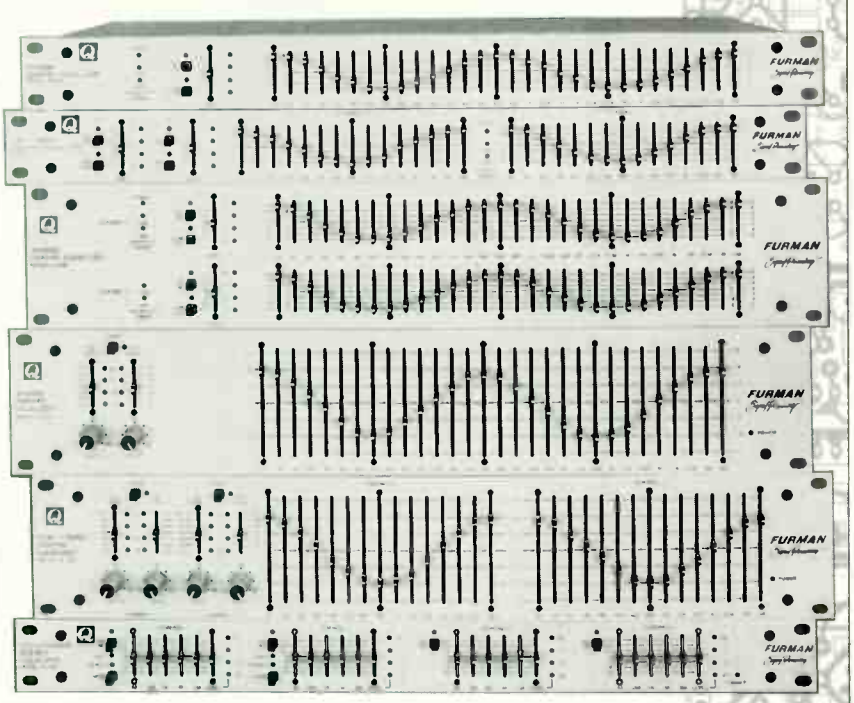
Graphic Details



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Contact Furman for the full graphic details.

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CIRCLE 27 ON FREE INFO CARD

IN A BAND VAN

ble) and surveyed the carnage. In between the Mr. Pretzel truck now squatting over half of my car and the 18-wheeler that started this scenario were the twisted hulks of eight passenger vehicles, their occupants emerging dazed and, like me, scratching their heads wondering "What just happened?" (I doubt any of the rest of them were also wondering "Is my bass in one piece?") The police eventually arrived, asked a bunch of questions, helped clear the wreckage (it took six people and two crow bars to pry my car out from under the pretzel truck), and told us how to get copies of the accident report. Oddly enough, I was able to drive the mile-and-a-half back to my driveway before the Toyota completely died. Thirty seconds after I got in the front door the phone rang, from Europe: you've got the gig, be there Tuesday. This was Friday afternoon.

Over the weekend, between frantically trying to get a passport and pack, I somehow managed to squeeze in a trip to the local police precinct to pick up a copy of the accident report ($6 fee). I also dashed off a quick note to my insurance company, explaining that I'd been in an accident and that my vehicle was a total loss. Then it was off to Europe for eight weeks, where I was mercifully able to forget my driving debacle. At least temporarily.

Upon my return to the States, the nightmare resumed. First, the insurance company for the truck which caused this mess denied any knowledge of my participation in the incident. They claimed the accident report made no mention of my vehicle's involvement, and accused me of being some sort of

World Radio History

scam artist trying to cash in on their misfortune! Why else would I have waited two months before filing a claim? It took an additional three months of my insistent phone calls and faxing my copy of the police report to numerous desk jockeys before they finally agreed to settle. Even still, despite the police report as evidence, the settlement check I eventually received was accompanied by a handwritten note implying that they were settling to get me off their back, not because they felt obligated to replace my vehicle!

I guess persistence pays off. Thoroughness probably does too, but since I was in such a rush to get off to Europe right after the accident, I neglected that aspect. Apparently the letter that I sent my insurance company did not in as many words state "Please cancel my policy, effective immediately." So after two months of my not paying premiums, they took it upon themselves to cancel my policy, and to inform the Department of Motor Vehicles that I was driving an uninsured vehicle. And they didn't tell me. The ramifications of this faux pas would not be felt until I had to renew my driver's license five years later. It didn't feel good.

And to top it all off, six months after the accident I got a letter from the insurance company representing the car that was behind me, the Buick that (inadvertently) collided with me and shoved my car under the pretzel truck; they accused me of being responsible for the damage to their car!

I would've laughed hysterically if I wasn't already sick of all the bureaucratic nonsense. I politely, if tersely, informed them of the police report identifying the 18-wheeler as perpetrator, and finally was able to put the whole mess behind me.

SLAM NUMBER TWO

The second time I was "slammed in a van" was last August. Once again I was coming from a gig, driving an immaculate '84 Ford filled with my bass rig, several instruments, and my girlfriend. At a traffic signal, some moron doing 60 mph decided the red light didn't apply to him, and proceeded through the intersection. Just as I was driving across. Our vehicles formed a geometrically perfect right angle...at least for the millisecond before we exploded into rapidly disintegrating hunks of metal. As the two cars ricocheted off one another, spewing parts and fluids like roman candles, I once again found myself praying "I hope my amp isn't destroyed."

I got lucky; no equipment damage, no personal damage. More importantly, I had the extremely good fortune of a police eyewitness. The offending driver was issued a moving violation practically before my car skidded to a halt. This meant he would be responsible for 100 percent of the damages to my car, which as it turned out, was a total loss. I was an emotional wreck, a seething mass of adrenaline-fueled fear and anger, but at least I wouldn't have to go through another interminable period of insurance company hell just to get reimbursed. Or so I thought. Silly me.

While the other driver's insurance company readily admitted responsibility for my loss, they were less than willing to agree on the value of my loss. Their first settlement offer (which I had to wait several weeks for) was so low I thought they had mistakenly appraised a Tonka rather than my Ford. I rejected the offer outright. Their second offer, another week later, topped the first offer by a measly $100. This was getting ridiculous. The insurance company claimed their appraisals were based on the blue book value averaged in with the yellow book value. I suspected they were actually consulting Mao's red book, and decided to do some of my own research. After perusing the yellow book at the local library, I discovered there is a range of values given, depending

continued on page 86

SURVIVING THE AFTERCRASH

Despite the headaches, hassles, aggravation, and angst (to say nothing of the complete loss of two vehicles), I consider myself lucky — my gear didn't get destroyed. Over $5000 worth of musical equipment was bouncing around in the back of my cars during their swan song and there's not even a scratch or dent to show for all of it. Kind of anti-climatic.

Which of course raises the question "What if it *had* been damaged?" Would the insurance companies, which so generously (cough cough) covered the loss of my vehicles, have reimbursed me for loss or damages to the contents of these vehicles?

In a word, maybe. There is a compulsory minimum limit of $5000 per accident for damage to someone else's property. Assuming the other driver (the perpetrator of the accident) is insured, your possessions are covered up to that dollar amount. Additional coverage is optional, however. I don't know anyone who plans to go out and crash into a van filled with $20,000 worth of musical instruments, so the likelihood of being struck by someone carrying additional coverage is miniscule. There's the rub: if my equipment had been as thoroughly trashed as my car, I most likely wouldn't have recouped the entire replacement value.

My own auto insurance would be absolutely no help either. No matter how complete your auto policy is, personal possessions damaged in an accident or stolen from the vehicle simply aren't covered.

Some homeowner's policies can add a rider that, for an additional fee, will cover possessions taken outside of the home. For musicians' needs, these are difficult — if not impossible — to find. Insurance companies are wary of musicians in general; I've had a few politely show me the door the minute I revealed the nature of my work. Apparently their line of thinking goes something like this: "$N000 (where N is any number greater than, say, 10) is far too large an investment to be a hobby. This guy must be a business." And then you're excluded from homeowner's coverage.

The only way to guarantee your gear is covered is to have a dedicated musical equipment policy -- one that specifically and only addresses the tools of your trade. Be forewarned: it won't come cheap. Members of the Musician's Union can take advantage of reduced rates offered by National Association Consultants. They require extremely detailed documentation of your musical inventory, down to the last plug, jack, and RAM card, but the premium rates are typically $2.50 per $100 of insured value. The inventory must be updated yearly and authorized by a qualified appraiser, but it's worth the savings. Non-union musicians are well advised to emulate the thorough documentation, but be prepared to spend two or three times that premium rate.

—Bob Ross

World Radio History

IN A BAND VAN

HAVE MAC, WILL TRAVEL

BAND NAME: Randy Jackson Live
MEMBERS: Randy Jackson and a Macintosh SE/30 computer
LATEST RELEASE: *Randy Jackson's China Rain*
WHERE HE'S BEEN: Tours of the Southeast (Texas, Louisiana, Florida, etc.) and the Northeast (New York, New Jersey, Connecticut), EQ's Music Recording & Sound Expo, New York
WHAT'S NEXT: In the process of writing new songs and programming them into the Macintosh for upcoming shows and recordings
HOW HE GETS AROUND: Volvo truck
SOUND ENGINEER: The entire 46-input mix is programmed by Randy and run entirely by the computer during the show. Randy also programs the lights into the computer for the show. Both sound and lighting consoles are on stage during the performance.
CONSOLE: Soundtracs PC/MIDI 24-channel in-line console, facilitating 48 "split EQ" inputs and MIDI muting on all 48 inputs and 4 aux sends
CONSOLE RACK: DigiTech MEQ-Mono 28 MIDI programmable EQs for the house (stereo) [2]; Niche Audio control modules (MIDI) [2]; Yamaha SPX 1000; Roland RSP-550; Lexicon PCM-70; Alesis Quadraverb; DigiTech VHM-5 Vocalist harmonizer; Symetrix 501 compresssor; JBL 2-way stereo crossover; Behringer MDX 2000 compressor; Behringer SNR-202 denoiser; Behringer DE 102 de-esser
LOUDSPEAKER SYSTEM: Double 15-inch EAW Forsythe-style cabinets with JBL E-130 speakers [4]; JBL 2441 drivers with Lens-style horns
AMPLIFIERS: House — BGW 750 [2] and BGW 250; Monitor — BGW 250
SYNTHESIZERS: Korg M1-EX, DSS-1, and DSM-1; Yamaha SY-22 and TG-55; Roland U-220 and R-8 drum machine; E-mu Proteus 1
GUITAR PROCESSORS: Zoom 9030; Alesis Quadraverb GT (All guitars are run direct — no amps)
GUITARS: Les Paul Custom; BC Rich double neck (6-12); ESP M-1 Custom; Ovation Legend 12-string acoustic; Guild 12-string acoustic; Gibson Melody Maker; BC Rich Bitch
OTHER GEAR: Shure SM 58; Lepricon LM-850 lighting console; Lepricon LD 360 MIDI dimmers [4]; Par cans [36]; Leiko Spot Lights [2]; Passport MIDI Transport; MSB REV 2 (MIDI patchbay); Conn Strobtuner; racks and cases (Big Audio Design and C&D Cases); Macintosh SE/30 with Mark of the Unicorn Performer sequencing software; Dean Markley strings
BEST LIVE EXPERIENCE: Randy states: The first show I did was in April of 1992 at a club called Ronnie V's in Long Island, NY. I was nervous! Here I was, sitting on a stage alone with a computer and a crowd of people staring at me and wondering just what the hell was going to happen.

Right before I started the first song (I start songs with a foot pedal), I closed my eyes and prayed. *Please work.* It did!!
WORST LIVE EXPERIENCE: Randy continues: The crew and I pulled up to a venue in Ft. Lauderdale, FL. When we walked in, there was a team of carpenters building a stage. They didn't finish it until 9:00 P.M. The show was supposed to start at 10:30 P.M. To make matters worse, we had just finished a two-week ZEBRA tour and the solo show equipment had ridden 6,000 miles in the truck since it had last been taken out. We got the equipment set up by 10:40, but there was another hour of troubleshooting to do before the performance could start. One of the house EQs (MIDI) took a dump and we had to use a spare (no MIDI). A lot of the cables in the racks had come loose and we were rushing to get it all working. Finally we were ready, but I was completely exhausted. In my haste to get started, I forgot to insert the Program Combination Card into the Korg M-1. By the third song, the sounds coming from the M-1 were "very interesting." The audience forgave us for the late start, but I felt like a train wreck by the time it was over.
TOUR TECH TIPS: The Soundtracs PC MIDI console plays a large part in making my show work. The console is modular, which makes it easy to replace a channel, even though I haven't had to yet. I have the spare in the console so I don't have to hunt it down if a channel goes out. The System Exclusive dump feature allows me to save or load up to 100 muting "scenes" at one time from the computer.

I use MIDI controllers sent from the computer to do real-time changes to effect parameters in all the signal processors. Even for an engineer mixing a live band from the house, the use of controllers to change multiple parameters simultaneously through MIDI allows much, *much* more control over these units and also eliminates the glitch that sometimes occurs when program changes are used to change an effect.
TOUR INFO: Randy Jackson/ZEBRA INFO, P.O. Box 1447, Selden, NY 11784

ROAD WARRIOR

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RANDY JACKSON goes it alone with his Macintosh SE/30, which runs the show while Randy plays.

Photo by Peter Monroe

World Radio History

IN A BAND

REAL TRUTH ADJUSTMENT (RTA)

ARE YOU GETTING THE MOST FROM YOUR RTA? Find out if you're using your RTA to the max. ABOVE: Rane RE-27 RTA.

EVERYTHING YOU ALWAYS WANTED TO KNOW ABOUT REAL-TIME ANALYZERS BUT DIDN'T KNOW WHO TO ASK

BY WADE MCGREGOR

■THE REAL-TIME analyzer, or RTA, is probably the most familiar piece of test equipment in live sound. The direct correlation between the RTA display and the graphic equalizer is not an accident, and is probably a major reason for the wide acceptance of this analyzer. The RTA can do a variety of tasks and, when used with an understanding of its strengths and weaknesses, provides a quick and powerful way to see the relationship of frequency and level within an audio system.

The RTA is capable of providing a range of information, from basic sound system frequency response, to feedback frequencies in stage monitor systems. The RTA is also very useful in making quick electronic measurements of EQ settings, interchannel crosstalk, or impedance. The cost of RTAs with high-resolution level displays and even data storage has fallen as DSP and other computer-related device costs have dropped, allowing this handy analyzer to be used by more sound technicians than ever before.

RTA has been used to equalize sound systems for 25 years. Don Davis was instrumental in the development of the 1/3-octave equalizer, putting the first Altec-Lansing units to work in 1967. Davis played a similar role in the development of an acoustic analyzer to speed up the sound-system equalization process. He proposed the idea to Hewlett Packard engineers, who went on to develop the 8054A, the first 1/3-octave RTA, in 1968. The best place to learn about the practical application of the RTA is firsthand, from Don and Carolyn Davis in their Syn-Aud-Con Sound System Design seminars.

The RTA receives an audio signal from either a microphone or line input and sends the signal through a series of filters with 1/3-octave center frequencies between 20 Hz and 20 kHz. The actual frequency range and number of bands vary among different models, as do the types of filters. There are, however, a number of low-cost RTAs that read 31 bands and use filters that meet the ANSI Class III standard. This allows direct comparison of the data measured on one analyzer to that measured on another — an important feature to those that must depend on various sources for their analyzers or want to compare their measurements with those of others. The audio level within each band is typically displayed with a vertical bar that is calibrated in decibels. Variations in the resolution of levels also exist between RTA models: some only resolve to 2 dB per vertical division and others to 1/4 dB or less.

The vertical and horizontal scales on the RTA allow measurements to be directly related to the legend on the front panel of the 1/3-octave equalizer. This makes the equalization of a sound system much faster than trying to correlate numeric readouts or continuous line graphs. The downside of all this is that when measurements are being made that are not going to be used in relation to a graphic EQ, important information that falls between the 1/3-octave bands of the RTA may not be displayed. For those that need information of this type there are highly sophisticated analyzers, such as FFT (Fast Fourier Transform), TDS (Time Delay Spectrometry), and MLS (Maximum Length Sequence) systems that can postprocess its information into a familiar 1/3-octave format but still store very accurate and detailed frequency data at much higher resolution.

The Techron TEF-20 is a TDS analyzer based on DSP technology. The TEF-20 is capable of very-high-frequency resolution in TDS mode, but by simply sending different instructions to the DSP, the TEF can also be an RTA. Because the TEF-20 uses a computer for an interface, it is not limited by display hardware. Therefore 1-, 1/2-, 1/3-, 1/6-, or even 1/12-octave measurements can be made. Using a computer for some of the processing gives the user access to a wide variety of storage, comparison, and data display options that are not possible in the less sophisticated hand-held RTAs. DSP technology is used in some of the hand-held RTAs as well, allowing a range of optional features to be added. The units that use LCD or other computer-like displays are capable of giving the user a range of detailed information.

The RTA typically sits at the mix position in a sound-reinforcement system for checking the frequency response of the system from day to day, venue to venue. Pink noise is used

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STARR PARODI • COMPOSER, PRODUCER, ARSENIO HALL SHOW KEYBOARDIST

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

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

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

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

WHY PROS PREFER MACKIE... PART ONE

WAYNE SHARPE • OMNIMAX FILM AND COMMERCIAL SOUNDTRACK COMPOSER

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

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

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

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

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

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World Radio History

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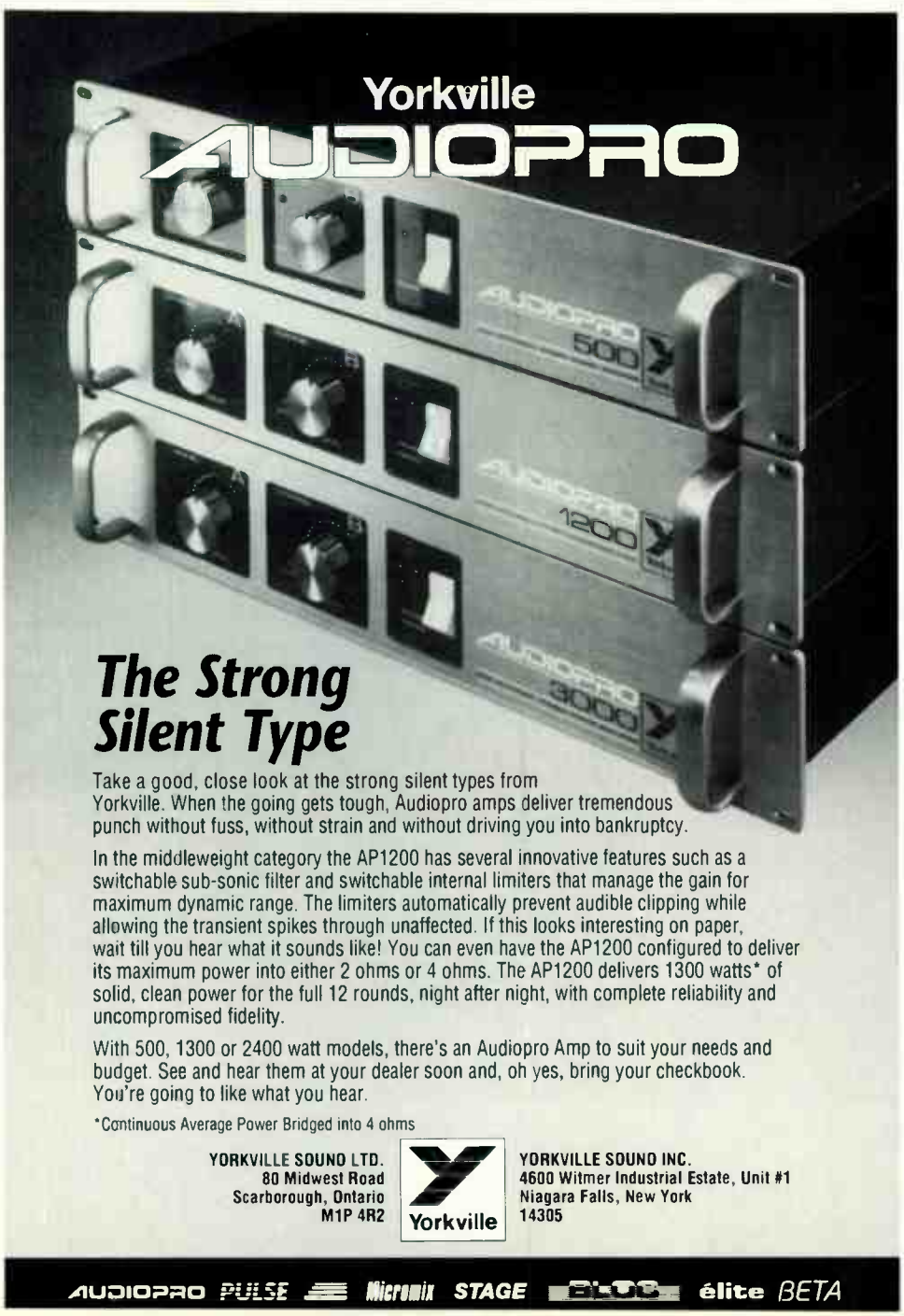
AUDIOCONTROL'S SA3050 Real-Time Analyzer

as a source of sound energy that is equal in each frequency band of the RTA. The RTA is not able to discriminate between the direct sound from the loudspeaker and the reverberation within the room. The human hearing system is capable of making this distinction and so the results shown on the RTA will not always directly correlate to the sound qualities we hear. The measurement microphone should be moved to a number of locations, as many as time permits, and the measurements averaged to achieve a representative response and not just the sound at one seat out of hundreds or thousands in the venue. The result can be stored in memory on some RTA models, or simply traced onto paper for future reference.

Measurements, if made with the RTA's measurement microphone in appropriate positions, can be very informative, but that information must be tempered with careful listening and the understanding that the display can also show errors in frequency response that cannot be corrected by equalization. For example, cancellations caused by multiple drivers covering the same listening area or sound reflected from surfaces within the venue may show up on the RTA as dips in the system response, but adding more level to those frequencies with an EQ will not remove the cancellation or correct the frequency response. Attempting to equalize these problems will usually make the system sound less natural because the frequency cancellation will not be positively affected by the addition of more level, but the adjacent frequencies will be. This results in an M shape in the frequency response, which we perceive as excessive EQ while having gained no additional level at the problem frequency.

Another application of the RTA is for monitoring and intercepting feedback in a system. Using the RTA display in its fastest decay mode, frequency bands that are nearing feedback will show up on the display as the slowest to decay when the system is reproducing music, speech or, best of all,



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

Studio Notebook

AT4033

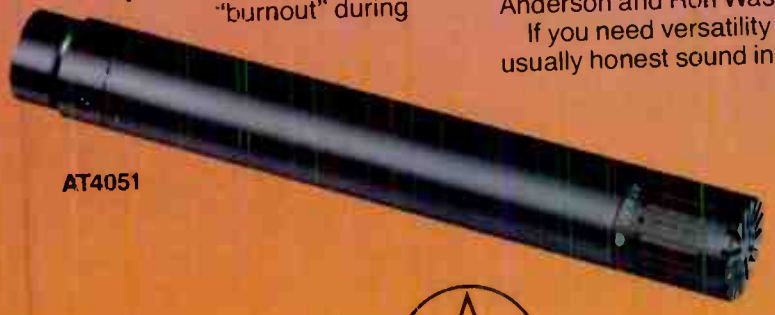
Jon Anderson is one of the most innovative of today's leading musicians. Co-creator of the seminal rock group *Yes*, his music has proven both popular and on the leading edge of musical thought. His current project is *Power of Silence*, an album for Geffen Records recorded primarily at his fully-equipped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

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

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

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

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



AT4051

audio-technica

INNOVATION □ PRECISION □ INTEGRITY

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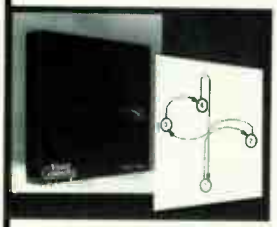

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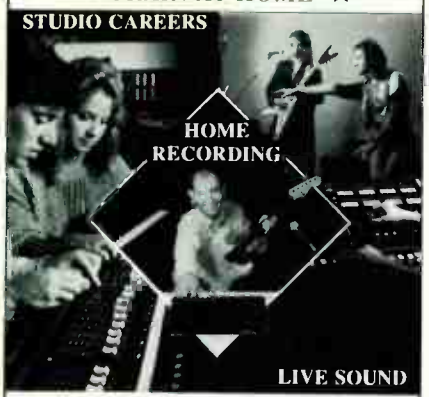

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impulse noise. A sound that is impulsive, such as the click of a metronome into a primary vocal microphone, will excite the feedback modes of a sound system and the RTA will display these as frequency bands that seem to hold their level longer than the other bands. This method of seeing potential feedback can also be used during a speech or musical performance. A watchful eye on the RTA will quickly identify the problem frequencies, sometimes before the feedback is even noticed by the performers or audience.

It is also worth taking the RTA microphone to the lead vocal mic on stage, shutting off the stage monitors, and looking at the response of the FOH sound system reproducing pink noise. This can be very enlightening, displaying the problem frequencies that are caused by anomalies in the system coverage pattern and reflections from surfaces within the room that return to the stage. It is worthwhile to also use the lead vocalist's microphone for this measurement. The frequency response and pickup pattern of that specific microphone may have a major impact on the feedback problems you will encounter during the performance. Connecting the headphone monitor output from the mixing console to the RTA and using pink noise fed through the various loudspeakers in the system will allow you to examine the frequencies that are being accentuated by microphones in certain locations, by soloing each one in turn.

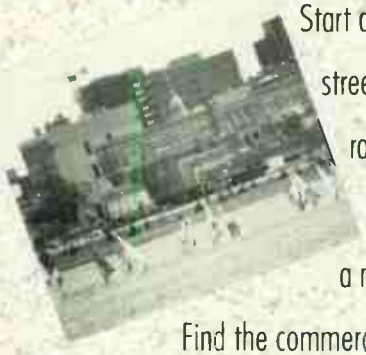
The RTA can also be used to measure your microphones and loudspeakers, creating a database that can be used to find devices that have been damaged and are due for repair or replacement. Quick tests can be set up in the shop between gigs to catch those devices that would otherwise become real problems during a soundcheck. By using an impedance bridge and a pink noise source, the RTA can even be used to measure driver- and loudspeaker-line impedance.

Precision equalization of sound systems requires parametric equalizers and high-resolution time-domain analyzers; but the RTA still has a place in providing quick, easy-to-read information concerning many aspects of sound system performance. If you are using an RTA to equalize a system, be wary of those dips and peaks in the response that don't seem to respond quickly to the EQ. They may be caused by time-domain problems and are beyond the reach of any EQ. If, however, your RTA, your ears, and your audience agree that you are making an improvement to the system's sound quality, then you are probably on the right track.

THE RTA IS CAPABLE OF PROVIDING A RANGE OF INFORMATION, FROM BASIC SOUND SYSTEM FREQUENCY RESPONSE, TO FEEDBACK FREQUENCIES IN STAGE MONITOR SYSTEMS.

World Radio History

A Scenic Tour Of The Seaside City That Plays Well For The Music Industry.



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World Radio History

GOLD LINE DSP-30 RTA

■IN LIVE sound reinforcement we have learned to trust our ears, but there are occasions when a more objective opinion is needed. If the club owner says the band isn't loud enough, the rental company says the crossovers never need adjustment, or the lead vocalist says his monitor is ringing at 500 Hz, you may disagree, but who will support your side? Perhaps it's time to buy an RTA and throw a little science into the discussion.

Gold Line has built a very lightweight hand-held RTA, the DSP-30. This portable unit has a wide range of features, including a nonvolatile memory option that allows you to examine your measurements in finer detail later. This ability to take coarse measurements (5 dB per division) that can later be displayed at a much higher resolution (1/4 dB per division) makes the unit quick to use, offering significant detail when required. Of course, the frequency resolution is fixed by the display hardware to thirty 1/3-octave bands between 25 Hz and 20 kHz.

The DSP-30 can have the microphone plugged directly into the unit so that you can walk around the venue and measure changes in the frequency spectrum or overall level while listening to the sound system. The DSP-30 is based on a high-speed digital-signal-processing chip that lets Gold Line offer an array of features and options that are created primarily in software. The front panel of the DSP-30 is flat and includes a level/frequency display, a numeric display, LED indicators for various modes, and settings selected on the membrane keypad on the lower right. This keypad has the numbers 0 to 9 and dedicated keys for RTA mode; SPL indication mode; saving and recalling the nonvolatile memories (optional); a print key (optional); and the Option key. Each number key has two legends. The first, beneath the number, is the normal function for that key. The second, in gold letters above the number, is a function accessed by first pressing the gold Option key.

The most common functions of the DSP-30 are easily visible and accessed with one or two keypresses. Less-used functions — such as adjusting the input level of the A/D converter or entering the optional RT-60 reverberation, Harmonic Distortion or Speaker Timing Analysis modes — are accessed using three-digit numeric codes after pressing the Option key. I did find that I had to enter Auto-level mode every time I used it so that it would optimize the A/D gain to suit the situation. If I didn't, the Auto LED would flash incessantly to remind me that the gain was too low or too high (it doesn't say which). This became a little annoying because unless you specifically store your favorite gain setting, the DSP-30 returns to factory default settings every time it is powered up. You look a little like a beginning Nintendo player when doing the same sequence of keypresses over and over.

The LED display of level/frequency is large enough to give the user a reasonable view of the spectrum. The total display range is from 2.25 dB in 1/4 dB resolution to 45 dB in 5

continued on page 86

ROAD TEST

MANUFACTURER: Gold Line, Box 500, West Redding, CT 06896. Tel: 203-938-2588.

APPLICATIONS: Quick acoustic and electronic ⅓-octave spectrum analysis.

SUMMARY: A portable real-time analyzer with a large display and numerous options.

STRENGTHS: Wide dynamic range, high-resolution level display, and expandable DSP-based measurement provide for a wide range of applications.

WEAKNESSES: Relatively short battery life, and the keypad lacks any tactile feedback.

PRICE: $1500 for the basic unit **EQ FREE LIT #:** 119

BY WADE MCGREGOR

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World Radio History

GOLD LINE RTA

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dB resolution. The scale for each resolution is clearly marked above the LED that indicates the current setting: .25 dB, .5 dB, 1 dB, 2 dB, 3 dB, 4 dB and 5 dB per division (row of LEDs). Measured values can be summed or subtracted from previous measurements of memorized data.

The Auto mode lets the DSP-30 adjust the display and A/D input gain to suit the current level. This can be very handy when (with the unit sitting beside your mixer) you want to see the current spectrum but don't have the time to adjust the unit yourself. When a measurement is to be examined later, it can be stored in one of six volatile memory locations — but only until the power is shut off. If you need more memory locations or to capture data and look at it days or weeks later, you can buy the nonvolatile memory option. This gives you up to five banks of six memory locations — 30 stored measurements in all. Either way, memorized data can be recalled and examined in any display mode that was possible when making the measurement. The DSP-30 actually stores all the data over an 85 dB range and in 1/128 dB resolution.

The factory-calibrated microphone supplied with the unit is normalized in the factory so that any other Gold Line MK-8A calibrated mic will work with your analyzer. The mic is actually normalized to the same sensitivity as the AKG C451/CK22, so if you want to use that mic instead, your SPL readings will still be accurate. The microphone connector is a standard female XLR-type and also provides 12-volt phantom power for condenser mics. This allows the measurement mic to be located remotely and connected through a standard mic line to the DSP-30.

Using the line input (a 1/4-inch phone jack) switches off the mic input, making it possible to do electronic measurement such as recording a 1/3-octave equalization setting or checking a tape machine's frequency response. The DSP-30 can even measure dBm when using the line input by subtracting 120 from the displayed SPL. The 1/4-dB resolution of the display makes the DSP-30 well suited to electronic measurements and the 85 dB window allows the user to examine harmonics generated by sine-wave distortion in the device under test. A full FFT (Fast Fourier Transform) analyzer is better suited to this form of narrow-band display, but Gold Line does offer a distortion measurement option that calculates the total harmonic distortion and shows the value in the numeric display on the front panel.

A carrying case that includes pockets for the microphone and cable and Gold Line's tiny pink noise generator is an option that suits many users who want a comprehensive portable RTA system. There is also an optional printer port for printing out the stored response curves and an RS-232 interface for manipulating the measurement data on a computer.

The large display on the DSP-30 is bright and easy to see even at a distance or in sunlight, but large displays also reduce battery life. The optional AC power adaptor is recommended for those who will use it primarily at the mix position. The power supply also can be switched to rechargeable NiCd batteries, an economical alternative to regularly buying eight AA batteries when using the analyzer in the field.

The software-based DSP-30 will allow for expansion because Gold Line can offer updated EEPROMs with new features and functions as requested by users. This makes this handy little analyzer a test tool that can provide excellent value and new functions as your measurement needs develop. ✇

UNPLUGGED

continued from page 67

I didn't know what to expect, especially since we hadn't gone over the set list. The minute I heard the new version of "Layla," I was floored. That was exactly what *Unplugged* was meant to do — make artists rethink their material. Clapton had embraced that.

"He deserves the Grammy he won for *Unplugged*," Coletti continues. "It was really hard for him to get up there and play some of those songs, which were really personal. We probably won't see that kind of success again."

Maybe not, but if Coletti sees his dreams come to fruition, Nirvana, Prince and Guns N' Roses will render acoustic versions of their classic songs on MTV's *Unplugged*. "Anyone can come on this stage and do a great job," he explains, "as long as they're sincere." So, are there any plans to have electronic wonders Depeche Mode and Nine Inch Nails on the show any time soon? "Who knows? LL Cool J found a way to get on. Anything's possible." ✇

SLAMMED

continued from page 73

on the condition of the vehicle. Their offers had constantly been on the low side, whereas my car had been in pristine shape. I also noted that there was a mileage premium that could be added or subtracted from a car's value depending on whether it had high or low mileage relative to its age. The insurance company had neglected to note the atypically low mileage on my eight-year-old car. With these figures as evidence, I countered with a settlement that was twice their initial offer, but at least now was in a range where replacement with a like-condition car would be feasible. Naturally, they rejected that outright.

And so it went, each of us making and/or rejecting offers, for several months. In a bit of economic reasoning I will never comprehend, the insurance company was spending $250 per week to provide me with a rental car for the entire period that we were haggling over what amounted to $1000! We did eventually reach a reasonable settlement, though by that time my opinion of insurance companies had sunk to a level somewhere between fascist dictators and serial killers.

So what's the point of all this? Why are you reading about my tribulations in *EQ* Magazine? I did learn a lot about dealing with post-accident stress management and corporate red tape from these mishaps; just not quite enough to write an article on how to avoid them. But that's not the point. The point is this: if you ever see me driving down the road in a car full of musical instruments, STAY THE HELL AWAY! ✇

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CIRCLE 40 ON FREE INFO CARD

Dolby 740 Spectral Processor

EQ LAB REPORT

MANUFACTURER: Dolby Laboratories Inc., 100 Potrero Ave., San Francisco, CA 94103-4813. Tel: 415-558-0200.

APPLICATION: Psychoacoustic enhancement for individual instruments, mixes, or masters, and audio restoration.

SUMMARY: Greatly enhances signals, without using distortion, by applying filtering and compression to low-level signals.

STRENGTHS: Brings out detail in virtually any sound when properly adjusted; quality construction; lots of possible control settings make it a surprisingly universal device; built-in noise reduction.

WEAKNESSES: No way to link channel controls electronically, so you always have to adjust two groups of knobs; no memory to store settings; no phone jack or digital I/O.

PRICE: $1760 **EQ FREE LIT #:** 120

REMEMBER WHEN engineers encoded vocals with Dolby A — but didn't decode them, in order to get an airy, transparent sound? That was because Dolby A compresses high-frequency, low-level signals during encoding, thus selectively boosting lower level signals while leaving higher level ones untouched.

Dolby has now taken that concept and applied it across the audio spectrum, but in a particularly interesting way. Welcome to the distortionless, wideband "exciter," or as Dolby calls it, a magnifying glass for audio.

FIRST IMPRESSIONS

At $1760, the Spectral Processor is expensive compared with other psychoacoustic enhancers. You will, however, feel a bit better about the cost after you open the package: the 740 is well built, fits in a 1U rack space, has a substantial feel, and comes with a well-done instructional video. (It's worth the seven minutes needed to watch it.)

In a nutshell, the 740 routes signals through frequency- and level-sensitive compression (in typical Dolby fashion, only lower level signals are affected). We saw something similar in the Aphex Model 104 review; that unit incorporates selective low-frequency compression to bring up the bass, along with the high-frequency Aphex effect. The Spectral Processor, however, is a much more complex and costly device.

There are four pairs of filters. Each pair contains a fixed-band filter that provides a variable amount of boost at a fixed frequency and a sliding-band filter that boosts by a fixed amount over a variable range of frequencies. Two of these filter pairs are dedicated to high frequencies, and two pairs to low frequencies. One of the pairs (for either band) boosts low-level signals but reduces gain as it nears midlevel; the other pair picks up from there, and reduces its gain as it nears 0 VU. This provides a smooth transition between stages, but can also create a sharper filter slope, which is one of the reasons why the 740 can help "pick" sounds out of a mix.

There's more, but let's look at the controls and explain the rest as we go along.

CONTROL FREQ

The 740 is a switchable dual mono/stereo linked unit, with two individual sets of controls (except for a single +4/-6 dB level switch) and two independent sets of electronically balanced, XLR connector inputs and outputs. The input impedance is around 10k ohms, and the output impedance about 20 ohms. There's no power switch, but there is a real IEC power cord — no wall wart.

An EQ in/out/sidechain switch can bypass the unit, combine the effect with the straight signal, or output the sidechain (processed sound) only. The latter lets you use the 740 as an effects loop device so you can add selective amounts of processing to different channels. It's also invaluable for hearing what the thing is doing as you learn the unit's operation, or for adding more signal processing to the effected, sidechain sound.

As expected, you need to set levels short of distortion (as indicated by a clip LED), but there's also a threshold control that matches each channel to the signal being processed. Signals below the threshold are boosted by 20 dB; the boost gradually tapers off so

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COMBINE IT • $249

A favorite of "power user" film scorers and session keyboardists, the MixerMixer ($249*) effectively turns up to three 1604s into "one big mixer" without "cascading" or losing AUX sends. Three CR-1604s and a MixerMixer yield 48 line inputs (24 of which are mic inputs), 12 stereo AUX returns, 24 direct outs and 3 stereo/6 mono submasters.

FADE IT • $75

All combining is done at unity gain, so no level or headroom is lost and no additional noise is introduced. Matching 100mm Remote Fader ($75*) controls master level of all mixers plugged into the MixerMixer (existing master faders become submasters). Comes with its own 6-ft cable and can be bolted to the side of a CR-1604, handheld or attached to any surface. Not shown: The CordPack ($69*) all patch cords needed to combine 3 CR-1604s.

EXPAND IT • $199

Instead of cheap, integrated circuits, the CR-1604 has six totally discrete preamplifiers with conjugate pair, large-emitter transistors. The result is ultra-low noise (–129dBm E.I.N. @150 ohms), low distortion (0.005%), astonishing headroom and 300K bandwidth that contributes to the preamps' transparent accuracy. At any gain level, you can handle everything from a close-miked kick drum to a flute with exceptional sonic fidelity and freedom from overload. These preamps have made the CR-1604 legendary among pros who are used to $150,000+ mega consoles. But what if you need more than six mic inputs? Simply add ten more of the same with our XLR10 Mic Preamplifier Expander ($199*). It attaches in minutes to form an integrated, mechanical/electronic whole and includes its own +48V phantom power switch. Plus you can still use the line inputs on Chs. 7-16!

AUTOMATE IT • $849

Never again will you lose that elusive "perfect mix." Save it, recall it and fine-tune it over and over with our OTTO-1604 MIDI Automation Retrofit System ($849*). Consisting of an internal gain cell board and external MIDI control box, OTTO provides realtime fader and muting automation of CR-1604 channel inputs, AUX Returns 1-4, ALT 3/4 buses and master outputs. The system works with any Macintosh, Atari or PC sequencing program which supports graphic faders.

FREE OTTOmix™ Mac® automation software that precisely duplicates CR-1604 controls, and adds features such as subgrouping is also included.

ROTATE IT • $25

Yet another twist to the CR-1604's unique rotating pod! The RotoPod bracket set ($25*) creates a 10-rack-space, jacks-to-top configuration with all inputs and outputs on the same surface as the mixer's controls.

*Suggested Retail Prices. Slightly higher in Canada. Actual prices at your local Mackie dealer will vary depending on a variety of economic factors including phase of the moon and barometric pressure.

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that higher level signals pass through at unity gain. A five-step horizontal LED meter makes threshold setting easy, as long as you understand the correlation between input level, threshold setting, and amount of spectral processing effect.

The multiple filtering/compression action mentioned earlier boosts low-level signals across the audio spectrum; a three-band EQ section, which is actually more like a crossover, narrows the action down further. There are three boost controls (up to 20 dB) for low, mid and high ranges. Crossover frequency controls set a "dividing line" between the low and mid sections from 75 Hz to 1 kHz, and between the mid and high sections from 500 Hz to 8 kHz. This lets you hone in on specific portions of the music that you want to accent more or less than others, with variable gain and bandwidth.

Like any crossover, equal low/mid/high settings have little effect — changing the relative balance of the three boost controls is what makes the difference. This section is also what allows the Spectral Processor to be useful in a variety of contexts, since you can tailor the unit's characteristics to the signal being processed.

And now for the question you've been waiting for: Would it be Dolby without noise reduction? Of course not. Since the processing can bring up noise and hum in the source material, there's a single-ended (sliding filter) noise reduction system that reduces noise up to 12 dB. Furthermore, two-position high- and low-cut filters (4 kHz/8 kHz and 100 Hz/200 Hz) prior to the processing can help prevent high or level signals from being "magnified." Finally, there's an output control and associated output-clip LED.

OPINIONS

For best results, the 740 demands practice, finesse, and a good ear. (I've heard reports that some people have had a hard time finding the "sweet spot" on the Aphex 104; if that's the case, they'll never figure out the 740.) Once you learn what the controls can do, though, the 740 becomes a miracle worker.

During the weeks of testing that went into this review, the 740's power was never more dramatically evident than during the restoration of some albums cut in the '60s. Judicious adjustment of the low range literally pulled the bass and drums out of the mix, where they had been previously obscured. A little high end also helped in matching today's brighter sound. The difference between the processed and unprocessed versions was revelatory; the mix was easily improved by 200 percent. (Yes, that much.)

Note, however, that the 740 seems happiest when working with a good graphic EQ (post-740) so that you can cut frequencies as well as boost. In fact, the 740/graphic combo makes a superb combination for any kind of mastering.

I don't want to downplay how good the 740 can also sound with other sources (particularly acoustic instruments), but mixing and mastering is where it truly shines. Sometimes I still have a hard time believing how much better the sound is when I flip the in/out switch. It's too bad there's no digital version. (I'd love to pump DAT through this effect into another DAT, all in the digital domain!) Maybe next year.

I've always been a fan of "exciters" (when used judiciously), but the 740 is a whole other world. The effect is subtle; nonetheless, this is the kind of box that, when you hit bypass, you can't imagine being without.

The main problem is cost. If the 740 were $499, I'd recommend it without hesitation. This is, however, a totally novel piece of gear — not in a special effects way, but by making things sound the way you think they should sound in the first place. I suspect that quite a few people who can't really afford this box will make the stretch to buy one anyway, because it is a quick and clean way to instantly improve the sound of your final mix, and that can be worth a lot.

—Craig Anderton

World Radio History

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

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

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

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CIRCLE 73 ON FREE INFO CARD

Jupiter Infinity Looping Tools

EQ LAB REPORT

MANUFACTURER: Jupiter Systems, 59 Crother, Applegate, CA 95703-0697. Tel: 800-446-2356.

APPLICATION: Software program to simplify sample editing and looping.

SUMMARY: Loops sounds normally difficult or impossible to loop, within an intuitive, efficient user environment.

STRENGTHS: The reality actually exceeds the hype; easy to use; doesn't crash or act ornery; saves hours of time getting good loops.

WEAKNESSES: Not invented three years ago, when I really needed it; doesn't transfer to any samplers other than SampleCell; licensing agreement places restrictions on commercially distributed versions of processed sounds.

PRICE: $495

EQ FREE LIT. #: 121

IF YOU'VE EVER sweated-through trying to loop the unloopable (pianos, cymbals, power chords, etc.), you know how difficult sample editing can be. Well, get ready for the best thing to happen to sample editing since waveforms first appeared on a computer screen. Infinity does one thing —loop samples — but does that task so well, so easily, and so transparently that even the most jaded sample jockeys will be blown away. This is not just a good product; this is a breakthrough.

FACTS AND SPECS

Infinity runs on the Mac and reads and writes AIFF, Sound Designer I, and Sound Designer II files. It does not shuttle samples between samplers (the exception is SampleCell I and II, which Infinity communicates with through Apple Events); it is solely an editing tool.

The program requires System 7.0 or higher, 4 MB of RAM (although at least 8 MB is more realistic), 68030 or better processor with 68881 math coprocessor, and 32-bit addressing. It uses key-disk copy protection but allows for two hard-disk installations. Samples can play back through the Mac or any of the various Digidesign DSP cards. The program uses the hard disk as virtual memory so you can work on samples of virtually any length, but you can process only the part that will fit in your available RAM.

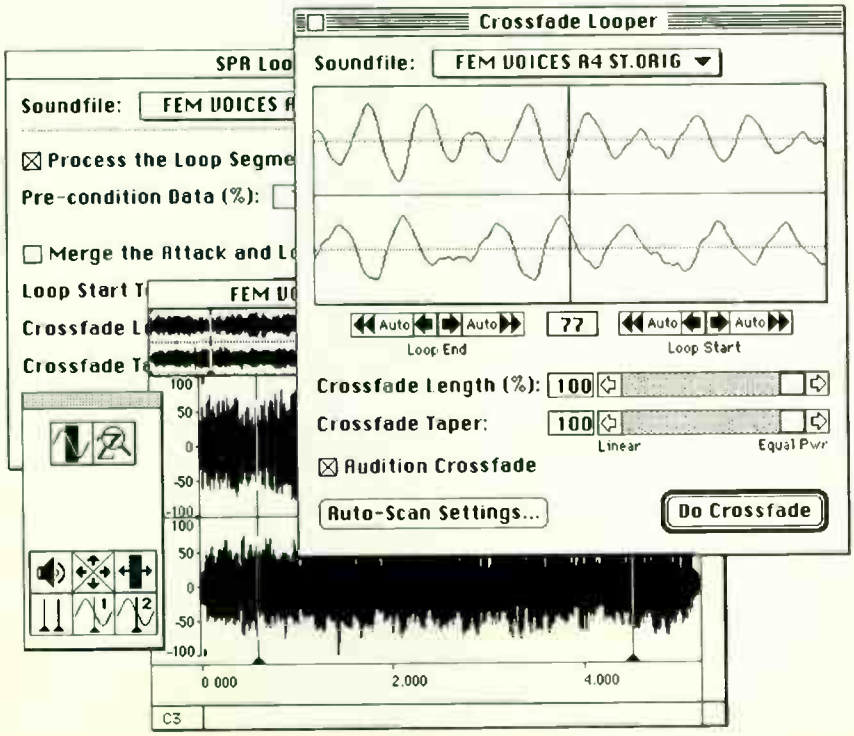
The editing environment (fig. 1) is similar to that of other sample editors. I'm glad Jupiter made the interface an extension of existing programs rather than coming up with something new and puzzling just to be different.

APPLIED LOOPOLOGY

There are four main looping algorithms: SPR, Rotated Sums, Freeze, and Crossfade. The first two work best with fairly long, nonperiodic loops (choirs, strings, power chords, etc.) and essentially distribute any loop anomalies over the entire loop. The result is a truly seamless loop.

Freeze is for shorter loops and solves (among other things) the end-of-piano loop problem (you set a single-cycle loop, but it goes off-pitch. So you add more cycles, but this produces an unacceptable fluttering). Freeze averages out the spectral energy in a selected region and turns it into a periodic waveform. You can then crossfade this with the sample's attack so not only does the note end with a perfect loop, it fades into the loop gradually. Most looping problems normally "solved" by single-cycle loops can benefit from the Freeze algorithm.

Figure 1 features the Crossfade Looper window, which shows the loop splice points. Crossfade uses a



World Radio History

"smart" scan of loop points to choose not just zero crossings, but loops with similar phase and level characteristics. The "77" between the loop movement arrows rates the splice point quality (100 is perfect). The program can search for loops that meet a certain quality level, as well as specify how many searches it will make. With audition crossfade selected, the program computes the crossfade before playback. If you like it, you can make it permanent.

The main-view window (lowest) shows the entire waveform, the loop points, and an overview. Time is shown in seconds, samples, or four flavors of SMPTE.

The small window (lower left) is the Tools palette. If you click where there isn't an icon, the window shows the keyboard equivalents for the various functions.

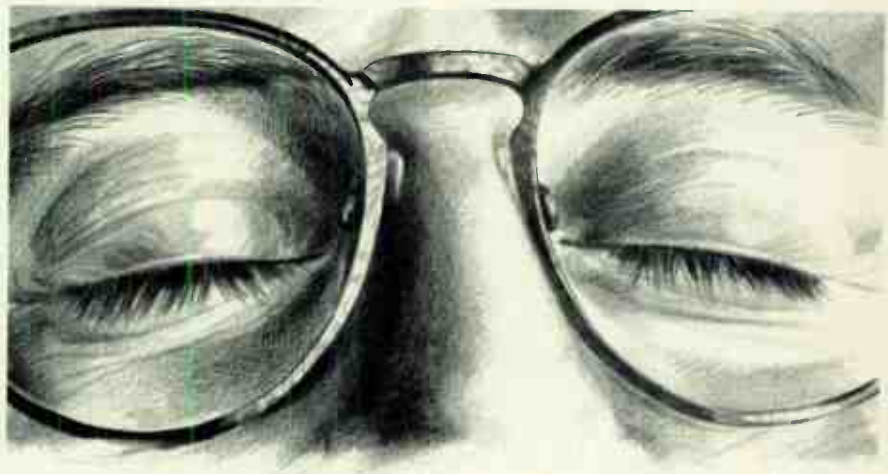
The remaining window is the SPR looper, one of the special functions. You set only one parameter to process the loop, then listen to the results. You can keep trying different iterations if you want; each trial will yield slightly different results. When it sounds right, you can merge the loop with the attack part of the sample. Everything in the program is undoable, so you can experiment without fear.

COOL STUFF AND APPLICATIONS

Getting good initial loop points helps the algorithms do their job more efficiently, and Infinity's loop points are adjustable in real time. In fact, many times I didn't really need to go much beyond crossfading to get excellent loops.

Applying SPR and Rotated Sums to program material yields fascinating results. Try looping a couple of measures of a Bach string quartet, then applying rotated sums; with low values, you hear a sort of convoluted tapped-echo effect. Higher values smear the sound into something that's ready to plop right into any movie soundtrack for atmosphere. Incidentally, you can keep applying the same algorithm over and over, or switch algorithms, crossfade, rotate sums, and then SPR.

I only found two "gotchas": if you're using normalized samples, some of the processes will create an overflow condition, which sounds awful. Fortunately, there's a gain-change function. Dropping levels about -3 dB before doing the loop processing usually solves the problem. Also, in Freeze loop mode you need to enter a MIDI note equal to the note being looped. With short loops (or loops where the harmonic is stronger than the fundamental), however, the program may get confused, requiring you to enter a MIDI note different from the "correct" one.



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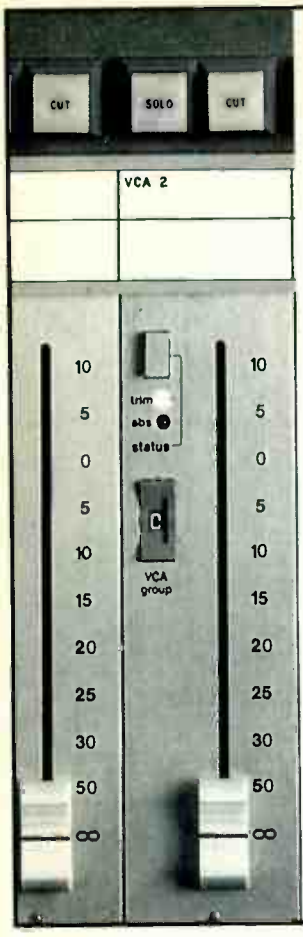

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There are also basic sample editing functions (cut, copy, paste, clear, mix, invert, reverse, silence, and so on), so you don't need to leave the Infinity environment until you need to do EQ, other DSP functions, or bounce samples over to a sampler. Finally, you can set a crossfade amount for cut and paste functions (and do these more easily than with other sample editing programs).

OPINIONS

Infinity isn't just a time and frustration saver, but a sound-generating program (whether Jupiter considers it one or not!): you can mutate samples so much they become something else entirely. This is very cool.

Amazingly, during extensive testing the program never crashed or glitched. The manual is complete to the point of overkill; if you know sample editing, you can get away with booting the program and jumping right into things, using the manual only when you have questions, get stuck, or want to learn what the program can really do.

One other point of interest is the licensing agreement, which is a bit non-standard. You can use the program for your own projects without restriction, but if you want to put out sample CDs, or the like, using sounds processed by Infinity, you need to give Jupiter credit. Manufacturers who want to use ROM sounds processed by Infinity must negotiate the agreement on a case-by-case basis, with generally some combination of flat fee and cross-promotion. Some would argue "it's a product and I can do what I want," but I don't have any problem with this kind of agreement. Jupiter has done a fine job and if they can get a few perks along the way, more power to them.

The bottom line: If you do sample editing on the Mac, you will not want to be without this program. Infinity would be impressive enough if it were coming from an established company, but the fact that it's a first product makes it all the more exceptional.

—Craig Anderton

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16-FOLD PROCESSING

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ROUTING:

All of the sixteen MT-16X inputs can be merged without limits and they can be distributed to any outputs. The programs can be recalled either via MIDI, remote or the foot switch. Every input has its own seperate MIDI on/off function with an integrated ALL NOTES OFF generator.

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SPLIT: 8 SPLIT zones per input.
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MANIFOLD: Multiplies the MIDI transmit channels.
SEND FUNCTIONS: PROGRAM CHANGE, VOLUME, MIDI CLOCK SEND DATA, TR-Transparent MIDI reset.

OPTIONAL EXPANSIONS:

On request, the MT-16X can be optionally upgrated to a combination of a MIDI Matrix/Processor and a Sequencer Player. It uses the universal MIDI File Standard for its internal format. This assures full compatibility to top software sequencers. Its built in 3,5" floppy drive (720 KB/1,44 MB) is PC compatible and allows loading of songs from this computer system.

PLAYBACK:

Hundreds of songs can be loaded into, if expanded to full 16 MB. Once loaded, any of them can be started instantly by the footswitch, MIDI program change or from the included remote control. Any of the 64 tracks can be assigned to any of the MT-16X outputs simultaneously.

RECORDING:

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EQ LAB REPORT

MANUFACTURER: Digital Audio Labs, 14505 21st Ave N., Suite 202, Plymouth, MN 55447. Tel: 612-473-7626.

APPLICATION: Recording, editing, and playback of stereo digital audio.

SUMMARY: Very good sonic quality; robust editing software; playlist and play catalog software for broadcast and live performance.

STRENGTHS: Excellent price/performance ratio; easy to learn, use, and install; very stable software; well-engineered card provides good sound quality; good editing and playback features.

WEAKNESSES: RCA inputs and outputs; won't allow independent editing of individual stereo tracks; not expandable; interface of editing software is somewhat inelegant at points.

PRICE: $1340 (both cards and all software) **EQ FREE LIT #:** 122

WHILE THE MACINTOSH is generally seen as the computer platform of choice for doing desktop hard-disk recording and editing, a number of systems for the IBM PC and clones are emerging that warrant a close look. One of these is the CardD.

The CardD (pronounced — despite its spelling — "the card") from Digital Audio Labs (DAL) is a 2-track recording system that was designed for medium- and lower-budget project studios, radio stations, and video postproduction houses. It is very competitively priced and offers solid audio quality.

The CardD system consists of three components: the audio card itself; a second, smaller card that adds digital (S/PDIF) input and output to the audio card's native analog I/O; and a set of Windows software applications that serve various functions. It requires at least a 25 MHz, 386DX machine equipped with at least 4 MB of RAM, a fast IDE or SCSI hard disk, a color VGA or EGA monitor, and a mouse.

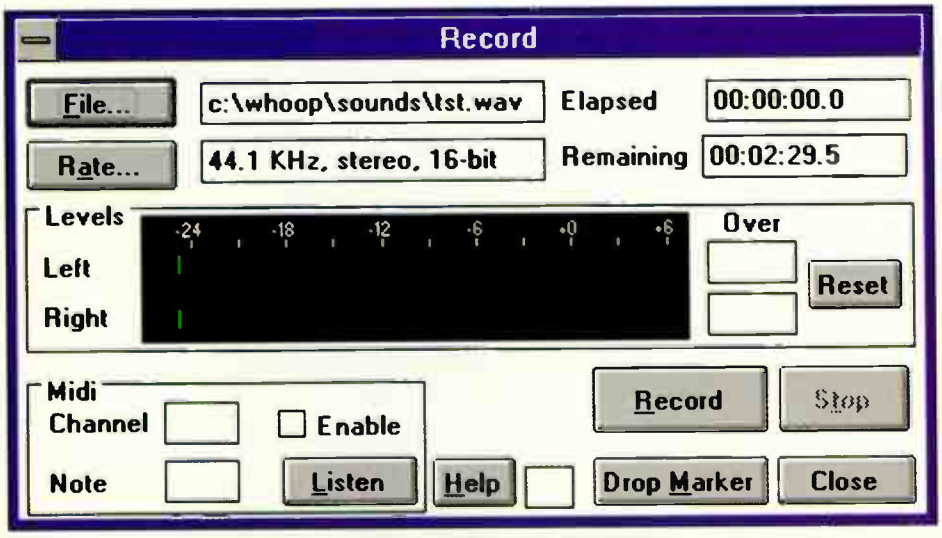

Figure 1: The record dialog helps you set up, monitor, and control a recording session.

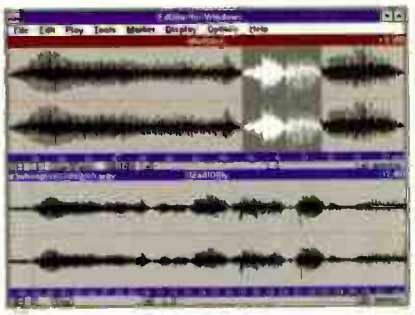

Figure 2: The EdDitor's basic display can show you two files and offers a lot of editing power.

HARDWARE

The CardD records and plays back both 8- and 16-bit sound at rates from 11.025 kHz to 48 kHz in mono or stereo, and both record and playback are specified at a 92 dB signal-to-noise ratio, with 0.003 percent total harmonic distortion. The back plate of the CardD has two RCA inputs and two RCA outputs. The inputs can operate at any of three levels (which you select by setting jumpers on the card): the -10 dB "semi-pro" level, the +4 dB professional level; and a third, intermediate level designed for use with consumer CD players.

To sample sound, the CardD uses high-quality sigma-delta analog-to-digital converters from Crystal Semiconductor that employ 64x oversampling. Dual 18-bit, premium grade, digital-to-analog converters with 8x oversampling handle the output. The DACs are specifically chosen for good low-level linearity, an area where digital recorders can experience problems with the quality of low-level sounds. A poorer grade of DAC will induce a "fuzziness" in low-level signals, whereas the better converters offer a consistent linear response at all levels.

Since your run-of-the-mill PC clone is not designed to be the finely tuned audio workstation you'd like it to be, it generates quite a bit of internal noise that will show up in more inexpensive

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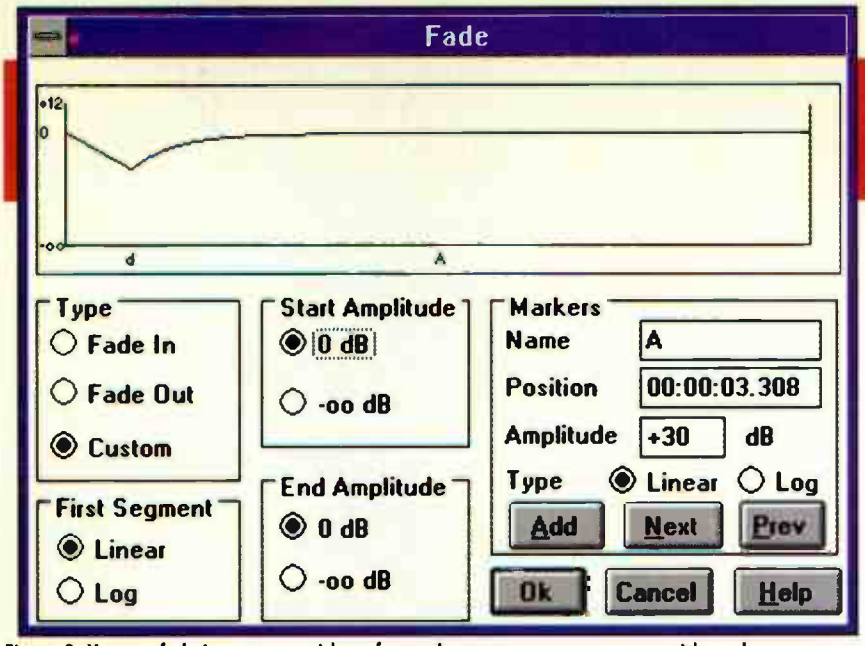

Figure 3: You can fade in or out on either of two slopes, or create your own with markers.

sound cards. The machine's electrical grounding (or lack of same), for example, can induce ground-loop hum. The CardD has two features that reduce such noise. First, it filters the power from the PC bus before it goes to the card's amplifiers and DACs, and second, it implements separate audio and digital grounds that eliminate ground loops.

The other piece of hardware in the CardD system is the digital interface. This is another card that fits into a second PC slot to provide a digital input/output port that lets you record sound in the S/PDIF (IEC) format on CD players and many DAT machines. With this interface, you can transfer sounds among CardD, CD, and DAT entirely in the digital domain.

SOFTWARE

The CardD comes with three different software applications that each perform quite different functions. The EdDitor for Windows is the basic recording/editing application; Catalog lets you display an array of sounds on screen and play them in different ways; and the Playlist Editor sets up a SMPTE-based playlist.

The EdDitor for Windows is an application that uses the standard Windows .WAV format sound files, which, among other things, makes the CardD compatible with Windows multimedia applications. All the editing commands in the EdDitor for Windows are mouse-based, and Digital Audio Labs claims the program works not only with the CardD, but with all the other audio cards currently on the market, including those from Turtle Beach, Media Vision, and Creative

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World Radio History

Sequence it Again—With Feeling

Orchestration and expressive playing are two keys to great music—both live and sequenced.

By Tim Tully

Together with a personal computer and a few contemporary MIDI instruments, a good MIDI sequencer application puts an entire orchestra—musicians included—on anyone's desktop. But along with its power, the cybernetic orchestra brings the challenge of controlling your instruments and making them musical—i.e., orchestrating them and playing them expressively.

Orchestrating with MIDI Instruments

While the goals of orchestrating in a sequencer are the same as in any other musical environment, the electronic milieu has different concerns and techniques. The first important consideration in orchestrating sequenced music is your sound sources: synthesizers and samplers. No matter how you program a given synthesizer, any sound coming out of it will still have specific characteristics, certain strengths and weaknesses. Analog synths are noted for fat, buzzy sounds and the "gronk" of hard-synched, detuned oscillators. L/A instruments find themselves used a lot for light, shimmering pads, FM creates excellent bell-like and pitched-percussion sounds, and so on. Where modern synthesizers shine is in their dynamics. Synths now have more voices than ever before and can combine them in a host of ways, using different sound architectures and complex, multi-stage envelopes to produce very active and lively sounds.

Sample players differ too, depending on how their designers decided to program them. Some are relatively genteel, suitable for symphonic music, while others, even if they contain the same basic instruments, are more in your face, and work better for the ruder forms of rock. The sampler's strong point is its realism; but there's a qualifier on that realism. A sampler, of course, plays back an exact replica of the note it sampled, but *only* an exact replica of only that note. In performance, a musician almost never plays two notes exactly the same, and there a sampler has trouble. The good news here is that the line between samplers and synthesizers is getting hazy, and samplers are acquiring more and more synth-style programming capabilities. But for both older and less expensive samplers, their tendency toward "realistic" but static sound can be a limitation.

As you build your studio, choose your instruments with these kinds of considerations in mind to help ensure your sounds complement each other. In addition, a few MIDI orchestration techniques go a long way towards accommodating the realities.

SEQUENCING *continued on page 98-3*

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Editorial

By Tim Tully

People have complained about the limitations of MIDI from the day it was released. But while the spec is far from perfect, an enormous amount of MIDI's musical potential is still untapped.

Today, it's hard to imagine the limitations of the early MIDI synths. (Yes Virginia, there *were* synthesizers that could play only one patch at a time.)

Not only did good multitimbral instruments only recently make a solid appearance in the market, even velocity sensitivity took a little while to catch on. Aftertouch was a luxury for a few years and Key Pressure is still not altogether common. And even now this handful of real time music modifiers (along with the ever-present pitch bend) are pretty much all we see on our keyboards, MIDI guitars and wind controllers.

The other place where we control our music is in the sequencer. Most good sequencers give musicians a few ways to add simple pitch and dynamic changes to a track with MIDI Control Change messages. But sequencers also offer quantization, step time recording, fast copy-and-paste and a raft of other editing algorithms that tend to produce music that's repetitious and regular. The bottom line is that it's easier to quantize a sloppy passage than add dynamics to a stepped-in drum line.

What this amounts to is that a lot of sequenced music still exhibits the less-attractive qualities that have plagued electronic music from in front: a canned stiffness that feels more like something that came out of a computer than out of a human's imagination. Not that there's no place for canned, stiff music generated by computers; where would we all be, after all, without Kraftwerk? Yet the bulk of humans seem to prefer music that has fluidity, suppleness and expressive nuance.

The irony is that while "MIDI music" is often blamed for the wooden feel of a lot of productions, the MIDI spec has 128 different Controllers that offer a huge potential for putting all kinds of character into any line we play or record. Unfortunately, an immediate, intuitive and convenient interface to these Controllers—even something as good as a mod wheel—is rare. As a result, a great potential for expressive musical control via MIDI by and large lies fallow.

One interesting counter to this plaint is that a couple of new sequencers designed specifically for Roland's GS instruments include virtual, on-screen knobs and sliders that control the GS instruments' effects. Since these synths standardize their on-board reverb and chorus to Control Change messages 91 and 93, a sequencer can put their controls right at the user's fingertips. But this is about as far beyond the old pitch bend/mod wheel setup as we've gotten.

This issue's feature talks about some of the ways we can use sequencers to make our music more musical, but there's still a lot of ground to be covered, not only by the users, but by the hardware and software designers too. ■

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continued from page 98-1

Instrumental Techniques

Although some synthesists spend large amounts of time tweaking their sounds looking for that Perfect Patch, there are other ways of achieving interesting and unique textures. One of the simplest ways is to double instruments. By sending any given sequencer track out on more than one MIDI channel, you can have as many instruments as you want playing the same line. The alternate way to do this is to make multiple copies of a track, assign different tracks to different MIDI channels and use the Program Change capabilities of your sequencer to get different sounds from each track and double up (or multiple up) your instruments. When you do combine instruments, be sure to listen to the results carefully and choose timbres whose strengths complement one another.

Here are some specific points to consider when combining instruments.

■ *Mixing voices.* Don't be content to play a chord, or even a solo line, with just one patch from one instrument. Mixing voices—either from different MIDI instruments or different multitimbral parts of the same instrument—can add depth and texture to harmony lines.

■ *Detune the patches.* If a chord or line sounds too static—like a blat from a car horn—there are a number of ways to help it. Use the synthesizer's fine pitch adjustment to put each of the instruments slightly out of tune—no more than a few cents up or down. Keep the patch that plays the bottom voice right on key to act as a harmonic anchor, and move the other voices to add life.

■ *LFOs.* Another way to accomplish detuning is to have an instrument's Low Frequency Oscillator impart a vibrato to a patch. All by itself, the repetitive nature of an LFO can sound a little boring, but a little added to an already-detuned patch can help. If you can change the vibrato rate; in real time, using a pedal, slider, or Channel Pressure, so much the better.

■ *Sample plus synth.* A chord played by a sampler—sampled brass, for example—can sound too static to emulate a real section. Mix a synthesized brass sound with the sampler to add life, or clean the sound up. Analog string sounds can fatten up sampled strings and actually make them sound more realistic. These techniques can be especially effective if each patch has its own unique vibrato characteristics (but don't go crazy and put so much vibrato on the different notes of a chord that they sound like they're being played on different planets). Sometimes it helps to think of the synth as a fill texture. If you have voicing problems, and can't double everything, use sampled instruments in the outside voices of the chord and synthesized sounds for the middle voices.

■ *Attack attack.* When a section of music played by two or more instruments plays a second time, change the patch on one or more of the instruments. It's best if you change the instruments playing at lower volume levels or in the lower voices of the chord. Subtle alterations like this will add a lot to a piece, even if they don't jump out at the listener.

■ *Envelopes.* Use two sounds whose envelopes change in different ways, at different times. If one goes up while the other goes down, the overall timbre will sound dynamically more interesting. In a

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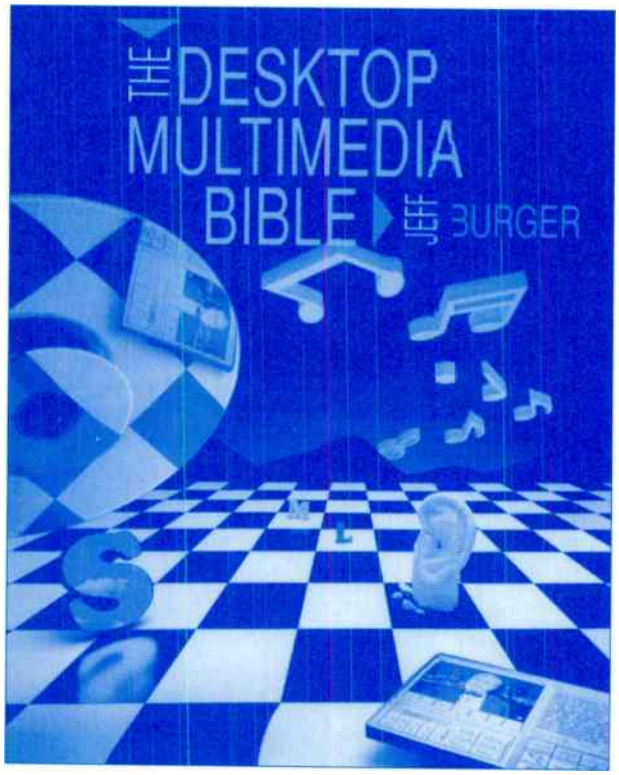

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sampled sound, the attack will often have the most complexity, but a loop later on in the sample may be a dog. Layer the sample with a synth sound that has an attack slow enough to let the sampled attack stand out; the sustain of the synth will mask the bad loop.

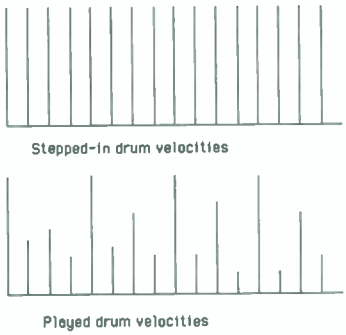

Figure 1: The velocities of played-in drums gives the line a liver feel.

■ *Envelopes again.* On the other hand, when you double instruments in a chord or unison line, differences in the envelopes of the two patches can make the sound sloppy. Particularly, differences in the attack or release times may need to be adjusted to maintain the illusion that one instrument is playing. Either the attacks and releases should be similar enough to work together or they should be different enough to create a specific effect. In between can make mush.

■ *Volume.* Playing the same line with two instruments can create a less subtle effect: the line gets louder. If an instrument is at the top of its effective dynamic range, you can make a line stand out by throwing another instrument at it.

■ *Octaves.* Some patches may be weak in specific frequency ranges: they may have a good bass, but a bad high end. Doubling such a patch with another that sparkles at the top may work even better if the second sound is played an octave higher. Experiment with placing sounds in different ranges (tessituras).

■ *Panning.* When you mix (or if your synths have Pan control), different placements of sounds in the stereo field can help them blend or complement each other. If, for example, a stereo string sample is spread across the entire field, doubling it with a synthesized brass sound that comes right up the middle makes for a highly dramatic effect. Place two similar sounds on opposite sides of the stereo spread, then juggle their attack times so first one, then the other, starts first. Sweeping an instrument across the field while it's playing can be a striking effect, as long as it's used relatively sparingly.

■ *Live drums.* Play in drum lines from a controller, rather than drawing or stepping them in. A drum controller is best, but a keyboard will work too. It's easier to tighten up sloppily-played parts with quantization than to add the right feel to a mechanically-played part.

■ *Drum tips.* Even if you have bad chops, record at least one or two bars of drums at a time. Use rhythmic placement and dynamics to make the part solid but expressive. When you get those right, copy them into the rest of the part. If you have *very* bad chops, step in the kick drum, then overdub each instrument on top of that, a few bars at a time. When everything else is there, try re-recording the kick to see if you can improve on the computer.

■ *Echo.* Copy every occurrence of a specific instrument for an entire section (all the snare drums, for example). Paste it back into the track about 50 milliseconds (1/10th of a beat at 120 bpm) later—or move the original notes about 50 ms earlier, and paste it where the original notes were. Then reduce the velocities of the new notes by about 20%. This makes for a tight, slapback drum effect. Use looser timings for less subtle effects.

■ *Fills.* After the basic drum part is laid in, add fills at logical divisions such as the ends of parts, every four, eight, or sixteen bars and where they can complement the lead or other lines. Use every instrument you have, but not all at once. There's nothing wrong with playing a cowbell fill once in a song and never repeating it.

■ *Rhythm parts.* If you are using a drum machine that responds to Program Changes, use them to play different variations on the basic pattern, or to access different sets of sounds. This can keep a good part from getting stale.

Expressiveness with Controllers

Along with orchestration techniques, MIDI Controllers give you ways to add expressiveness to your synthesized sounds. These include Pitch Bend, Key and Channel Pressure (aftertouch), and over 100 Control Change messages. They can continuously change timbre, stereo pan position, pedal functions, chorus and other musical parameters via real-time control over filters, envelopes, sample layers, modulation of volume, pitch and timbre and so on. The musician who ignores them is missing out on an important and exciting aspect of making music with MIDI.

Using Controllers in a Sequence

You can get expressive Controller, Pitch Bend and Pressure information into a sequence in many ways.

■ *Controller overdub.* You can overdub a performance of controller data into a track, just like overdubbing a musical performance. First record the notes on a sequencer track, using no Controllers at all. Assign a second track to the same MIDI channel as the first, and begin recording on the second track. While the first track plays back as recorded, move the Pitch or Modulation wheels, or hold down a key and exert pressure. That data will be sent to the synthesizer as you play it. You'll hear the original performance, but played with the Controller changes, which are also recorded into the second sequencer track.

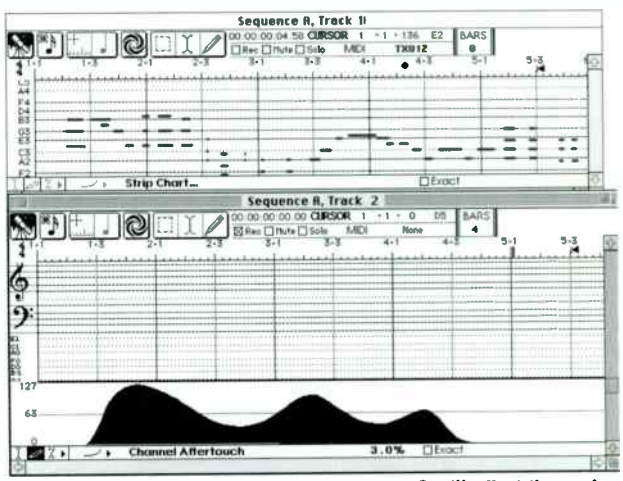

Figure 2: Drawing an aftertouch curve in track 2 will affect the performance in track 1 if both tracks are set to the same channel.

Record as many takes of the Controller movements as needed to get a satisfactory performance, and either leave the Controller data in its own track or cut and merge it into the track with the notes.

■ *Controller drawing.* This feature

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bypasses both mechanical controller devices (pitch and mod wheels) as well as the one-message-at-a-time data entry method. Most sequencers let you enter data by drawing a continuous curve on the computer screen with the computer's mouse. Technically, you're sending many discrete MIDI messages, the curve looks and feels continuous, and is intuitively analogous to the musical effect you want. Some sequencers let you control the density of the controller data you draw.

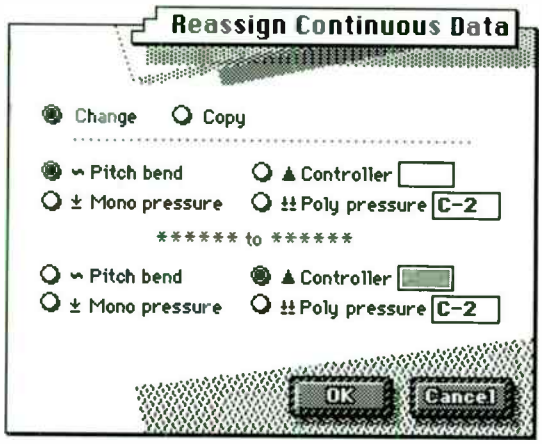

Figure 3: You can translate one kind of Controller data to another.

■ *Translating controllers.* Even if your keyboard doesn't generate every MIDI Controller you'd like, you can add any kind of Controller data to a track. A sequencer can translate the data generated by any controller keys, wheels, levers or pedals into any other MIDI Controller.

Record a smooth sweep of the Pitch Bend wheel, for example, from all the way sharp to all the way flat. While recording, this changes the pitch of that track, but once that series of data values is in the sequencer, you can change it to any other kind of Controller data. Changing it to Controller 07 data, for instance, would create a fadeout.

Different sequencers perform this data translation in different ways. Some let you cut and paste among windows, others have commands that change the controller addressed by the recorded data while leaving the values untouched. The result is the same in each case.

■ *Controller editing.* After a stream of controller data has been recorded, you can edit it, either by redrawing it with the mouse, or with an algorithm that alters data by a consistent amount or percentage, limits it to some minimum or maximum, or follows some similar logical instruction.

■ *Thinning the data stream.* If you record enough Control Change messages in a given period of time, they can clog the MIDI data stream and compromise timing. To fix this, most sequencers have a data-thinning algorithm that deletes some of the messages in a series. You can usually have it delete messages that occur more closely together than a given number of "ticks", or with any value change finer than a certain number, or by a given percentage.

Sequencers generate data streams; musicians compose music. Don't let the powers of your sequencer lull you into the false sense that the software makes the music. It gives you some amazing tools, but you still have to swing the hammer yourself. ■

This article is adapted from MIDI for the Professional, by Tim Tully and Paul D. Lehrman soon to be published by Amsco.

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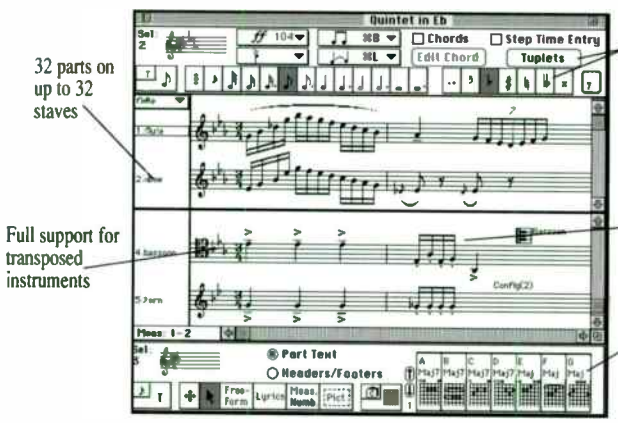

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The Next Generation

LATEST PRODUCTS

New software is being written to address new hardware, and the new hardware is more clever and less expensive.

Ballade ($99.95)
GS Controller ($68)
Super MIDI Player ($88)

Dynaware is shipping *Ballade* for both the Macintosh and Windows, identical sixteen-track scoring and sequencing programs that include a customizable on-screen mixer, virtual keyboard and standard notation editing. The interface includes controls specifically designed for the special features of Roland GS series instruments and is compatible with OMS and General MIDI. Dynaware is also shipping two Macintosh applications specifically for Roland GS series synths and the General MIDI Roland SC7.

The *GS Controller* is a complete editor/librarian that lets you change all of a module's setup parameters and individual tones and save them to disk as a standard MIDI file. This allows the user to use the file as the basis of any new song, and will load all the setup information into the instrument when it plays. The *Super MIDI Player* has all the ed/lib functions of the Controller as well as the ability to let you create a list of up to 100 MIDI files and play them back in any order.

Dynaware
415.349.5700

K2000 ROM Sounds (no Price)

Young Chang-Kurzweil is developing another 8 MB of ROM for the K2000. The sounds in the new chips will be largely orchestral, and fill out the K2000's current orchestral sounds. They'll include solo strings, viola, violin, arco bass, cello, oboe, bassoon, and both solo and ensemble french horn. There will also be a great deal of orchestral percussion, a soft trumpet, plucked acoustic bass and plucked harp. All or most of the sounds will be based on brand new recordings or else completely reprocessed older ones. The new sounds are expected to be released in July.

Young Chang-Kurzweil
310.926.3200

Maui Wavetable Synthesizer Upgrade Card ($199)
MultiSound Tahiti ($399)

The *Maui* is an IBM PC expansion card designed to let owners of any other PC sound card add the benefits of 24-voice wavetable synthesis and sampling capabilities to their existing setups. Maui contains 2 MG of 16-bit ROM samples programmed to be General MIDI compatible. The card also includes Sample Store, a user-definable sample player that lets users define their own samples using existing .WAV files, then play them back with a MIDI sequencer. Maui ships with 256K of RAM and can be upgraded to hold 8MB. The card is MPU-401-compatible.

Turtle Beach has also announced the *MultiSound Tahiti,* a MultiSound without the on-board Proteus synthesizer chipset. Designed for OEMs and those interested only in digital audio, the Tahiti offers two tracks of 16-bit, CD-quality hard disk recording with the same audiophile specs as the original MultiSound. It includes a Creative Labs WaveBlaster-compatible header so a synthesizer can be added later. The card's patented "Hurricane Architecture" includes a 20 MIPS Motorola 56001 DSP chip, and a proprietary buffering system that is eight times faster than the more commonly-used DMA offloading system. This offload speed avoids the "choking" problems associated with DMA-based hard-disk recorders. The Tahiti also uses premium ADCs and DACs of a better quality than most home CD players.

Turtle Beach Systems
717.843.6916

QuickScore Deluxe ($149.95)

Dr. T's Music Software has announced *QuickScore Deluxe,* a music notation program for Windows. The program is intended to let both professional and amateur users quickly score music on the PC. Notes can be drawn in with the mouse or recorded in real or step time with a MIDI keyboard. QuickScore Deluxe offers up to 16 staves, all standard musical symbols including guitar chord grids, and the ability to place text anywhere. The program supports any Windows-compatible printer that prints True Type fonts. It also includes the Romeo Music MIDI library, a collection of 50 MIDI files of classical performances, holiday songs, anthems and folk dances. QuickScore Deluxe requires an IBM 386, 2MB RAM, Windows 3.1, VGA video and MPU-401/compatible or Windows sound card.

Dr. T's Music Software
617.455.1454

Concertware Pro 6.0 ($339.95)

Great Wave Software announces a new professional real time transcription program for the Mac. Designed for both amateur and professional musicians, it is simple to use yet powerful. It includes 32 staves that allow mapping of 32 musical parts, each with independent clef and instrument transposition, slanted beams, auto-beaming to a definable beat, and custom beaming. Intelligent, real time transcription allows full rhythmic detection of right and left hand parts and provides unique scoring rules for MIDI keyboard, guitar and drum instruments. The program also includes diatonic and jazz harmony generation, smooth variations in tempo and volume, score scrolling during playback, text and lyric tools, guitar chords and printing capability. Requires a Mac Plus or better running system 6 or better, 1 MB RAM and hard drive. Recommends MIDI interface.

Great Wave Software
408.438.1990

Mezzo Media (various)

Grey Matter Response has developed a series of more than a dozen storage and backup devices specifically designed for digital audio and other media. The rack-mountable *Mezzo Media* devices all contain both a high-speed, high-capacity hard drive and a 4mm or 8mm tape backup drive, and range in price from $1995.00 to $16,495. The advantage of the Mezzo line comes in the form of Mezzo Media software that

ILLUSTRATIONS BY LINDA BLECK

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is customized specifically for digital audio workstations such as Digidesign's ProTools and (soon to come) Session 8. This software saves the user significant amounts of storage space by recognizing the multiple types of data in digital audio files and only backing up changes.

In addition, the *PortaMezzo* series of racks containing removeable hard drives and/or tape drives can come in either 2U or 3U sizes with from 1 to 4 bays, and range in price from $5495.00 to $11,495.00.

Grey Matter Response
408.423.9361

MIDIscan For Windows (no price)

While a number of programs transform MIDI sequences into printed music, Musitek's MIDIscan for Windows is designed to do the opposite: convert printed sheet music into multitrack MIDI files.

MIDIscan claims up to 98% accuracy at recognizing note pitches, note and rest durations, chords, accidentals, bar lines, clefs, and key and time signatures. The software can automatically process multiple pages of a musical score, determine score type (either part or ensemble) and correct skewed images while ignoring non-note objects such as titles, guitar tablature, lyrics and other markings which do not translate into MIDI. MIDIscan will even handle poorly printed sheet music and music printed with smaller fonts.

Required hardware is a PC running Windows and a hand-held or full-page scanner to capture the score. MIDIscan automatically loads the TIFF files created by the scanner and processes each page of them sequentially. It keeps track of every page, staff system and staff line that it processes, regardless of whether the music is scored for ensemble, part or solo instruments. The user only interacts with the software to initiate the recognition sequence. Rate of recognition is approximately five minutes per page of music.

A provided graphic editor displays the scanned image in one window, and the interpreted result in another. Fixing incorrectly recognized symbols is simple and intuitive. A full suite of MIDI options is available prior to the MIDI conversion process.

Musitek
805.646.8051

Notator Logic ($699)

The respected sequencer/notation program is now available for both the Atari and Macintosh. The programs are designed so that both versions have the same look and feel. Logic offers an unlimited number of tracks of any length, unlimited sequences, unlimited polyphony per track, a 960 ppqn resolution and a tempo range from 0.05 to 9999.99 bpm. Logic allows real time editing including reversible, non-destructive playback parameters and control over the look of the program that allows the user to open any number of windows. LOGIC's notation has automatic triplet recognition, an unlimited number of staves and styles, unrestricted text input anywhere on the page and more.

New features on the Macintosh version include step entry, real time groove design with percentage quantization, more powerful time-transform, and significant enhancements in score, score formatting and score style windows.

The Atari program supports the ST, STE, TT and Falcon030, and ships with the LOG 3 MIDI interface that includes three independent MIDI outs to provide 48 discrete MIDI channels.

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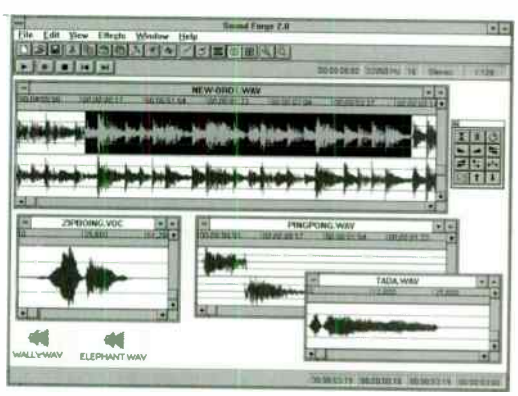

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Version Updates

LATEST SOFTWARE AND FIRMWARE VERSIONS

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

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

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

PRODUCT	V.	R.D.	$	REQ.	FIXES/FEATURES	REVIEWS
BALLADE (DOS/WDWS) Dynaware 415.349.5700	2.51/ 1.01	11/91/ 8/93	$35/ n/c	386 PC/Clone/ Windows 3.1	10-Track seq'r, CM64 Ed/lib, Prnt Scores/ 16-Trk Seq'r, Print Score, GS/GM spprt	PC MAG 3/92
BALLADE (MAC) Dynaware	1.1	8/93	n/c	Mac Classic <	16-Trck Seq'r, Print Score, GS/GM spprt	EM 3/92
BEYOND 2.0 Dr. T's Music Software 617.455.1454	2.1			Mac II		KYBD 1/92
CADENZA FOR WINDOWS Big Noise Software 904.730.0754	2.04	5/93	$10 or n/c <60 days from purchase		Staff edit & print, bank select, swing quant, multitrack record	EM 6/92; HSR 8/92
CADENZA FOR DOS Big Noise Software 904.730.0754	2.5i	5/93	$10 or n/c <60 days from purchase		Small fixes	EM 5/90
CAKEWALK PRO/WINDOWS Twelve Tone Systems 800.234.1171	1.03	1/93	n/c	PC/clone, Windows 3.0+, MIDI interface	Fix VGA display, edit controller fill Other	KYBD 10/92
CAKEWALK FOR DOS Twelve Tone Systems	4.01	1/91				KYBD 2/90
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CAKEWALK ALIVE FOR DOS Twelve Tone Systems 800.234.1171	4.01	1/91				
CLICKTRACKS Scores Unlimited 212.242.1275	2.6	1/93	$99<v 2.x no manual <v 1.x $89 new manl	Mac Plus	29.97 non-drop, 32-bit clean, core Apple Events, check marks next to "made" hits	HSR 7/92
CONCERTWARE PRO Great Wave Software 408.438.1990	6.0	7/93	$339.95	Mac Plus < Sys 6 <, 1MB RAM	Mac Real time transcription; 32 staves, symbols, auto beaming	
CUBASE ST Steinberg-Jones 818.993.4091	3.01 Falcon030: 3.02	5/93	$10	Atari TT, ST, Mega (1 Mbyte Monochrome only)	64 track sequencer	KYBD 10/89
CUBASE AUDIO MAC Steinberg-Jones 818.993.4091	1.1	5/93	n/c	Mac II SE30, 2M RAM Large Hard Disk	Score Printing bug fixes	KYBD 1/93

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

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PRODUCT	V.	R.D.	$	REQ.	FIXES/FEATURES	REVIEWS
CUBASE LITES Steinberg-Jones 818.993.4091	10	7/93	$149 new	Mac Plus < Atari ST < 386 PC/Clone<	Entry level 16-track sequencers, print simple notation	
CUBASE MAC 2.5 SCORE Steinberg-Jones	2.5/ 1.0	7/93 7/93	$60 $699 new	Mac Plus, 2M RAM Mac Classic <	384 ppqn; 8 mixer maps; MIDI mixer; SMPTE sync/ Integrated Seq'r-Score printing. PostScript	EM 5/93
CUBASE WINDOWS/SCORE Steinberg-Jones	1.02/ 1.0	5/93 7/93	$60	386 PC/Clone Windows 3.1	GS mapping/PostScript-compatible printable on-screen notation, interactive phrase synthesizer.	
CUE Opcode Systems	3.01	12/90	>3.0 n/c, <3.0 $50	Mac Plus		
DECK 2.0 OSC 415.252.0460	2.0	7/93	n/c	Mac II, Quadra	16-bit, 4-track hard disk recording, non-destruc've editing, unlimited virtual tracks, waveform editing	
DIGISYSTEM INIT Digidesign	2.4	5/93	n/c	Mac IIs and Quadras		
DIGITAL PERFORMER Mark of the Unicorn 617.576.2760	1.4	7/93	n/c	Mac II, 5M RAM Digital Wavebcard or Digidesign card	All Performer 4.2 features plus improved continuous sync	KYBD 6/93
DIGITAL WAVEBOARD Mark of the Unicorn 617.576.2760	1.0	4/92	$1495 new	Mac II, 5M RAM, hard disk, A/D D/A converter	Hard Disk recording	
ENCORE MAC/WINDOWS Passport Designs 415.726.0280	2.6	5/93	$99 >prev	Mac Plus/PC Windows 3.1	Proprietary True Type Font, "Anastasia"	KYBD 6/90
EPS 16+ (ROM) Ensoniq 215.647.3930	1.3	7/92		EPS 16+	Intelligent backup & restore, SCSI improvements	KYBD 2/91
GALAXY Opcode Systems 415.369.8131	1.2.2	1/93	$15 o: n/c	Mac Plus; OMS		
GALAXY PLUS EDITORS Opcode Systems	1.2.2	1/93	$99	Mac Plus; OMS	Set#2 Editors: K2000, E-mu Procussion, Alesis D4, Roland U-220	KYBD 4/92
INFINITY Jupiter Systems 800.446.2356	1.5.8	5/92		Mac II<	Sample-looping program. Proprietary looping algorithms loop any sound	EQ 8/93
JAZZ IMPROVISATION SOFTWARE MiBAC Music Software 507.645.5851	1.5.8	5/92		Mac, multitimbral MIDI Synth	Improved transmit routines, drum note sustain, improved printing, 12 styles, tempo and countoff control, humanize rhythm	MacWorld 11/90, EM 9/90, KYBD 10/90, Downbeat 10/90
KCS Dr. T's Music Software 617.455.1454	3.5	10/91		Amiga		KYBD 10/86, 2/87
KCS LEVEL II Dr. T's Music Software		3/89		Mac		
KCS OMEGA Dr. T's Music Software	4.0			Atari		
MACPROTEUS FRONT PANEL Digidesign	1.02	12/92		Mac II, IIx, IIcx, IIsi, IIci or IIfx		
MASTER TRACKS PRO 5 Passport Designs 415.726.0280	5.2	5/93	>prev: $99	Mac Plus	Auto mixer, SMPTE insert, enhanced Step Editor, transpose map, velocity editor	
MASTER TRACKS PRO FOR WINDOWS Passport Designs	4.6	:/92	>prev: $99	IBM AT, PS2/clone, MPC, Windows 3.0, DOS 3.1Microsoft	Issues commands to Start, Stop MCI player to play WAV. Audio in Windows	
MASTERLIST Digidesign	2.3	12/92				
MASTERSCORE II Steinberg-Jones 818.993.4091	2.0	1/93	$89	Atari ST/Mega	Score Printing, bugs	

VERSIONS *continued on page 98-10*

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PRODUCT	V.	R.D.	$	REQ.	FIXES/FEATURES	REVIEWS
MAX Opcode Systems 415.369.8131	2.5	7/93		MAC II	Flexible MIDI Programming	KYBD 4/91
MIDISCOPE Kurzweil Music Systems 213.926.3200	1.5		n/c	Mac	MIDI data analysis	
MIDIMIXR 7s CNSLE MAC/PC Mark of the Unicorn 617.576.2760	1.1.1/ 1.02	1/93 1/93	n/c n/c	Mac PC/clone	Control MIDI Mixer 7s ditto	
MIDI TIME PIECE CNSLE Mark of the Unicorn 617.576.2760	1.03	6/93	n/c	Mac	PowerBook Compatible	KYBD 8/90
MIDI TIME PIECE ROM Mark of the Unicorn 617.576.2760	1.0d	1/93	n/c	Mac		
MIMIX Steinberg-Jones	1.06	4/92	$5,995 new	Atari ST/Mega	Mixing automation	
MOD FACTORY Creacent Engineering 201.746.9417	1.0	3/92	$250 new	Eventide H3000 Ultra-harmonizer	New H3000 functions: gain-ducked delay and reverb, envelope-controlled filter, audio-rate LFOs	
MOSAIC Mark of the Unicorn 617.576.2760 Fax: 617.576.3609	1.3	7/93	$195 for Composer owners	Mac II 2.5M RAM (Sys 6) or 3M RAM (Sys 7) hard drive, ATM	Many New features, QuickDraw printers	KYBD 2/93
MUSIC TIME MAC/PC Passport Designs 415.726.0280	1.2	5/93		IBM AT, PS2/clone, MPC, Windows 3.0, DOS 3.1Mcrsft mouse	Auto mixer, SMPTE insert, enhanced Step Editor, transpose map, velocity editor	
MUSICATOR GS/ WINDOWS THINKWARE 415.255.2091	1.0	12/92	n/c	Mac II	Various feature enhancements	
NOTATOR LOGIC **(MAC/ATARI)** Emagic 800.553.5151	1.0	7/93	$699	Mac II < / Atari ST <	Many sophisticated sequencing features	
OFFICE MANAGER White Crow Inc. 800.424.0310	2.5	12/92	n/c	Mac II	Various feature enhancements	
OBJECT MOVER Kurzweil Music Systems 213.926.3200	2.0			Mac	K1000/1200 series librarian	
OMS Opcode Systems	1.2	1/93	n/c	Mac IIs, Quadras	Fixes problems with PowerBook modem port	EM 3/92
PERFORMER Mark of the Unicorn 617.576.2760	4.2	7/93	n/c	Mac Plus 4M RAM hard drive	Partial solo; solo button in all edit wdws; popup menus for track switching	KYBD 8/90
POWER CORDS Howling Dog Systems 613.599.7927	1.1	5/93	$15, free if after 4/15/93	PC/clone, Windows 3.1, mouse, snd card or MIDI interface	Copy/move/delete groups of bars, smart MIDI thru, key transpose	
PRO TOOLS Digidesign 415.688.0600	2.2	7/93		Mac IIs, Quadra	Built-in timecode calculator; set selection by SMPTE; SMPTE in Transport window	
PRODUCER/PRO Passport	1.1/ 1.0	5/93 8/93		Mac IIs, Quadra	Pro Video support, hardware control etc.	
Q-SHEET A/V Digidesign	2.01			Mac Plus, SE1, SE/30, IIs		
QUICKSCORE DELUXE Dr. T's Music Software 617.455.1454	1.0	7/93	$149.95 new	Windows 3.1 386 PC 2MB RAM	Windows MIDI Scoring Program; 16 staves; Suprts Windows Printers & True Type; input from MIDI Kybd.	

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

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PRODUCT	V.	R.D.	$	REQ.	FIXES/FEATURES	REVIEWS
SAMPLECELL EDITOR Digidesign 415.688.0600	2.0	7/93	$50	Mac IIs, Quadra, SampleCell Nubus Card	New Interface, Sys & savvy, Apple Events.	
SESSION 8 Digidesign	1.15	7/93	n/c	386 PC/Clone	Supports Data for the PC	
SOUND ACCESS Digidesign	1.10		n/c			
SOUND DESIGNER II Digidesign	2.5	12/92	>2.xx: n/c <1.xx: $195	Mac IIs, Quadra	New time compression/expansion, pitch shifting	
SOUND DESIGNER II PT Digidesign	2.5	12/92	$995 for Pro Tools	Mac IIs; Quadra	New time compression/expansion, pitch shifting	
SOUND EDIT PRO MacroMedia 415.442.0200	1.0	1/92	$349 new	Mac Plus, Sys. 6.0.7	Edit 16-bit audio, non-destructive editing, DSP effects	
SOUND STAGE (56K SYS) Turtle Beach Systems 717.843.6916	2.0	1/93	n/c	PC w/ Windows 3.1	feature fixes, larger buffers	KYBD 5/91
STUDIO 3 DA Opcode Systems 415.369.8131	1.01	9/89	n/c	Studio 3 Interface		
STUDIO 5/OMS SETUP Opcode Systems	1.1.3	1/92	n/c	Studio 5 Interface	More OMS device names	
STUDIO VISION Opcode Systems 415.369.8131	1.5	3/93	>1.3 n/c; <1.3 $29	Mac SE or II with Digidesign card; OMS	Four-channel audio w/ Audiomedia I &II, Sound Tools I & II, and 4- to 16-channel compat. w/ Pro Tools.	KYBD 1/91; EM 2/91
TIGER CUB Dr. T's Music Software 617.455.1454	1.1	10/91		Amiga		
TIGER Dr. T's Music Software	1.21	2/91		Atari		KYBD 2/90
TIMEBANDIT Steinberg-Jones 818.993.4091	1.0	5/93	$495 new	Mac II, LC, SE/30 and Classic I	Time Correction, Compression, Expansion, Pitch Shift and Harmonization effects for Sound Designer II files	
TIMECODE READER (ROM) EnterTec Inc. 804.353.7133	1.1		$179	PC/Clone DOS, Windows 3.x	Captures SMPTE to Clipboard	
TRACKCHART Opcode Systems	1.03	4/92	n/c	Mac Plus	Sys 7 compat., 32 bit clean	
TURBOSYNTH SC Digidesign 415.688.0600	1.00	7/93	$50	Mac Plus or better	Sound creation and editing system for samplers; Suprts Stereo; SmpleCel Edtor via Apple Evnts; AIFF; SD II; new Manl; no samplers but SmpleCell	KYBD 10/88
UNISYN Mark of the Unicorn 617.576.2760	1.00	7/93		Mac Plus or better	Universal Editor Librarian	
VISION Opcode Systems 415.369.8131	1.43	5/93	>1.3 n/c; <1.3 $29	Mac Plus		KYBD 7/89
WAVE FOR WINDOWS Turtle Beach Systems	1/93	2.0	$39	PC/clone Windows 3.1	DSP reverb, delay, pitch shift	
X-OR Dr. T's Music Software	2.1A			Mac, PC/clone		KYBD 1/91
X-OR Dr. T's Music Software	1.12			Atari		

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Hardware Basics

By Craig Anderton & Bob Moses

If you're just taking the leap into computers, these basics can help make sense out of the jargon.

You don't have to know about internal combustion engines to drive a car, nor do you have to know how a computer works to use it effectively. But being able to conceptualize what goes on in your computer can sure help you make better use of it, as well as get along better with the computers built inside today's musical instruments. So let's take off the computer's clothes, and see what's going on underneath.

Artificial Stupidity

Actually, computers are very stupid; they can't learn anything we haven't taught them, and they reduce the world to a series of gross oversimplifications—everything is either yes (1) or no (0). What they can do is perform mathematical operations at blinding speed. As long as data can be expressed numerically (and most data can), the computer can analyze, process, and modify those numbers.

A computer has three main elements:

- *Memory.* This is the computer's data repository. Data you enter goes into memory, and data you call up comes from memory.
- *Central Processing Unit (CPU).* This consists of the Arithmetic Logic Unit (ALU, the computer's decision-maker that does all the math work and computations), and the Control Unit, which regulates the computer's operation by pulling instructions out of memory, in the right order, to accomplish specific tasks.
- *Input/output (I/O).* Just as we use paper, guitar, paint brush, or whatever as output devices for our brain, the computer can also control devices such as printers, synthesizers, tape recorders, and so on. Input is how the computer obtains data from the world. For example, playing keyboard could provide note data that the computer then processes (e.g., transposing it).

Thanks for the Memory

Since computer data consists of strings of 1s and 0s, the basic computer memory "cell" (i.e., one bit of memory) uses a flip-flop circuit because it has two states. When triggered (set), the flip-flop generates a logic 1 and when cleared (reset), generates a logic 0. The flip-flop "remembers" its existing state until told to change. Computer memory chips, which are made up of thousands or millions of tiny flip-flop circuits, store thousands or millions of bits.

To retrieve data from these millions of bits, the computer works like a post office. Just as every post office box owner has a unique number and set of contents, each byte (or word) of memory has a unique identification called an address and set of contents called data. In computer talk, the address specifies the memory location, and the data describes what's stored at that location.

Computer memory comes in many flavors, but Random Access Memory (RAM) and Read Only Memory (ROM) are the most basic types.

RAMming It Home

The computer can read (recall) data stored in RAM, or write over it with new data.

There are several RAM technologies. A Dynamic RAM (DRAM) cell is based on a capacitor, an electrical component that can hold a charge—sort of like a battery, except that it's easy to discharge rapidly. Each capacitor represents one bit of memory; a charged capacitor might indicate 1, and a discharged capacitor 0.

However, these capacitors are extremely "leaky," and as the charge leaks off, the memory contents are lost. So, special circuitry refreshes the charge if it exists—sort of like throwing water into a leaky bucket to maintain the level. The refresh process happens hundreds or thousands of times a second.

Static RAM (SRAM) uses flip-flop circuits that don't require refreshing. However, a given amount of memory requires more "real estate" with SRAM technology than DRAM technology. DRAM chips are also less expensive for a given amount of memory than SRAM. Computers usually use both types of memory.

Most RAM requires power to retain its data; if the power goes away, so does the data. However, some SRAM can be backed up with battery power to protect data if the main power source goes away.

The Roads that Lead to ROM

Data is programmed into a ROM chip during the manufacturing process. From that point on, data can only be read from the ROM, and new data cannot be written to it.

A Programmable ROM (PROM) is a more expensive type of ROM that can be programmed after it leaves the factory—but only once. Erasable PROMs (EPROMs) can be programmed, erased, and reprogrammed thousands of times, making them convenient for prototyping new software. For production runs, once the software's perfected it's customary to manufacture cheaper PROM or ROM versions.

Electrically Erasable PROMs (EEPROMs) are conceptually similar to RAM. However, RAM loses its power when turned off, whereas EPROMs are non-volatile and remember their data

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forever (or at least a hundred years or so).

Note that battery-backed RAM is similar to the EEPROM since both types of memory can be read to or written from, and neither loses its data if the power supply is interrupted.

Getting on the Bus

A bus is a group of related connections that tie together the elements inside a microprocessor. For example, transferring a byte from one memory location to another occurs over a bus.

Buses come in two flavors: serial and parallel. MIDI is an example of a serial bus, since it requires only one cable and sends data one bit at a time, one right after the other.

Parallel buses use multiple cables to send several bits of data simultaneously, and are much more expensive than serial buses. Parallel buses are faster than serial buses, because an 8-bit-wide parallel bus can send an entire byte in the time it takes to send one bit over the serial bus.

Buses appear in several places in a computer system. Internally, several busses will exist on the motherboard, the computer's main module. They connect memory to CPU and other modules. There are also external buses, like the ADB desktop bus that hooks together the Macintosh keyboard and mouse, and the SCSI bus that transfers huge amounts of data to peripherals such as hard disks.

In Through the Output

I/O is the computer's connection to the outside world. Because there are lots of things out there that might interest a computer, there are many types of I/O.

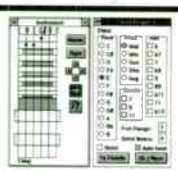
An input or output connection is usually called a port. The simplest I/O ports are general purpose input and output types. An input port typically connects to something outside the computer (like a keyboard switch, footpedal, etc.), and the program monitors data appearing at this port.

The output port sends data from the computer to an external device, which senses the data and acts on it. For example, the computer might send a piece of data that says "play middle C" to a MIDI-compatible output port; a MIDI synthesizer connected to the output

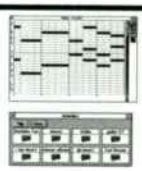
BASICS *continued on page 98-15*

Sequencing? Simple! Use *Power Chords 1.1!*

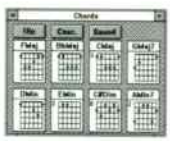
Create any chord you wish. Use chords directly while sequencing. Lots of flexibility - change instrument setup or tuning at the click of a button.



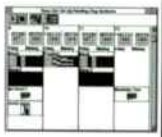
Melody and bass parts are created on-screen, imported from a MIDI file or recorded via MIDI in. No fiddling with raw MIDI data - all music elements are represented graphically.



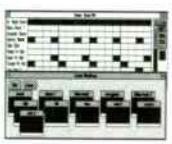
How many chord progressions do you see? Virtually unlimited! 'Paint by chords' into the song framework.



Drag and drop music elements into song framework. Edit or rearrange parts quickly and easily. PRESTO!



Small repeating phrases make drum part creation a snap. Strumming / plucking phrases just as easy.



Save time and effort with Power Chords. Our customers say they do! You can too!

"...the ability to compose, see and hear each phrase of the music you are creating makes this one of the easiest to use and rewarding computer music programs I own." ***D.B.***

"I've been wrestling with sequencing programs for about two years and Power Chords is a welcome relief. You really have a smokin' program here." ***R.K.***

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World Radio History

Software Directions

STUDIO SOFTWARE NEWS AND UPDATES

Music and multimedia products struggle to sleep in the same bed, and despite it all, the technology advances apace.

Apple continues to improve the quality and usability of the Mac's multimedia powers. The company has released version 1.6 of **QuickTime**, the System 7 extension that allows synchronized playback of multiple media on the Macintosh. The new version takes up only about 20K of memory—about a 90% reduction in size from previous versions—which will be a boon to users with entry-level machines.

Of particular interest to project studio owners is the planned support of Apple's upcoming (RSN) **Sound Manager 3.0**. Another system extension, Sound Manager 3.0 will allow QuickTime movies to play back 16-bit digital audio, using cards such as those from Digidesign, overcoming the 8-bit-audio limitation of earlier versions of QuickTime. The second feature will be very cool for those fortunate enough to own one of Apple's new high-speed CD-ROM drives—the AppleCD 300 or 300i—and will add functionality to applications that play QuickTime movies.

Put a CD or CD-ROM in one of these drives (connected to a Mac configured with QT 1.6, of course), and your QT application will be able to bring any Red Book audio on the disc into the Mac and turn it into a soundtrack on a QuickTime movie. When the new version of QuickTime and Sound Manager 3.0 are both installed, Sound Manager's improved handling of audio will allow movies to play back at frame rates about 10 times faster than before, giving movies a noticeably smoother look.

QuickTime 1.6 includes a new version of the Mac Scrapbook in which you can cut, copy, paste, and play graphics, sound, video, and animation in QuickTime movies, and shrink larger images to fit, so you can see the entire image in the Scrapbook window. It supports the Macintosh Easy Open system extension, which you can use to translate sound (and image) files from a variety of formats into QuickTime formats. **Apple Computer**: 800.769.2775 ext. 6596.

Jupiter Systems, the new company that developed the sample-looping program **Infinity** seems to be making the best of the inevitable growing pains associated with such a venture. The licensing agreement shipped with the program took a number of reviewers (and probably not a few users) by surprise. The document seemed to put some prohibitive limits on the legal use of samples looped with Infinity. When this was brought to Jupiter's attention, to its credit, the company quickly faxed a revised and eminently sensible agreement to as many interested parties as it could. Infinity owners who didn't get one, and who are concerned, can get the real skinny with a quick phone call or fax.

Jupiter Systems has a curious history. Its founder, Andy Hildebrand developed a technology that lets geophysical scientists create images of "slices" of the earth up to 100 miles deep in a matter of hours instead of months. He used this technology to develop Infinity, and to design other DSP-based products that he hopes will take digital audio processing to its next step. In addition to Infinity, two of these programs are scheduled for release in next 12 months, and the company expects them to be "paradigm shifters" that will change the way people work with digital sound and to provide functionality not now available. The new products will be directed not only at the musician, but at the production world as well. **Jupiter Systems**: 800.446.2356.

Passport has determined that its multimedia authoring program, **Producer**, will find a home at the upper echelon of the production world. The new version of the program, called **Producer Pro**, is scheduled to ship at the end of July and, along with a spate of new features, will include a $1495.00 price tag.

The new version has added MIDI Machine Control as well as compatibility with the ARTI and VLAN protocols (that provide control over nearly any audio or video tape deck) and the VISCA and Pioneer laser disc protocols. Producer Pro will also capture video with any QuickTime-compatible video card; display video from a live source in a window; and can send its output to tape (via a video card). It will add interactivity, path-based object animation, and improved graphics and text.

Sources at the company indicated they found the first version was used less for simple presentations than for high-end, professional venues such as video production, audio post, multimedia title production, kiosks, computer-based training and preproduction/storyboarding. Along with the professional price, the program will continue to evolve towards the high end and add audio and video features that support that direction. **Passport**: 415.726.0280.

Turtle Beach Systems Inc., the makers of IBM PC digital audio products (The 56K System, Wave for Windows, the MultiSound card, etc.) announced "an agreement in principle" to merge with **Integrated Circuit Systems, Inc.**

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ICS is the leading manufacturer of video and motherboard timing semiconductors in the world, including multimedia chips used for timing video synchronization, creating wavetable synthesis and developing business audio.

The principals feel that Turtle Beach's expertise in audio technologies such as DSP, hardware design, and software development complements ICS's world class silicon engineering and manufacturing, well-rounded chip line and capital. Turtle Beach will work with ICS, but as a separate entity, to develop semiconductor products for multimedia and expand its efforts in consumer hardware and software.

The companies have already announced one new product (see Next Generation) and are planning a number of others. **Turtle Beach Systems Inc.:** 717. 843.6916.

Some of the new software updates coming out of **Digidesign** are making great use of the Macintosh's System 7. The new **Turbosynth SC** uses Apple Events to communicate with the likewise new version 2.06 of the **SampleCell Editor** program (which works with both the new *and* original SampleCell cards). What this means is that when you use Turbosynth to develop a new sound, you can send it directly to SampleCell, and play it immediately from a MIDI keyboard, making the process of developing a sample much more like creating a synth patch. SampleCell has the same relationship with Jupiter Systems' **Infinity**. The program also offers a new and improved interface. **Digidesign:** 415.688.0600.

Opcode Systems continues to support and improve MAX, the real time, object-oriented music programming environment that can be used to develop virtually an infinite number of applications. A MAX user can create software that composes and improvise music, controls MIDI gear manually or under automated control, modifies music played into it in real time and scores of other functions. MAX is based on a "high-level" computer language where the user writes applications by manipulating icons, and can be remarkably easy to use.

The new 2.5 version supports QuickTime, Apple Events, OMS, Sound Manager and includes an E-mu Procussion editor free. **Opcode Systems, Inc.:** 415.856.3332.

Apple Computer has announced plans to phase out the Macintosh NuBus architecture and replace it with the Peripheral Component Interconnect (PCI) local-bus interface. Apple joins with such PC manufacturers as NEC and Digital Equipment Corp. in endorsing the PCI specification. Computers with PCI boards can use PCI graphics boards, SCSI controllers, network adapters and other cards. Apple's adoption of PCI means both an Apple and a PC computer will be able to use the same boards, just by substituting different drivers. Apple claims the PCI will "allow us to continue to innovate unique solutions. NuBus isn't as extensible." The new standard will first appear on the Apple PowerPC machines, though only on later versions.

The move is seen as an attempt on the part of Apple to garner a share of the huge PC market through compatibility, but it raises questions as well. How will this affect the Macintosh owners who have already invested in NuBus cards such as ProTools, SampleCell and others? The answer is that most of these systems will likely be obsolete by the time state-of-the-art PCI products come out. Indeed, Apple has already mentioned that the Macintosh line will not be developed forever.

No one ever said putting your money into a computer was a good long-term investment.

In the search for the perfect storage medium for the studio, removable, rewritable magneto/optical technology has long been intriguing. Unfortunately the medium lacked the speed required for serious digital audio applications. Now Digidesign, Roland and Otari have all endorsed a removable optical drive developed by **Alphatronix**. The **Inspire II** ($4495 list) is a 650-MB m/o drive that spins at 3600 rpm and claims the fastest throughput on the market today. **Alphatronix,** founded by the three people who developed the original rewritable magneto-optical technology at the 3M corporation in early 80s, shipped the first commercial rewritable optical storage system in 1988. **Alphatronix:** 800.849.2611

Steinberg has pushed up the shipping dates for **Cubase Mac Lite** and **PC Lite** to July. Both are priced at $149 and are fully upgradable. **Cubase Audio Atari** for the Yamaha CBX-D5 is also shipping in July, and **Cubase Audio Windows** (which currently works only with CBX-D5) will ship in August. Both will be priced at $999. **Cubase Audio** for the Atari Falcon is scheduled for September. Steinberg Jones also announced that **MIDI Explained**, a HyperCard-like MIDI education program, will be bundled free with all non-audio versions of Cubase. **Steinberg/Jones:** 818.993.4091

BASICS

continued from page 98-13

would then sense the command and play middle C. Ports are usually flip-flops, and remember their state until told to change.

We Interrupt this Article...

The computer reads from and writes to the I/O ports pretty much whenever it feels like it. In the real world, though, events often happen unpredictably that demand the computer's attention—such as MIDI note-on messages. These events must interrupt whatever the computer is doing and force it to service them.

Computers therefore support a special type of I/O called an interrupt. An interrupt temporarily suspends the program's normal execution and executes a special block of software to handle the other task.

What's Next?

That's enough for the board-level stuff. In the next and final installment, we'll look at the peripherals with which the computer spends its life conversing. ■

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

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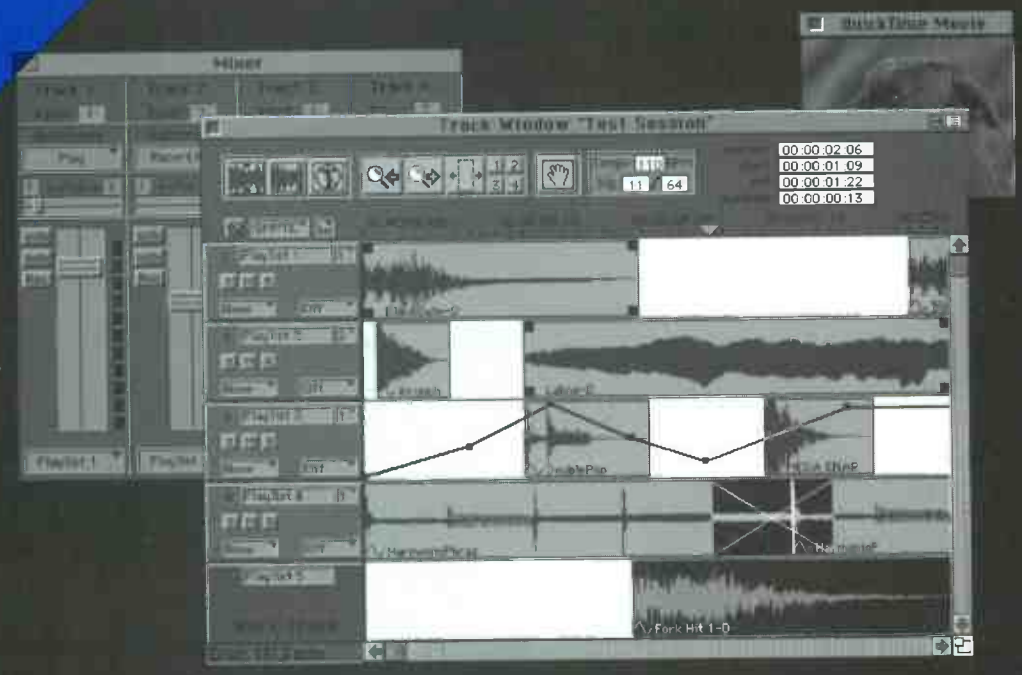

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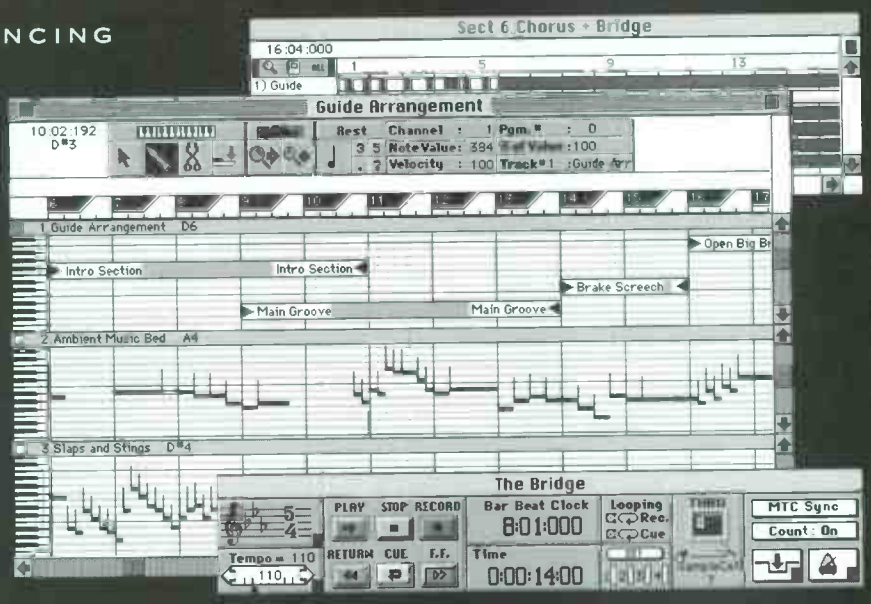

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Labs. I used it with a Sound Blaster 16 ASP with no problems whatsoever.

For recording your own sounds, The EdDitor for Windows provides a Record dialog box that shows you the file's location, sample rate, and resolution, and provides dynamic metering of the sound you record (fig. 1).

The Record dialog offers a lot of control over the process of recording, including the ability to set sample rate, file name, and the MIDI note number that you can send to begin recording. Once a sound is recorded (or brought into The EdDitor via the Open command), the program displays sounds in one of two graphic displays: a modifiable window and a faster, read-only display (fig. 2).

In the modify window, you can cut, copy, and paste any portion of a sound; mix sounds together at adjustable levels; automatically fade a sound in or out with either a logarithmic or linear slope; and drop markers into a sound file at any point, then set the volume at each marker to create your own slope (fig. 3).

An Automatic Crossfade feature makes cut and paste functions operate smoothly by overlapping a programmable amount of the sounds that you splice together — either when you cut out a section from between sounds or paste in a new sound — and fading one sound out and the other in. You can set the total duration of the crossfade as well as the length of the fade in and fade-out times individually. This helps enormously in editing sounds. It prevents not only pops and clicks, but unpleasant-sounding, radical shifts in the volume or character of edited sounds. Plus, it can save a lot of time.

The EdDitor has a Gain Change command that lets you change the amplitude — from -48 to +12 dB — of any portion of a file. The Normalize command digitally rewrites a sound file so that its highest peak is at the maximum level before clipping, and the rest of the file is amplified proportionately, thus maximizing a sound's signal-to-noise ratio. The Gearshift feature works like speeding up or slowing down a tape: the sound's pitch and speed both increase or decrease by up to 10 percent. You can reverse a sample so it plays backwards, and a clipping display lets you set the software's clipping level (the point above which distortion occurs) to match the nominal level of a tape deck, CD player, or other device.

The program provides 20 dB of cut and boost for bass and treble; and the frequency range of the bass is adjustable from 20 Hz to 1 kHz, the treble from 1 kHz to 20 kHz. This flexibility makes the modestly labeled bass and treble controls actually perform as a pretty good quasi-parametric equalizer.

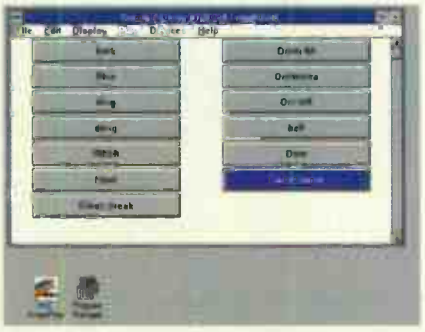

Figure 4: You can set up a grid that lets you play sounds by clicking on labeled buttons.

The EdDitor stores an Edit history list that lets you undo up to ten previous edits, lets you drop and name markers at various points in a file and use them to delimit other operations, and lets you create and save edit lists with which you can play different sections of different files as if they were a single file — a great saving in editing time and disk space.

In general, the EdDitor is a solid, functional piece of software. Its feature set is adequate for most recording and editing, and it's easy to use and very stable. The major flaw I found was that you can't edit individual stereo tracks; a cut, crossfade, or other edit done in one channel is also done in the other. DAL is aware of this shortcoming and says Version 4 of the software will implement independent tracks and include more effects.

OTHER APPLICATIONS

The second program that comes with the CardD is called Catalog. It lets you create an unlimited number of boxes in a window and assign each box to a particular sound file. Clicking on any box plays the associated sound. While this doesn't address any of the more common recording studio functions, it can be useful for live performance with the computer, as audio support for a speaker, or for broadcast (fig. 4).

Catalog also lets you assign any sound to a MIDI note and play sound files from a MIDI keyboard. Digital Audio Labs also supplies a proprietary driver that allows a MIDI sequencer running on your PC to play the sounds in the EdDitor.

The third program bundled with the CardD is the Playlist Editor, which lets you line up events so they play when the program sees a particular SMPTE timecode value. This can be very useful in more sophisticated multimedia productions or for producing audio for video. It also lets you slice a recorded song into segments for remixing songs.

WRAPUP

The CardD offers high-quality, stereo hard-disk recording at about the lowest price around. And since it's a PC (as opposed to a Mac) system, users can save when buying the computer as well. Its recording/editing software is capable, easy to use, and stable, and the secondary applications are quite useful for their specialized functions. Since you cannot add more channels to it, the CardD would not be the right choice for someone who needs an expandable system. But for studios that record fairly straightforward dialog, individual sound effects, or want a digital mixdown system with both the destructive editing and nondestructive playlist powers of random-access audio, The CardD would be a good investment. — *Tim Tully*

Tim Tully, whose articles have appeared everywhere, is editor of the *Studio Software Report*, a special supplement to *EQ* Magazine offered to subscribers.

World Radio History

Hard Disk Recording Tips

by Digital Audio Labs

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

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

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The CardD System, by Digital Audio Labs.

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The EdDitor for Windows	**$250**
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REVIEW SHORT

Waveboy Disks

"These disks deliver more mileage from your late-model Ensoniq sampler."

THE WAVEBOY series of disks is perhaps the least expensive way to significantly enhance the performance of the Ensoniq EPS 16 PLUS and ASR-10. Waveboy takes advantage of the fact that these samplers can load in new effects algorithms from disk — and each $39.95 disk offers some pretty hip algorithms.

Parallel Effects Disk: This includes 15 parallel effects algorithms with plenty of editable parameters. You access the effect's mono input through the bus 1 and 2 effects sends, so panning between left and right pans between the inputs of two effects. In multitimbral setups, it's easy to put distortion + echo on guitar, reverb on drums, slow chorus on piano, and fast vibrato on strings, or an instrument could feed two parallel effects equally (such as two reverbs) to get an overall smoother reverb sound, or all instruments could go through a little bit of reverb and three could have their own effect, and so on.

You may also be able to save the cost of the output expander if your main reason for using it is to be able to put different instruments through different effects.

Audio In Effects Disk: This transforms the EPS 16 PLUS or ASR-10 into a signal processor for external signals (you patch instruments through the audio sampling input). There are 21 effects files; 13 are identical to the original EPS algorithms, but include the Audio In option. Another 5 are new effects (one is a plate reverb that doesn't have Audio In), and 3 parallel effects are offshoots of the Parallel Effects disk. Two of these have the Audio In feature.

The Time-Dicer + pitch shifter algorithm is particularly noteworthy (the fidelity is marginal, but it can change pitch without changing loop length or change loop length without changing pitch, and there are enough options to make great sci-fi sounds). Also, the 3V Harmony algorithm generates three-part harmonies from the input signal.

Resonant Filter Disk: This is a Minimoog emulator that creates a 4-pole filter with resonance, fast ADSR envelope generator, sample-and-hold modulation source, and effects. There are also Minimoog samples on disk. A second algorithm allows for 1-op FM synthesis with effects.

The Rez Filter algorithm offers plenty of effects parameters, including single or multiple envelope triggers and fairly sophisticated chorus/delay and echo. The biggest drawback: the filter is global so you can't have individual filter articulation on each note; and the FM works best monophonically, although chords give trendy, industrial sounds. Nonetheless, the Rez Filter alone is worth the price of admission for vintage synth fans.

Waveboy disks are useful, and affordable. Check them out if you want more mileage from your late-model Ensoniq sampler. —*Craig Anderton*

For more information, circle EQ free lit. #123 or contact Waveboy Industries, PO Box 233, Paoli, PA 19301. Tel: 215-251-9562.

SHORT TAKES

• **Yamaha** has begun shipping its CBX-D5 digital recording processor to dealers. The CBX-D5 is a computer-based hard-disk recording system that lets virtually any computer function as a multitrack audio recorder. The CBX-D5 is a 4-track recording system with 2-track simultaneous recording and 4-track CD-quality playback. It provides on-board Digital Signal Processing (DSP) and digital equalization with 82 different reverb and modulation effects. For more information, contact the Yamaha Corporation of America, Digital Musical Instruments, P.O. Box 6600, Buena Park, CA 90622. Tel: 714-522-9011. Circle EQ free lit. #124.

• **The Rolls Corporation** has introduced the MX22 Mini-Mix, a compact mixer that will mix two inputs. It has two level controls, one for the 1/4-inch jack line in and another for the two RCA inputs. One possible application for the MX22 is in audio/video recording where one input could be used for the sound source and the other for background material. Contact the Rolls Corporation, 6995 South 400 West, Midvale, UT 84047. Tel: 801-562-5628; Fax: 801-562-5655. Circle EQ free lit. #125.

World Radio History

The *EQ* Balanced Line Driver

A build-it-yourself alternative to expensive DI boxes

BY JULES RYCKEBUSCH

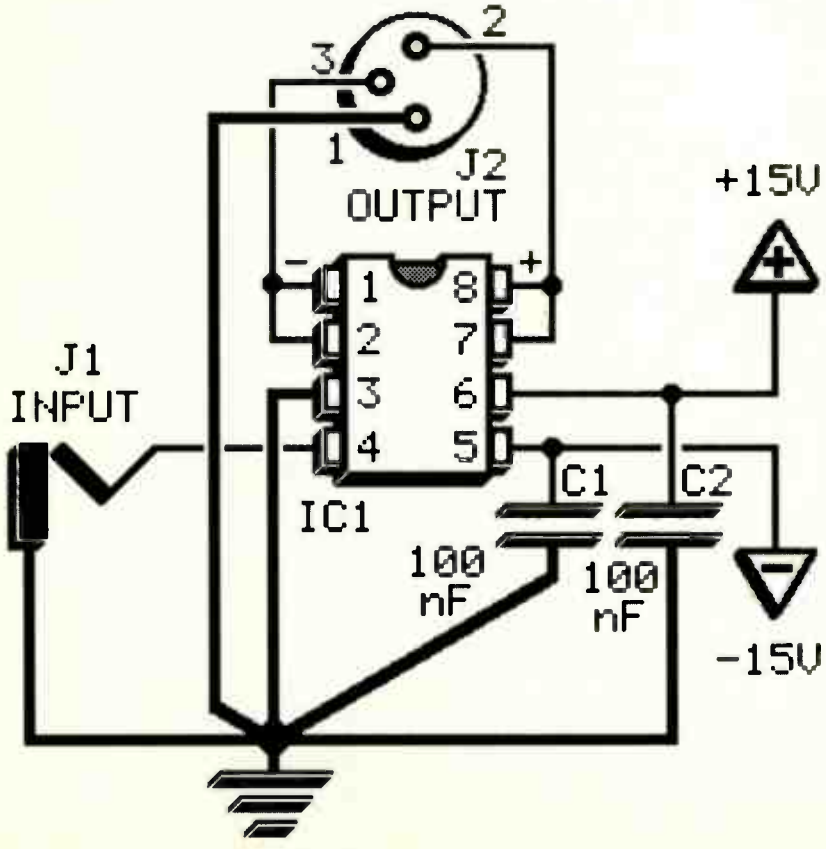
Although 1/4-inch unbalanced outputs are fine for home studio use, when you finally get on stage or into a big studio you'll generally need to drive balanced XLR connectors. A commercial, good-sounding DI box can cost a bundle, so here's a budget, no-compromise alternative: the *EQ* Balanced Line Driver.

This project is about as simple as it can get. The SSM-2142 (from Precision Monolithics) is an 8-pin, self-contained balanced line driver designed for pro audio applications. It's close to a piece of wire with gain — specs are 0.006% THD with a >93 dB signal-to-noise ratio while driving a 10-volt signal into 600 ohms. The frequency response is flat down to 20 Hz (better than all but the best audio transformers). All outputs are short-circuit protected.

The pinout is:

1. inverting (-) output
2. - output sense line
3. ground
4. input
5. - power supply (-18V max)
6. + power supply (+18V max)
7. + output sense line
8. noninverting (+) output

The SSM-2142 is available from Newark Electronics, which has distributors in just about every major metropolitan area. Look in your local yellow pages or contact the main office at 4801 Ravenswood Ave., Chicago, IL 60640-4496 (Tel: 312-784-5100).



FODDER FOR SOLDER

Construction is very simple. I've built several of these with Radio Shack experimenter PC boards (part #276-149), which have pads for soldering an IC as well as other components. This board can mount inside a piece of gear, or in an external box. For live use, I made a 6-channel version with all the input jacks in a small box, and the outputs fanning out via a short cable to feed a snake on stage. Wire the male XLR out so that pin 1 is ground, pin 2 the + signal, and pin 3 the - signal.

The IC's input impedance is high enough (10k ohms) so that you can wire two parallel 1/4-inch input jacks. This provides a "thru" connection for the instrument so it can also feed an amp or other device (just like most DI boxes).

This is a noncritical circuit, but there are a few cautions:

- Use a low-wattage soldering iron (40 to 60 watts), not a soldering gun.
- Use 60/40 rosin core solder, not acid core solder.
- Bring all grounds to one common point (the schematic shows ground lines as thicker).
- Bypass the IC power supply pins with a small-disc ceramic capacitor (0.01 to 0.1µF) as close as possible to IC pins 5 and 6. The SSM-2142 has extremely wide bandwidth, so the supply lines must be well bypassed to prevent possible oscillation.
- Keep all leads as short as possible. It's advisable not to use a socket since this could create unwanted capacitance between the IC leads.
- Because you're not using a socket, solder one pin at a time, then wait at least 30 seconds before soldering the next pin.

PARTS LIST

C1, C2	10 to 100 nF (metric) or 0.01 to 0.1 µF (U.S.) ceramic cap
IC1	SSM-2142 line driver
J1	1/4" female phone jack
J2	Male XLR panel jack
Misc.	Power supply, wire, solder, labels, board, etc.

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HOOKUP TIME

Connect a ±15 to ±18 volt power supply (as used in most other *EQ* construction projects). Plug the output from an unbalanced, low-impedance signal source (synthesizer, drum machine, sampler, etc.) into the line driver input, and patch the output to any piece of gear with a balanced line input.

This is definitely one item that is cheaper to build than to buy, yet it's equivalent to the best commercially available products. Make sure you have at least one *EQ* Balanced Line Driver sitting around — you never know when you might need it. EQ

Jules Ryckebusch is from the planet analog. He has written many do-it-yourself articles and is currently working on a book entitled Sound Reinforcement for the Complete Idiot.

BALANCED AND UNBALANCED LINES

With an unbalanced line, one wire carries the signal, which is referenced to ground. A surrounding copper braid or foil wrapping, which connects to ground, "shields" the wire from interference. This works fine for short cable runs, but for long runs the shield and center conductors are susceptible to hum and noise pickup. This is particularly problematic with low level signals (e.g., mic outs).

A balanced signal uses two signal wires and an outer shield. The signals traveling down the two lines are identical except that they are 180 degrees out of phase with each other. At the other end of the cable, a transformer or active circuit senses the voltage difference between the two wires; since any induced noise or hum will not be out of phase (both wires get the same interference signal), there's no difference between the noise signals so they are rejected.

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The Art of the Deal

What to look for when it comes time to find a manager

BY SANDY ROBERTON

Do you need a manager? Producers and engineers without management live by word of mouth, finishing one project then looking around for another — unless they happen to be one of those fortunate few who are always in demand. But managers do more than just find work. The following are the answers to the most common questions I am asked about producer and engineer management:

Q. What exactly do managers do (or why do you pay these guys)?

A. A good, full-service management company does budgets, books studios, finds musicians in various cities, and all the other intrusive work that keeps your attention from the musical matters at hand.

Mostly what a manager does, is talk to A&R people. With A&R people, you really have to be out there all the time and always in their faces. They are busy people who are looking for bands and if you don't go to see them, and call them and remind them whom you represent, they tend to forget. There are plenty of producers out there, and A&R people have a large choice. Having a manager involved with them on a constant basis raises the odds in your favor.

Q. How can I avoid getting ripped off by a manager?

A. Most of you have heard horror stories about managers taking off with their clients' hard-earned dollars, but this is not really an issue anymore because most clients get whatever earnings are due sent to them directly. Managers do not get paid on behalf of their clients anymore, so beware of managers who tell you otherwise. Producers should have a situation where the manager does the billing, but the checks are sent to the talent, whom the manager should invoice for the commission.

Q. What should I look for in a manager?

A. Reputation. Call up A&R people and ask about your prospective manager — get a reaction. And not just in this country. Look for someone with contacts in other countries to increase your chances of getting work — and working with whom you want.

The relationship between manager and client should be one of confidence and respect. Producers should have confidence in their managers and know that they are trying to get the best projects for them. Likewise, managers should have the utmost confidence that producers can do the job and really, *really* believe in their clients. After all, if your manager doesn't believe in you, how's he going to convince other people to invest money in you.

Q. When should I start looking for management?

A. Early on, it is best to represent and hustle yourself. Just as with

THE ARTISTS & THE DEALERS: (Clockwise from bottom) David Kershenbaum, producer of Tracy Chapman and Joe Jacksonm among others; Ross Elliot, O'Brian's manager; Sandy Roberton; RCA Records recording artist Dillon O'Brian; and Leslie West, A&R West Coast for RCA Records.

World Radio History

bands, if producers or engineers go to a major label too early, they might not get the attention they would receive at an independent label. There are many independent and alternative bands out there putting out their own records. Once you've worked on a few of those, then go to a manager and say: I've done these songs with these bands and they've been released on these labels and here's the cassette. If a producer has nothing to show or play, it's going to be hard to convince a record company to walk in and tell the execs how great this guy is and how they've got to give him lots of responsibility and a $100,000 budget. A manager needs something to go on.

Q. How do I break into the big time?

A. Like any entertainment industry, there's no one way. I recommend not having too much of an attitude, but instead being straightforward. I also recommend taking any job that gets you inside a studio. Keith Cohen, for example, is one of my clients who went to recording school and went to work for the Record Plant as a janitor. Today he's one of the top mixers in America and has produced two #1 records and worked on projects with the likes of Paula Abdul and Prince (when his name was still pronounceable).

Another good example is one of my most successful producers — Tim Palmer. I've represented Tim for nearly ten years, and when I took him on he was a second engineer. Now he's worked with Robert Plant, David Bowie, Tears For Fears, and others.

Unfortunately, producers and engineers are an "en vogue" thing. Very few producers go in for the long term because music changes and so do people's taste and who they want to work on records. Having an active manager gives you the extra edge to get ahead in this highly competitive market and to keep on top. EQ

Sandy Roberton is a former producer and founder of Worlds End Inc., a full service management facility that specializes in producers, engineers, and remixers. Worlds End's client list includes Danny Kortchmar (Billy Joel, Don Henley), Daniel Rey (Ramones), and Don Gehman (Bruce Hornsby), to name just a few.

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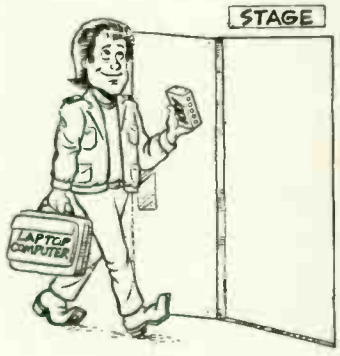

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EQ&A

continued from page 12

BLAST FROM THE PAST

Q *In EQ's April 1991 issue, a Craig Anderton article mentioned Precision Monolithic's SSM-2134 high-performance replacement for the Signetics NE5532 op amp. I decided to try the more quiet 2134's in my Hill Audio 24x4x2 mixer's mic preamps. I replaced the 5532's in channels 1-12, leaving 13-24 alone for comparison. Upon power-up, both the V+ and V- fuses in the power supply blew. Thinking one 2134 might be defective, I reinstalled the 5532's, leaving a 2134 in one channel only. Upon power-up this time, the fuses held but a resistor on one of the 2134's outputs became toast. The 18 volt V+ and V- fuses in the power supply are rated at one amp each. Do the 2134's draw that much extra current? Why did a resistor on the op amp's output (pin 7) burn up?*

Tony Benson
Ames, IA

A So far we've only had one known typo in the do-it-yourself articles, and I'm very sorry that it had to be the one to trip you up. A correction in the June 1991 issue said: "The SSM-2134 should have been identified as a high-performance replacement for the NE5534 *single* op amp instead of the NE5532 *dual* op amp."

However, note that now there's the SSM-2139, a dual op amp that can substitute for the NE5532. It is internally compensated for gains of 3 or more and offers the following specs (for comparison, specs for the NE5532 are given in parenthesis): Input noise voltage: 3.2 nV/root Hz (5.0 nV); unity-gain bandwidth: 30 MHz (10 MHz); slew rate: 11 V/µs (9 V/µs); and typical supply current: 4.5 mA (8.0 mA). The 2139's output swing is not as good; at 600 ohms it's about 23V, and 26V at 2k ohms (versus 32V for the 5532 at 600-ohm).

If driving 600 ohm lines is important, you might want to put up with the slightly reduced fidelity of the NE5532. Hope this helps.

Craig Anderton
West Coast Editor
EQ

TO PRE OR NOT TO PRE

Q *What is the most effective use of a console's pre/post fader button(s)?*

Doug Lynch
Seattle, WA

A The answer to your question should be based on one very important question: "What do I want to accomplish?" When it comes to the most effective use of pre- or postfader buttons, you must first consider the console application. This would include live sound reinforcement, remote and studio recording, and mixing.

Live sound reinforcement benefits the most from the prefader use for monitor mixes. This allows independent mixes to be sent to the performers, and these mixes can be set or changed at any time without affecting the main mix fader settings. Just as important, it allows the main mix fader settings to be changed without affecting the monitor mix.

The post-fader application is most useful as effects sends. This ensures that when a fader changes level, the effects send level for that particular channel changes relative to the fader setting. Otherwise, when a channel fader is dropped to the off position, the effect send would still be active and thus pass the unwanted signal to the main mix.

The most effective use of a prefader application during remote or studio recording is for headphone send levels. This allows the engineer to use the faders to ensure proper recording level while still having an independent level control for the headphone mix. This applies to the playback during overdubbing as well as to the initial recording process. By returning the effects to channels, the pre-fader configuration is useful for sending to headphone mixes regardless of the fader levels.

During the mixing process, the most effective way to use the pre/post function depends entirely upon the desired effect. The most common set up is postfader, but for some unique sound effects, the prefader set up can provide some very interesting results.

When things start to get confusing, just try to remember the basics: effects sends are usually postfader; headphone or cue sends are prefader.

Keith Medley
Technical Support
Mackie Designs

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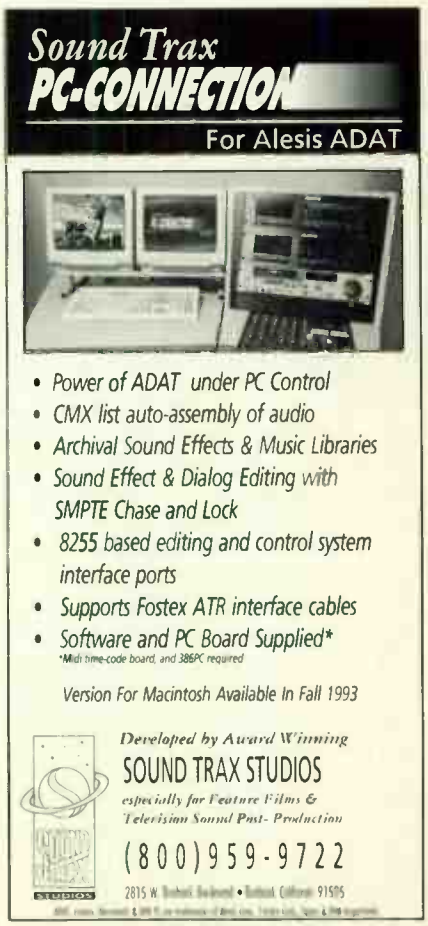

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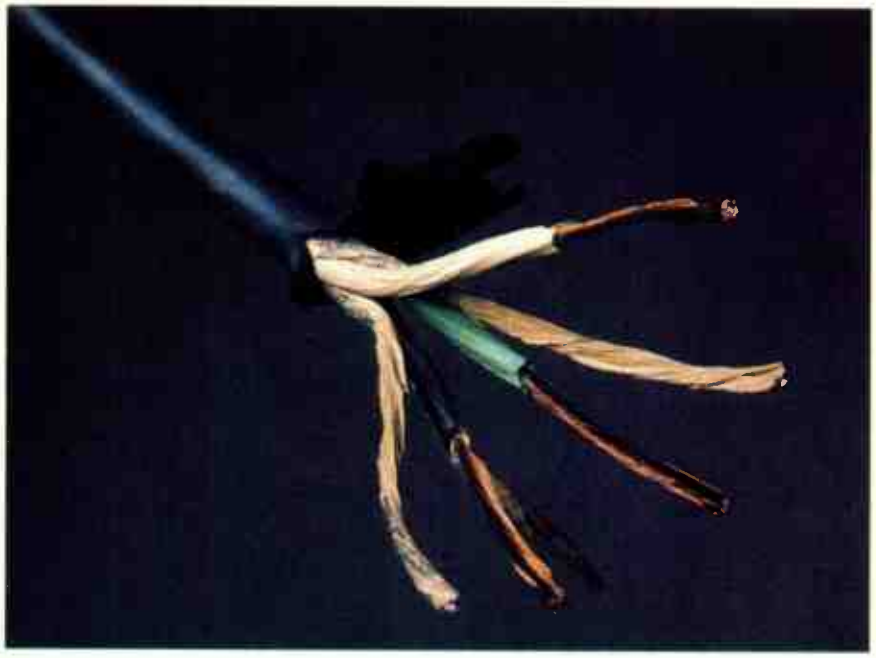
Getting Wired: The Basics

A good wiring design can save you from snaps, crackles, and pops, as well as cure any repositioning nightmares

BY MR. CHRISTY



Tired of rewiring your live rig or studio every time you get a new piece of gear? Do your interconnections snap, crackle, and pop? Is repositioning your gear a tiresome task? The solution to these and other problems is good wiring design.

Because digital wiring is a whole other animal, we'll concentrate on wiring your analog gear. Many of the principles given here, however, apply to digital signals as well.

OPEN RACK SPACE

Allocate some open rack space so you can quickly accommodate new or borrowed gear. Each space should have a corresponding cable(s) and electrical outlet. Leave one blank space between units to insure proper ventilation (overheating affects reliability adversely) as well as to inhibit hum by isolating the power transformers. If you need additional ventilation, mount a muffin fan (available at most electronics stores) in the back of the rack — it works!

Midiman (Tel: 818-449-8838) sells a "quick mount fastener" that makes it easy to insert or remove rack-mount gear. It also isolates the unit from the rack rails, which can eliminate potential grounding problems.

WIRE FOR HIRE

Most people can hear the difference between cable types and quality, most noticeably in the high end. Good cable is transparent and maintains the sound quality from the source to the destination.

There is a trade off between quality, durability, and budget. One rule of thumb is "the higher the price per foot, the better the cable," but there is a point of diminishing returns. Audiophile stores sell great-sounding expensive cables that do not hold up to the rigors of road use.

All too often, bargain barrel wire is not a bargain — expensive wiring is cheap compared to the cost of bad sound.

WIRE SPECS

Wire is actually an electronic circuit consisting of capacitance, resistance, and inductance. Here are some of the specs associated with wire.

• Capacitance: A capacitor is two conductors separated by an insulator, and shielded cable meets this definition. This capacitance, expressed in microfarads per foot, is between the hot signal and ground. In balanced lines, this capacitance also exists between the two hot signals. Cable capacitance rolls off highs; whether you notice this or not depends on the impedance driving the cable. For a given cable capacitance, the lower the impedance, the higher the cutoff frequency. (The formula for finding out where response is 3 dB down for purely resistive loads is $F = 1/6.28RC$, where R is in megohms and C is in microfards.) Cable capacitance can be very noticeable with high-impedance lines (especially guitar pickups), but has little effect on low impedance signals. For example, 0.001 micofarads of capacitance draped across a guitar amp with a 1 Mohm input causes response to be down -3 dB at around 1.5 kHz, whereas with a 10k input, the -3 dB point would be 150 kHz.

• Resistance: A wire is not a perfect conductor. There will be a little bit of resistance, and pumping current through a resistance results in a voltage drop. This is why you want speaker cables to be thick — to transfer power as efficiently as possible.

• Flexibility: Wire can be stiff or flexible. This isn't something that's measured, but comes into play when wire is bent or twisted.

• Gauge: The lower the number, the thicker the wire. 8-12 gauge is ideal for speakers, whereas 16-22 gauge is best for instruments and mics. The more power you expect to

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put through a wire, the thicker it should be.

• Insulation: A critical factor for high-voltage signals. The voltage required for insulation to break down is specified in kilovolts, and is often printed on the insulation itself. For wiring patch bays, recorders, etc., however, the insulation breakdown rating is not important since those are not high-voltage signals.

Here are some of the different types of wire:

• Conductor(s) with braided shield: A braided wire shield surrounds the center conductor(s) to keep hum out of low-level signals. Use high-impedance shielded cable for devices such as passive guitars, older keyboards, guitar stomp boxes, and so on. Use low-impedance shielded cable for pro-level synths, high-end signal processors, low-impedance microphones, digital audio, and so on. Low-impedance types can be longer than high-impedance types (e.g., about 50 ft. vs. 20 ft.). In any event, high-impedance lines should be as short as possible.

• Conductor(s) with foil shielded: This type of shield is easier to work with than the braided type, but is thinner and less durable. It typically connects mixing consoles, patchbays, and recording machines. It is not recommended for live use.

• Non-shielded: Used between power amps and speakers; look for low resistance. Restrict the maximum length to 30 ft.

• Stranded: This type of wire is made up of small strands of individual pieces of wire. It's ideal for applications where the cable will be moved or twisted.

• Solid: This has a solid conductor and, if twisted or bent often, will probably break. It's used for permanent wiring, such as inside gear or between patch bays and mixers.

RUNNING CABLES

• Length: To facilitate testing, cabling within racks should have approximately 3 to 4 ft. of slack so they can remain connected to units being pulled out temporarily. The added length also lets you run the cable to any rack position in case the module needs to be repositioned. Let the slack just hang, or coil it in a loop.

• Isolation: MIDI, audio, and power cables should be as far away from each other as possible to prevent hum and crosstalk problems. "Wall wart"-type power supplies can generate a lot of hum, so keep cables well away from them. Corrugated plastic sheathing is available for cable runs, and not only keeps things neat, but also acts as an insulator. Typical products are "Snake It" from Get Organized (328 Canham Rd., Scotts Valley, CA. 95066. Tel: 408-438-0259), and Radio Shack's split loom tubing (part #278-1654).

• Labeling: Don't write directly on the cable or connector. Place stick tags on the cable (not the connector). However, a major problem with stick tags is that they leave a gum residue. A better solution is to use small tie wrap labels. Again, "Get Organized" and Radio Shack (part #278-1648) sell ready made labels that work great. They don't leave a residue, are easily removed, slide down the cable in case of repair, and some are even erasable in case your equipment changes.

BUNDLE EM' AND GET RID OF THE TENSION

Bundle like groups of cables (power, MIDI, and audio) with either tie wraps or Velcro strips; avoid using garbage bag ties or pieces of wire as they can be conductive. Toleeto Fasteners Intl. (170 Mace St., Unit E6, Chula Vista, CA 92011; 619-426-3725) offers clever Velcro strips with two separate Velcro sections on one small piece of material. One section wraps around the cable(s) and the other secures the cable(s) to the stand. Their latest product is Buckle and Grommet, which cinches the cable and hangs it from a hook by way of a grommet. Another option is the Rip Tie Velcro bundler from Seam Tech (PO Box 77394, San Francisco, CA 94107; 800-348-7600).

Tie wraps, which are nylon strips with little "teeth" that grab a fastener (Radio Shack part #278-1631), should be secured with medium tension;

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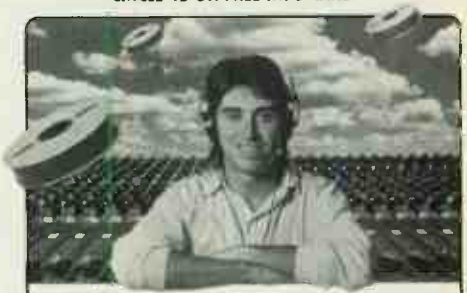

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Cat Scratch CD

Sink your claws into some awesome effects with a simple CD player modification

BY CRAIG ANDERTON

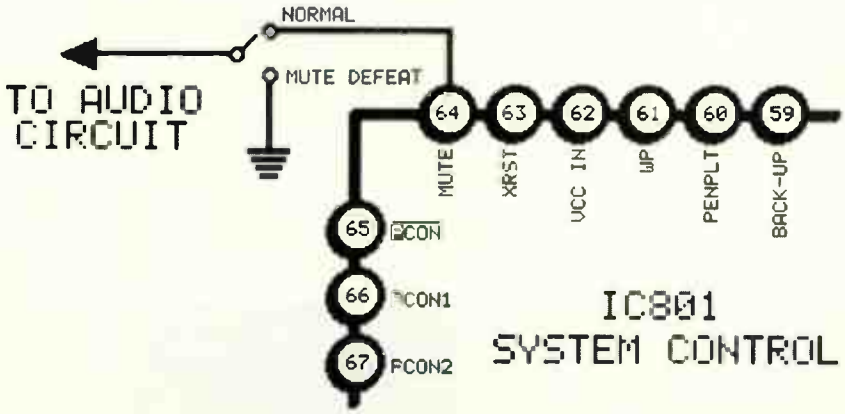
CDs aren't as good as records for scratching, but they're here to stay so we had to figure out something." So says Nicolas Collins, a respected musician in the New York underground scene who recently relocated to Amsterdam to become part of STEIM, an electronic music research facility funded primarily by the Dutch government. Collins favors found sounds and creative mixing over synthesis, yet mangles digital gear and devises alternate controllers to accomplish unusual effects.

If you've been frustrated that you can't abuse CDs the way you can vinyl, take heart. Collins has figured out a way to mess with CD players that, although it doesn't duplicate standard scratching, gives effects that sound pretty wild in their own right.

TAKE THE GAG OUT

Collins's CD scratching/looping technique is brilliant, but simple. Virtually all CD players have a surface-mount "system control" IC that controls the player's operation (on a schematic, it's the chip that hooks into the display and switches). One pin controls the mute function that shuts off the output when paused or when shuttling from one track to another. Defeat the mute by installing a switch, and there's a whole new world of sound.

Unmuting while the CD is paused plays a loop around the paused region. This is good as is, but also makes excellent sampling material. Advancing to another track produces a cascade of sound, some recognizable and some a jumble. Collins uses this technique with a variety of source material: something like baroque music is comparatively



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homogeneous, since the instruments and timbres are similar, but a Prosonus Studio Reference CD with numerous test tones and noise bursts produced Columbia-Princeton-style electronic music straight out of the '50s. These effects are tough to describe in print, but you can hear the CD-scratching technique on Collins's latest CD, *It Was a Dark and Stormy Night* (Trace Elements Records, 172 East 4th St. Suite 11D, New York, NY 10009. Tel: 212-260-7431).

TRY THIS AT HOME

About the mod itself: there are no step-by-step instructions because this is a delicate mod whose specifics vary for different machines — and besides, it should be attempted only by those who are familiar with miniaturized electronics. (In some ways, though, the hardest part is finding a place to mount the switch!) However, any friendly repair shop should be able to disconnect the mute pin and bring out two leads that can be connected to a switch. Standard cautions apply to these connections — don't let any static electricity boink them, or you could blow the chip.

If you're going to do the mod yourself, first get the CD player's service manual and locate the mute pin. Figure 1 shows a representative circuit for a Sony Discman. Carefully apply heat to the mute pin, and gently lift it off the board. Wire a switch, as shown, to the place on the board where the mute pin was connected, the mute pin itself, and ground.

FUN FACTS

• A CD loops faster toward the center, and slows down toward the outside of the disc (CDs play from inside to outside).

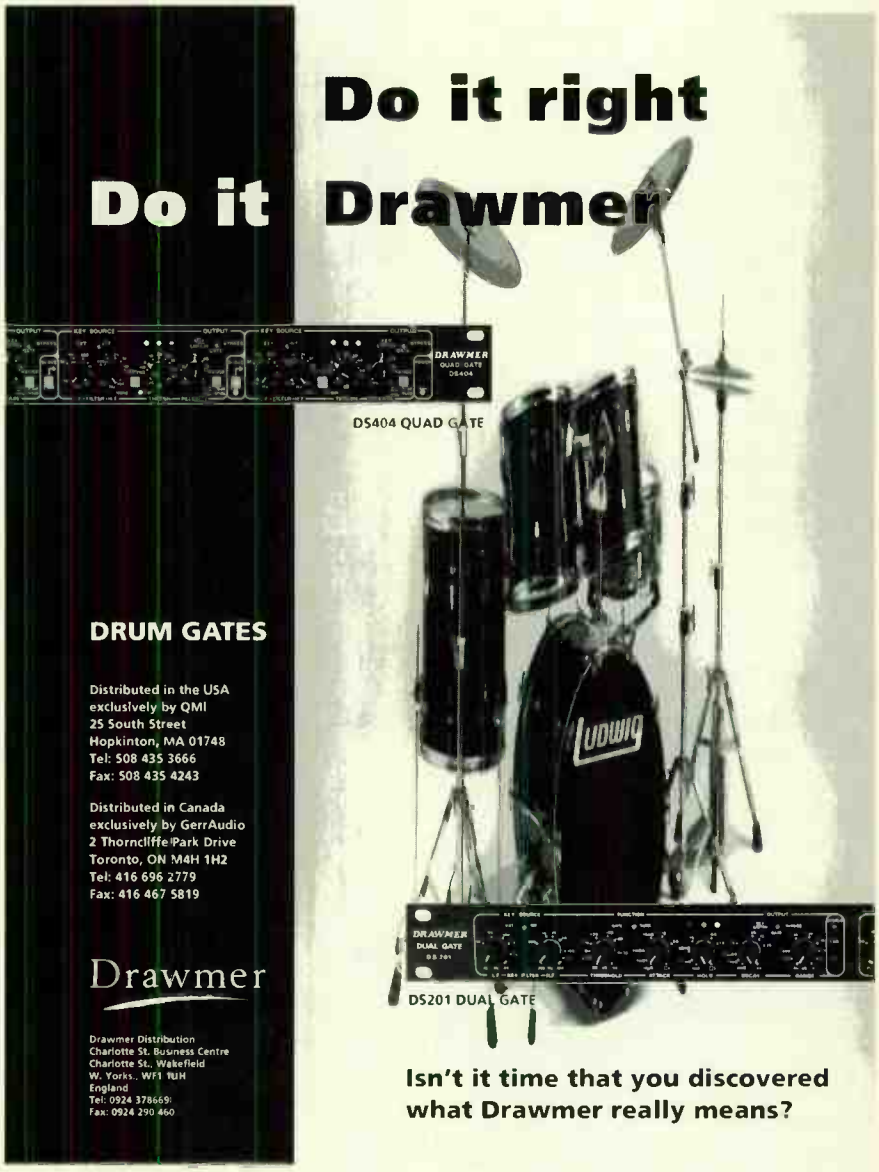
• Random play (what Sony calls "shuffle") works exceptionally well with this technique.

• Many CDs have a port for connecting a remote control, and it is easy to adapt this port to a footswitch.

• The reason for muting in the first place is that the CD produces wicked transients while pausing or searching. Don't blast your amp, or you'll blow tweeters and woofers. High-cut filtering will cut down on the spikes somewhat, or if you're into storing the coolest bits in a sampler, it's easy enough to edit out the spikes.

• During searches, portable players tend to be a bit sluggish (the motors are fairly weak, to conserve power). Higher priced home decks are much faster.

And now you're ready to make some truly outrageous sounds. You won't believe it until you try it. Hey — maybe this will catch on enough to make manufacturers produce special DJ-CD players that have the mute pin brought out to a switch. Well, we can dream, right? **EQ**



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The Tax Man Giveth

More money for your audio purchases may be heading your way

BY MARTIN POLON

After an inauspicious start to tax year 1993 for personal and project studio owners in terms of limitations placed on in-dwelling studio-space deductibility (owing to Supreme Court decisions as previously reported here), the Clinton administration and its allies in Congress are trying to gather support for an increase in small-business capital deductions. This change in the nation's tax code would benefit project studio operators because it would increase the amount allowable for same-year tax write-down.

In one stroke, the recording equipment user, manufacturer, and dealer gain from the tax program already in place for same-year deductions of capital equipment acquisition by small business — and potentially gain further advantage if Congress raises the ceiling. The tax code revision would raise the limit on these same-year write-downs of capital purchases from the current $10,000 to a possible high of $25,000, although a compromise figure of $15,000 will probably emerge from conference committees.

At first glance, the idea of tax help earmarked for equipment purchases by smaller facilities doesn't seem to have much total impact on audio equipment makers and users. But the reality of sales growth in audio recording and other associated technology is that so-called small-business transactions account for over half of the total dollar volume spent yearly industrywide, encompassing all equipment providers and all equipment purchasers. And audio industry research indicates that at least half of the 'buys' made by small- or medium-sized audio entrepreneurs have been influenced by the tax advantage already in place. The proposed increase in the so-called "capital acquisition" ceiling from $10,000 to $15,000 or better significantly widens the spectrum of deductible studio equipment purchase options.

Nowhere is the potential impact greater than in the emerging arena of non-linear editing for audio and video production. The availability of a tax advantage, coupled with the better-than-60-percent drop in computer system and accessory prices over the last 18 months, means that the total acquisition package for a computer A/V recording and editing system can be written off in the year of purchase.

With the total prices for workstation packages dropping significantly close to the $25,000 level for some systems and expected to drop further for others, the ability of small studio users to use tax relief for a larger portion of the purchase seems assured.

Many of the other new computer-based systems entering the audio and video production universe can also now qualify by virtue of splitting the hardware and software buy into separate packages. Under the provisions of the current tax code, unmodified by the Clinton tax program, the purchases must be of capital items, with the price remaining under the limit that Congress sets to qualify for the accelerated write-off.

This tax change could be an even bigger boon for the development of the personal and project studio marketplace than the original $10,000 tax write-down provision. So the bottom line on the rise in the equipment acquisition ceiling has to be win-win for the small studio recording industry! Talk to your accountants and find out more. EQ

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Analog To Digital (and back again)

How do analog sounds get transformed into 0's and 1's? Read on MacDuff...

BY LEN FELDMAN

It all started way back in 1972, when Nippon Columbia of Japan (better known here for its Denon line of home audio products) produced the first digital audio recording device. Today, no studio worth its salt is without at least some digital recording equipment, even if it's a simple consumer-type DAT recorder. This time I'd like to talk about the two types of devices that are at the heart of digital audio technology: the analog-to-digital converter, (usually referred to as the A/D Converter, or just plain ADC) and the digital-to-analog converter (usually referred to as a DAC).

ALL SOUNDS ARE ANALOG

Sounds, which consist of continuous air-pressure waves of varying amplitude, lend themselves to analog representation. Continuously varying sounds picked up by a microphone are translated into continuously varying voltages that in turn can be translated into continuously varying wiggles in a record groove or a continuously varying magnetic pattern on magnetic tape. The idea behind digital audio involves sampling those continuous signals (usually at a very fast rate) and representing each sample by a number value expressed in the binary number system. In a binary numbering system you only have two digits available, "0" and "1." By stringing together a bunch of these 0's and 1's you can express any number value (providing each string has enough "places"). The compact disc standard for example, calls for each sample to contain sixteen digits. This number of digits in each sample gives us a total of 65,536 possible amplitude values.

In converting analog signals to digital signals suitable for mastering CDs, an ADC examines the analog waveform some 44,100 times each second. If the instantaneous sample represents a "loud" instant of sound, the ADC will represent that sample as a "high" binary number —close to its maximum relative level of 65,536. If the sample encounters an instant of silence (or the passage of the analog waveform through its zero axis, going say, from positive to negative or from negative to positive), the binary number produced would be "0." In other words, the A-to-D converter produces 44,100 samples per second (in the case of a CD master), each of which represents a numerical value between 0 and the maximum. These numerical values eventually end up as a pattern of "pits" beneath the surface of a CD, or as a pattern of magnetic pulses on digital tape. There is no variation in amplitude of either these "pits" or pulses — only a change in the digital numbers that they represent as they are read by a laser pickup (in the case of a CD player) or a magnetic playback head (in the case of a digital tape recorder).

RESTORING THE ANALOG WAVEFORM

Human beings can only hear continuous, analog sound waves and patterns — at least in our present state of evolution. So while storing sound in the form of a bunch of numbers offers a great many advantages — such as wider dynamic range, the absence of audible residual noise, and lack of wear with repeated playings (at least in the case of laser-read CDs) — if we want to enjoy the sounds that have been converted to numbers we must convert those numbers back into a continuous waveform. That's the job of the DAC.

The earliest DACs, variously known as parallel or ladder converters, can best be understood by thinking of them as having a series of buckets. The smallest bucket can hold a single unit of water. The next, somewhat larger bucket can hold two units of water, the next one four units, the next one after that holds eight units and so on, until you get to the largest bucket, which can hold 32,768 units of water. If all the units are "filled" by a given digital sample, the translated voltage value of that sample will be 65,536 times as great as it would be if only the very smallest "bucket" were filled. Thus, each digital sample causes the DAC to produce an instantaneous output voltage whose amplitude is proportional to the digital number represented by that sample. Remember, in the case of CDs some 44,100 samples must be translated back to finite voltage values every second.

Earliest D/A converters utilized a series of resistors, each of which was twice as great as its next-door neighbor. As with all physical things (including resistive "ladders"), perfect precision is difficult to achieve. Thus, if the highest value resistor is not exactly 65,536 times as great as the smallest value (or if any of the resistors is not precisely equal to its intended value), a certain amount of error will be introduced into the recovered waveform. Call it distortion, if you like, or deviation from perfect linearity.

HOW MANY SAMPLE VALUES?

There's another point to consider when it comes to discussing the accuracy of a recovered waveform, even if the D/A converter is absolutely precise in its resistive steps. Remember, the 16-bit format permits only 65,536 possible amplitude values. Any difference between the actual value of an input signal and the closest 16-bit value assigned to the sample repre-

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sents what's called "quantization error." Under normal conditions, such quantization error shows up as "white noise" (equal amplitude at all frequencies). While it is fairly low in amplitude, it represents one of the major imperfections in digital audio.

When CDs were first introduced, many audio purists felt that 16-bit samples did not provide a sufficient number of amplitude levels. Remember, each time you add one more bit to the sample, you double the number of available amplitude values available for representing a given instantaneous audio waveform value. Thus, if the CD standard had elected to use 17-bit samples, 131,072 amplitude values would have been available, for a more precise sampling of the analog audio waveforms. An 18-bit standard would have yielded 262,144 available amplitude levels, and so forth. The reason 16-bit samples were chosen is really quite simple: At the time when CDs were introduced, large-scale integrated circuit technology had not progressed to the point where anything above a 16-bit A/D or D/A converter would have been economically feasible. In fact, some of the earliest CD players actually used 14-bit D/A converters, in effect "throwing away" or rounding off the two least-significant bits read by the laser pickup in the CD player.

HOW MANY SAMPLES PER SECOND?

There's one other criticism of CDs that is often voiced by some audio purists, and it's one that's not as justified as the 16-bit versus more-bits argument. That criticism has to do with the sampling rate, which, as I mentioned earlier, is 44,100 samples per second. An argument has been put forth that the sampling rate for digital audio should have been "much higher," perhaps as high as 100,000 samples per second or even higher. Well, here we run into some indisputable facts about digital sampling. A theorem known as the Nyquist theorem states that if you want to accurately convert to digital and recover analog audio up to a given frequency, you need to use a sampling rate that is at least twice that given frequency. So if you agree that audio reproduction need not go higher in frequency than 20,000 Hz, the minimum sampling frequency necessary to produce all frequencies up to 20,000 Hz would be 40,000 Hz. The value of 44,100 samples per second was chosen to provide some margin for low-pass filter designs that must "cut off" all frequencies beyond the highest audio frequencies desired.

Next time I'll tell you about new types of DACs — so-called 1-bit DACs — that solve the problems of nonlinearity and distortion that I mentioned earlier. We'll also take a look at 20-bit master recording and other 16-bit systems without requiring any modification of playback devices. EQ

M-1

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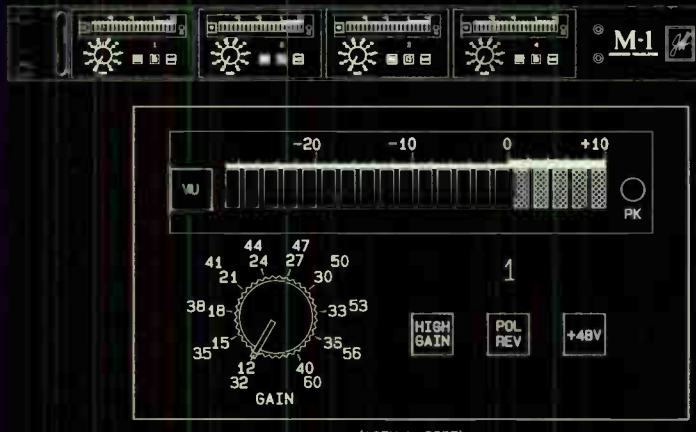

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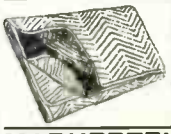

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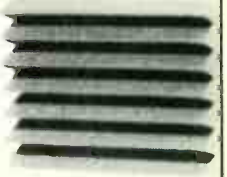

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ADAT Add-Ons

You may think you're getting the most out of your ADAT, but wait until you check out these add-ons and enhancers

BY J.D. SHARP

It happened with the IBM PC, didn't it? First a company with clout comes along with an open-architecture product that fills a market need. Then along comes a legion of third-parties to expand (exploit?) the product's possibilities and help fit it into a specific niche.

The same market phenomenon seems to be happening with the Alesis ADAT 8-track digital recorder. Not surprisingly, Alesis is promoting the trend itself by running ads showing the names of numerous ADAT-supporting companies in the background, and by providing its own add-ons (the BRC remote control and the AI-1 digital audio interface).

All of these products are based on two Alesis standards: the eight-channel ADAT Multichannel Optical Digital Interface (Alesis ADI™) and the ADAT Synchronization Interface (Alesis ASI™). Keep in mind that some of the products covered are in development, so features may change from preliminary descriptions provided by manufacturers and developers.

Even though it hardly qualifies as an add-on, the most visible product in terms of additional support for the ADAT format is the Fostex RD-8 eight-track digital recorder. It adds on-board synchronization and the ability to record SMPTE timecode on the subcode area of the tape to the ADAT's standard list of features. This orients it as an excellent machine for video postproduction and audio-for-video applications.

Like all forms of synchronization for the ADAT, no tracks are consumed by code. Compatibility with the ADAT is so thorough that the RD-8 can act as master or slave in combination with Alesis units. This means that one RD-8 could provide synchronization capabilities for several ADATs locked to it, since only one machine in a multimachine setup needs to be synchronized. The integral synchronizer is a true chase/lock system, and all of the commonly-used code formats (24/25/29.97/30 drop- and nondrop-frame) are generated and read. Pull-up and pull-down (compensation for timing differences between film and videotape formats) are accomplished automatically. The RD-8 offers front-panel switch-selectable sample rates, while the ADAT employs the variable speed control and its digital readout to deliver a 44.1 kHz sample rate (48 kHz is the default rate).

SYNCHRONICITY

Synchronization is very much on the minds of third-party developers. JLCooper is shipping the dataMaster synchronizer ($749.95) for the ADAT. It covers just about all bases — and does it in both directions. The ADAT's internal sample clock can be converted to MIDI timecode (MTC), which will then autolocate an attached sequencer that's MTC-literate.

More interesting is the ability for a sequencer with an interface that generates MTC to autolocate the ADAT! If you jump ahead 15 measures, the ADAT will dutifully tag along. These capabilities are extended to SMPTE timecode by the dataMaster. Any source of SMPTE code can be

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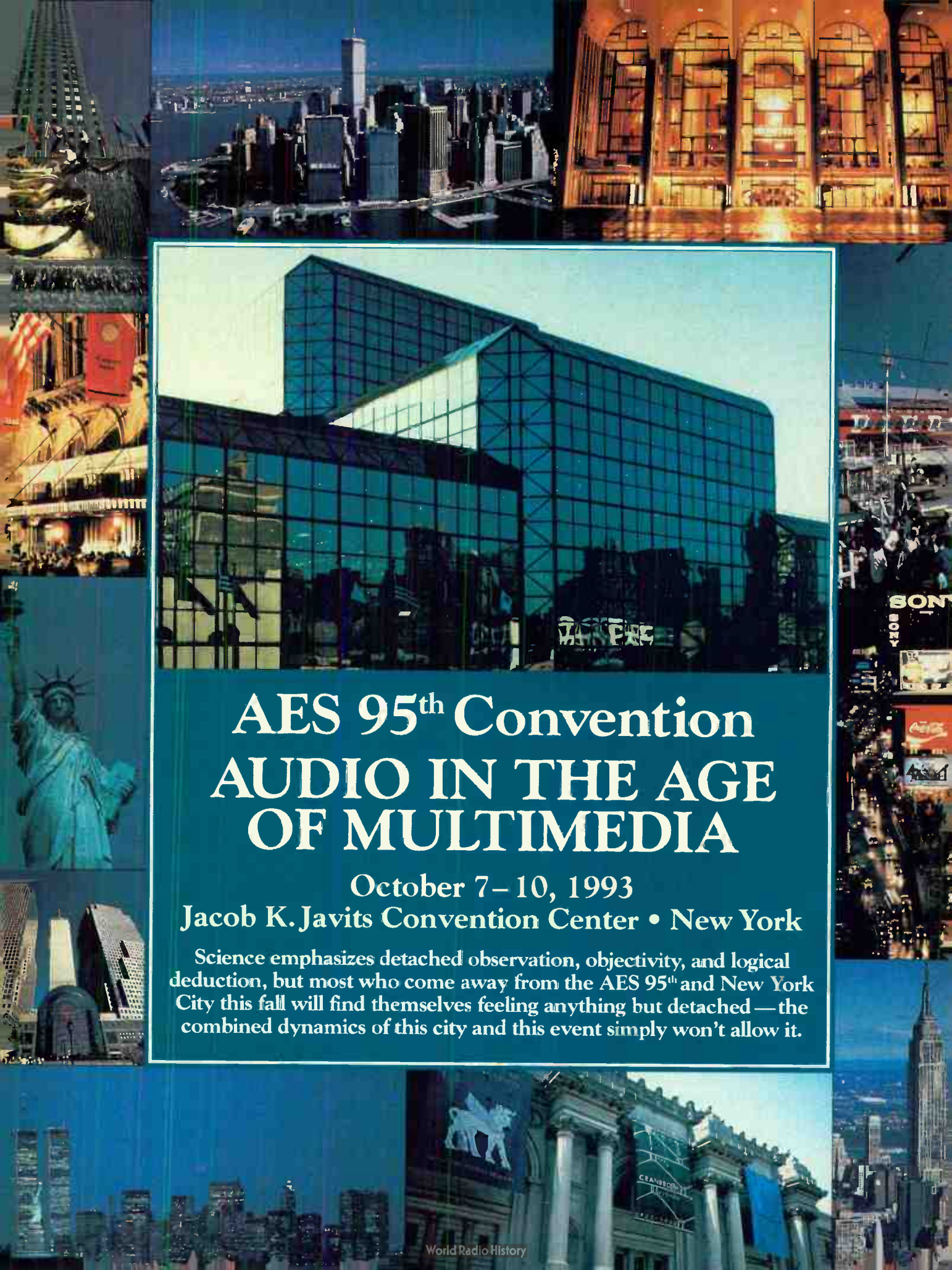

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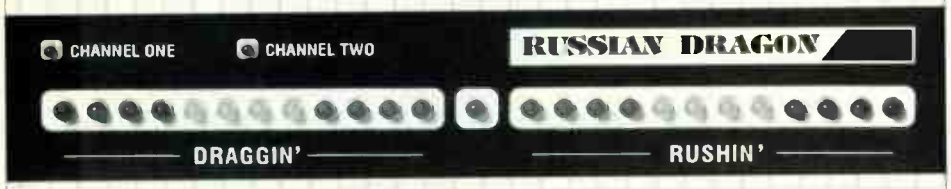

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locked to (frame rates of 24, 25, and 29.97 and 30 drop- and nondrop-frame formats are supported).

Cooper has also announced an option for the dataMaster: a Sony 9-pin/ES-bus sync adapter ($149.95), allowing connected ADATs to be treated as a video machine when controlled from video editing systems. An input for composite video or black burst assures that code conforms to actual video frames.

Another synchronization device is scheduled to appear late this summer under the Alesis label; the AI-2 multipurpose audio/video synchronization interface is the result of collaboration between Alesis and TimeLine; one of the leading manufacturers of professional synchronization equipment. The AI-2 packs a bevy of features into a single rack space. It can be used as a standalone synchronization solution for the ADAT; provide it with timecode and it will merrily autolocate connected ADATs, like the dataMaster. Both word clock and video reference (composite, black burst) are supported. Seamless integration with the popular Lynx and MicroLynx synchronization systems are provided; the MicroLynx controller can select Record Ready for up to 128 tracks.

Further compatibility with the video world is enhanced with the Sony 9-pin compatible interface, which emulates a BVU950 and connects directly to most popular editing systems (these can address all Record Ready selection via a mapping assignment scheme). Additional connections for the Alesis BRC are provided, and the AI-2 "talks" to it intelligently, so both units can be used simultaneously (for instance, you could have three machines connected to the AI-2 and a BRC, and the BRC could be used to offset one of them from the other). MIDI Machine Control will be supported, with MIDI In and Out connectors fitted, and the AI-2 promises to also support System Exclusive; allowing a computer-savy software author to address all ADAT functions via Sys. Ex commands. The AI-2 is also capable of reading the header the ADAT prints at the top of each tape and can recall offsets that have been stored there. A keypad, display, and LED indicators make it easy to enter data

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and read the status of the AI-2. Targeted list price: $995.

More basic (and inexpensive) synchronizer needs for MIDI sequencing are handled nicely by JLCooper's dataSync ($349.95). It uses MIDI timecode to lock sequencers to the ADAT (but you can't go the other direction as with the dataMaster). MIDI Machine Control (MMC) is also provided; all transport functions of the ADAT can be addressed by any program that is MMC-savy.

GETTIN' DOWN & DIGITAL

Digital transfer is another hot area. After all, once you've gone through the trouble of recording digitally, why return to analog before you have to? Alesis has commenced shipments of their AI-1 ($895), which brings two ADAT tracks out to both AES/EBU and SP/DIF digital outs, and allows two channels of input from these same digital formats. Sample rates, while defaulting to normal values, may be selected between 44.1 and 48 kHz, allowing a convenient means of sample rate conversion (this even works without the ADAT as a standalone function). Any adjacent pair of tracks (one and two, three and four, etc.) can be converted, and when used with the BRC any two tracks can be broken out.

Digidesign has announced an eight-channel interface that will allow synchronized direct digital transfers between its ProTools and Session 8 products and the ADAT. This will serve two functions: mass transfers for editing will be easily accomplished; and the ADAT will serve as an optimal back-up system for projects that need to be unloaded from the hard disk to clear space for new work. Delivery date, specifications, and price are still not finalized.

There has been talk about an 8-channel data transfer interface box and format converter that lets your ADAT talk directly to Mitsubishi X850/880, Sony PCM 3324 multitracks or the Yamaha DMC 1000 and DMP 7D digital mixers. Unfortunately, as sometimes happens with small third-party developers, no more word has been made available since the initial press release.

Does this sound like a world-wide network? Perhaps not yet, but there's far more bubbling under the surface. There are quite a few folks hard at work on add-on products, both as certified and pending third-party developers. In the former category are companies like Steinberg Jones and Apogee. Steinberg Jones has a product called ACI (ADAT Computer Interface) that allows Cubase or any MIDI sequencer to control the ADAT's tape transport functions. Apogee is applying their expertise in world-class A/D conversion to a more economical product packaged for the ADAT.

Sound Trax Studios in Burbank, California has developed the PC-Connection for the ADAT which puts the recorder under PC control. It claims to perform all the functions of the Alesis BRC such as SMPTE chase and lock and auto-locate points, with the added capabilities auto-locate lists, master machine control, and auto-assembly under CMX EDL lists. The product requires an IBM-compatible PC 386 or higher running MS DOS 3.2 or later, and a MIDI board with SMPTE. The PC-Connection sells for $695.

Other products in various stages of development include a program that allows Windows to control a synchronization interface; an interface to the ADAT that chase-locks it to video and combines it with a 12-channel digital mixer and video editing; and various digital and optical interfaces with existing digital standards. Pending developers are attacking additional areas such as direct keyboard interfaces, remote controls, Windows drivers for ADAT control, and interfaces to computer-based video editing hardware and software. All of this means that it won't be a quiet year for new ADAT product introductions, and this can be nothing but good news for the tens of thousands of ADAT owners and many more prospective customers.

Stay tuned for developments! EQ

J.D. Sharp is the owner/operator of Bananas At Large, a S.F. Bay Area pro-audio dealership. He is available for questions and answers on America On Line as "BananaDan."

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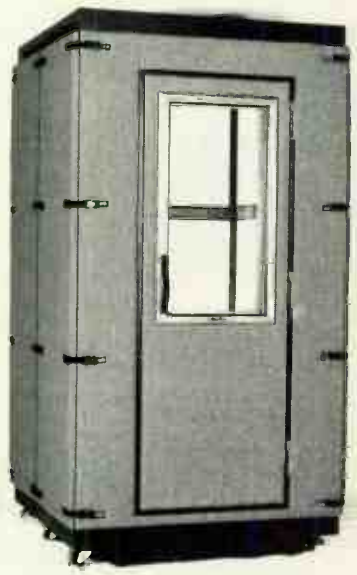

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ACROSS THE BOARD

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agreement between the RIAA and all of the equipment manufacturers was that in exchange for the copy code hardware, each customer would be allowed to make a single copy of the purchased CD for his/or her own use. It didn't say anything about having to take physical delivery of the CD before you copy it, did it? There is nothing wrong with the premise that you could walk into the record store, pay for the CD of your choice, and then allow the store, as your agent, to make the copy for you. Follow me? If you pay the record company for your copy of the music, you can put it on whatever format you want.

Remember what happened to video rental stores in the early '70s? The movie studios tried to put them all out of business. Now these same movie studios are proud to announce that video sales and rentals contribute to as much as 50 percent of the total income produced by a movie. There are tons of movies that are produced only for video release.

The same thing is going to happen because of the Blockbuster/IBM idea. Record companies will make more money from their old catalogs. A re-release will only need to sell a few hundred copies to make it worthwhile to remaster it. Small record companies will have more of a chance against the big guns than they have in the past. Nobody will have to get out the crystal ball and try to decide how many CDs to press up and distribute. New record companies will start up in project studios. The consumer sitting in the listening booth at the record store will stand an equal chance of hearing the CD that you made in your basement for $300 or the new Michael Jackson megabuck production.

When you pay for your CD, the record company's account gets credited instantly, and so could the artist and songwriter royalty accounts. I guess that might cut down on the funny accounting practices that seem to crop up from time to time.

Think about it. There already are homes with CD recorders. Coupled with some of the new digital-audio-by-satellite companies, soon you will be able to order the CD after seeing the video and can have the CD sent right to your home, just like pay-per-view movies.

Well, that is all I have to say this month. Let me know what you think. Even better, let your favorite record company know what you think. Let your favorite record store know what you think. Let the 7-11 owner know what you think (if you can find an interpreter). Soon one of these new CD listening booths might be right next to the cash machine in every convenience store. (I just hope they don't put the CD recorder near the Slurpie machine.) EQ

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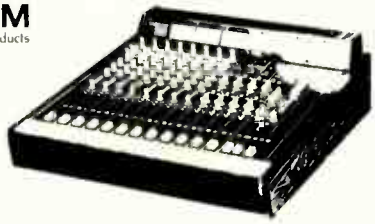

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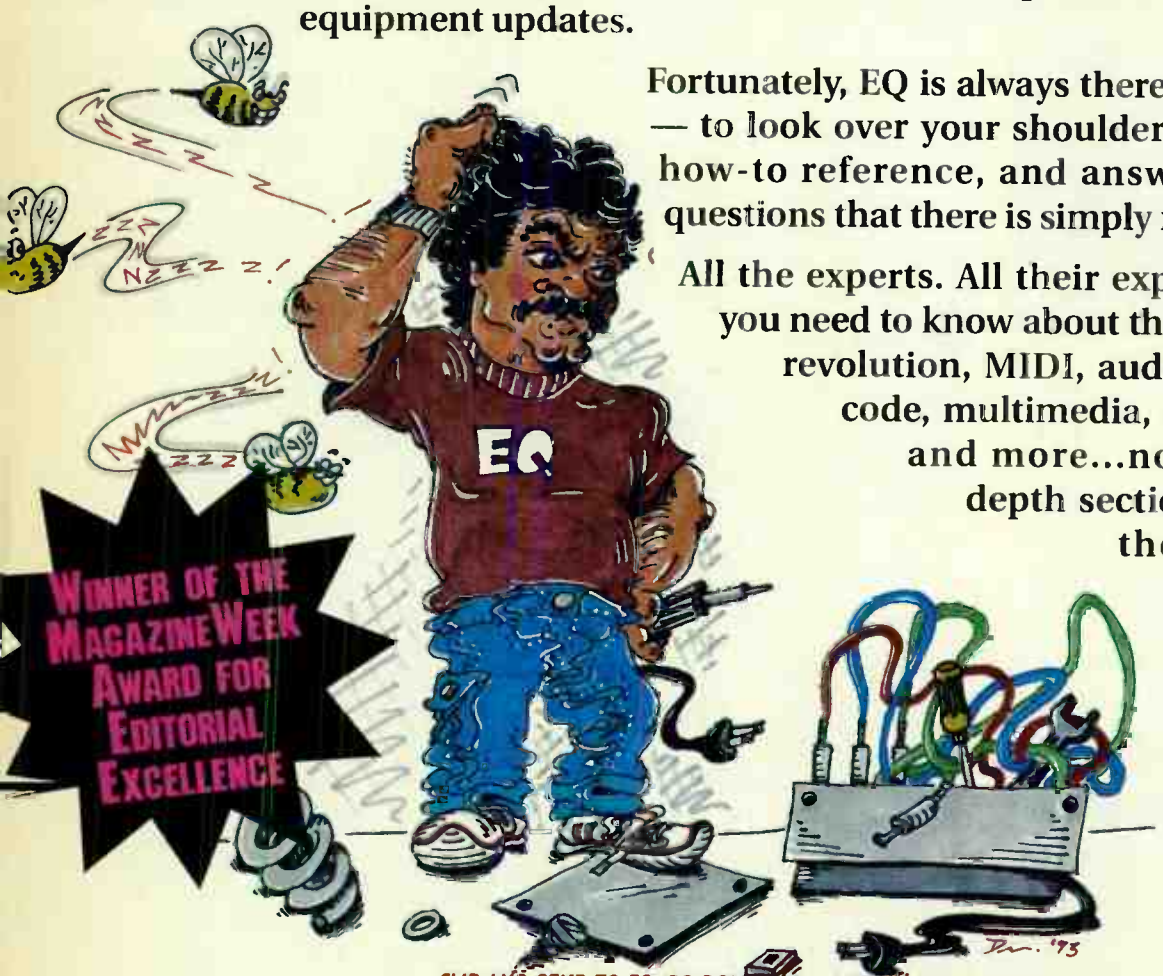

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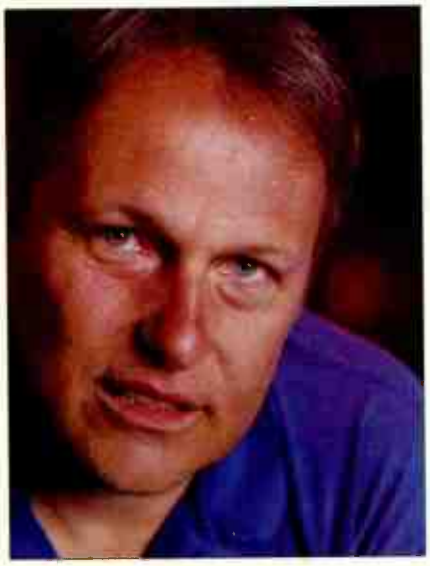
Pressing News



Blockbuster has entered the music scene and is looking to change the CD pressing and distribution cycles

BY ROGER NICHOLS

As you can see, I have written my little fingers to the bone this month, so this won't take long...

I got an Alesis BRC to test, along with a beta unit of the Alesis AI-1 digital interface box with built-in sample rate conversion. After reviewing the Tascam DA-88 and doing all of the transfers analog, I decided to see what the actual difference was between using a sample rate converter or just going analog. The results were surprising and you will get to hear about them next time. Until then, don't be afraid to make your transfers analog. And take it from me, a guy who has to wash his own mouth out with soap every time he uses the "A" word, that is a pretty ballsy statement.

CD INSTAMATICS

The big buzz in the record biz is about the recent Blockbuster/IBM joint announcement dealing with distributing and selling CDs. The ramifications are mind-boggling for anyone involved in music — even those lonely project studio owners with dreams of fame and fortune.

It works like this: You walk into the record store and enter a booth where you listen to any cut on any CD that you are interested in purchasing. When you decide which one gets your hard-earned money, you push the button and insert your credit card. The CD is recorded for you on the spot. It takes about six minutes to crank out your CD while a color laser printer churns out the CD booklet. If there is some special packaging associated with the particular CD, then you get a temporary booklet and the real one is mailed to you. Bingo Gringo.

No matter how esoteric the CD you are looking for, you can be assured of being able to walk out of the store with it. Blockbuster says that based on surveys it has conducted, some 40 percent of the people who go to the store to buy a particular CD can't find what they are looking for. This will change all that.

For persons who want to expand their musical horizons, this is fine — imagine being able to listen to a CD before you buy it! Let's say you read about this new world music movement to combine Celtic harp music with Pygmy chanting. When you get to the music store you discover that there are seven different CDs of this stuff. It would be nice if you could listen first.

You know, that is the way it used to be back in the '60s. In California, it was Walich's Music City at Sunset and Vine in Hollywood. You could get the records out of the rack and go into this little phone-booth sized listening room. You could play records until your brain felt like a stale tortilla, and then go up to the counter and tell them which ones you wanted to buy. The sales staff handed you a new sealed copy and you were on your way.

An interesting side aspect of this new system is that since all of the product is delivered by computer, all of the accounting and payment can be done the same way. When you pay for your CD, the record company's account gets credited instantly, and so could the artist and songwriter royalty accounts. I guess that might cut down on the funny accounting practices that seem to crop up from time to time.

Warner Bros. Records and Sony Music have said that they will not support Blockbuster in such an endeavor. Not surprising. They have their CD plants and their distribution companies to protect.

But the record companies should be all for this new technology. Their CD plants could start gearing up for blank CDs. There is also another profit center that will need to be addressed. It seems that if the 40 percent of the customers who previously had been unable to find what they wanted now left the store with a CD, record company profits would increase. Blockbuster says that without the shipping and handling charges that average about $3 per CD, the prices of CDs should come down. And what about the reduced inventory that would be required by each store, and the reduced cost of handling all of the returns? It all looks like good news for the consumer.

The format doesn't have to be limited to CD, either. You could just as easily get the MiniDisc, DAT, cassette, or DCC (choke, sorry) version instead if that is what you wanted. The record companies won't have to complain about stocking so many different formats.

Guess what? If the big record companies try to fight this new technology they are in for a surprise. It seems that a few years ago the record companies tried to stop DAT by requiring SCMS copy protection. The

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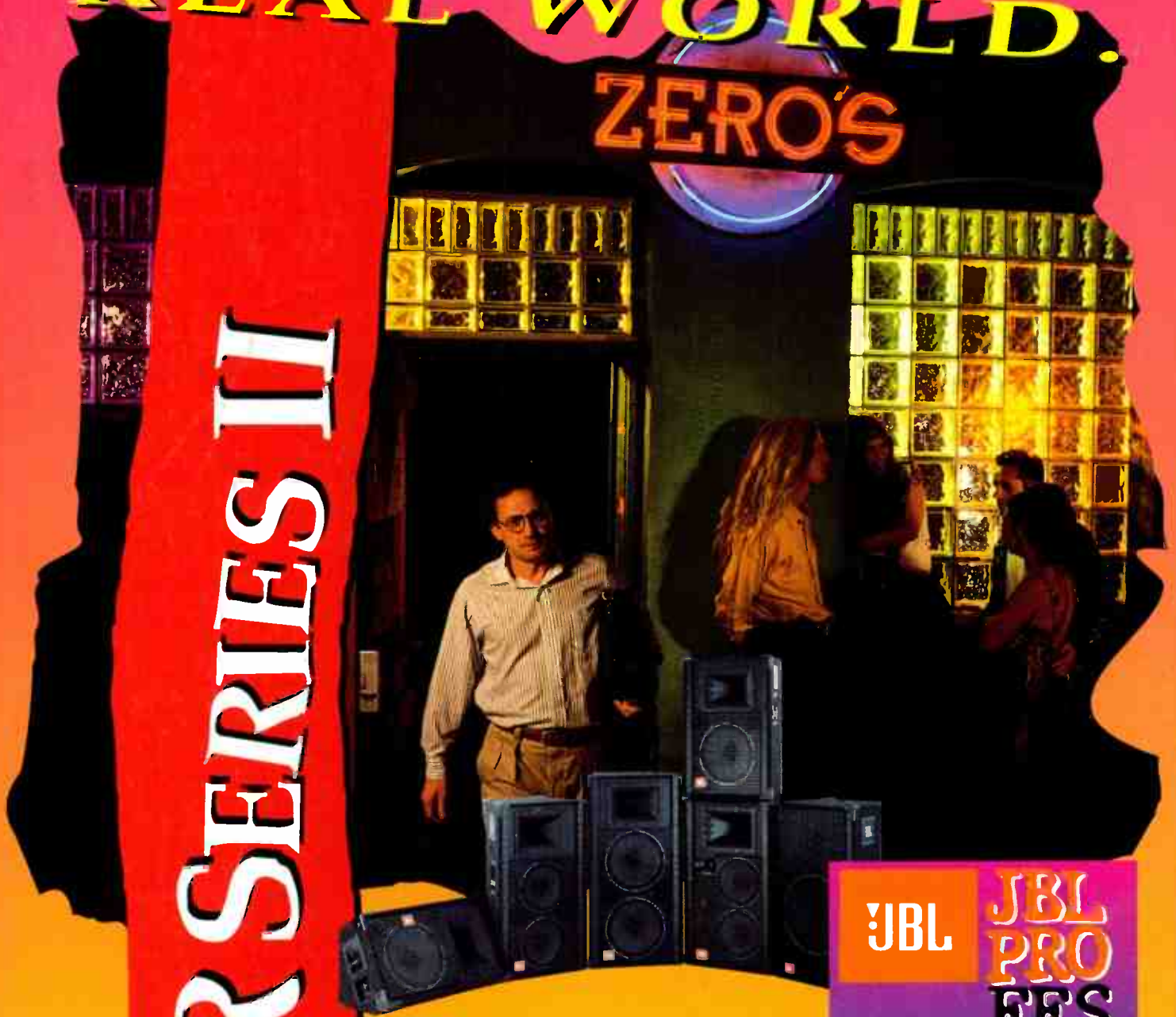

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