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EQ

THE PROJECT RECORDING & SOUND MAGAZINE

1995 • ISSUE ONE

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& SOUND TECHNIQUES
VOLUME 6, ISSUE 1
JANUARY 1995

BEST SHO

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If there was a rule about how to get ahead in this business, it would say something about using the right tools for the job.

And as far as references go, no tool is more important than your near-field studio monitors. And the hands-down favorite happens to be the Yamaha NS10MS.

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LETTERS TO EQ

TALK SOUP

In the October '94 issue, Murray Allen tried to explain the recording and conversion process for voice for games and multimedia presentations. The only problem is that Mr. Allen relies upon his experience in the recording industry, not upon experience in the multimedia and games industry.

First of all, he makes an error in his explanation to take care of the "J," "S," and "TH" problem. Since all three have their strongest signal between 2.5 and 4 (well below the 5.5 kHz that an 11 kHz sampling rate can handle), there is no need to compensate for the artifacts that these consonants might produce. In fact, there is no way to compensate for them. The only way would be to use a DSP4000 and do a frequency shift on the voice, but this would sound too robotic. The way we do it is to put in a logarithmic EQ curve that starts at approximately 4800 Hz and ends at 5500 Hz, with a top boost at 5500 Hz of approximately 4 or 5 dB. This will preserve some of the rolloff that sample-rate conversion programs do.

Second: at sampling rates of 11 kHz or 22 kHz and a bit resolution of 8 bits, the last thing you worry about is how warm a microphone sounds. All of this will be lost in the cheesy 8-bit D/A converter, anyway. What you want to look for is a really quiet microphone. An AKG 414 TLII or a later model Neumann TLM 170 will do well. We always go straight from one of these microphones to an Avalon preamp (or the Mackie 8-bus preamp), through a Neve or DSP4000 compressor to 44.1 DAT. Unless you're willing to denoise 12,000 sentences with DINR or NONOISE, any noise inherent in the 16-bit signal will get magnified 256 times when going to 8-bit. Comparing how to do 8-bit speech files with early radio recording is like comparing oranges and apples.

Third, regarding Mr. Allen's advice on how to use compressors: if possible, avoid going back to the analog domain once you have your voice recorded. If we're in a rush, we use a dbx 902, but otherwise we'll use Jupiter's JVP or a soon-to-be-released SDII plug-in from Waves that does compression, gating, de-essing, etc. On some of our projects, we'll go in by hand and lower the volume on all "SS-type" waveforms. Besides this, for each sentence, you have to remove all clicks, lipsmacks, and soft breaths (because these will end up as static noise on 8-bit files, anyway). We use MDT after this with a small amount of compression. At this stage we add ambiance using NuVerb, DSP4000, and Spatializer. After this, we use Waves Q10 to EQ the voice, MDT to compress it all more drastically, and L1 to maximize volume some more. After this, we use an in-house program to go from the higher rates to 8-bit, 22 kHz or 11 kHz. There are simply no good commercially available sample-rate converters on the market. If you have to use one, use SoundHack 0.65 to do your sample-rate conversion and bit-depth conversions.

Over the past two years we have converted over 25,000 lines of dialog — all with excellent results. It takes a little bit of work, but it's worth it.

Charles Deenen
Audio Director
Interplay Productions
via America OnLine

NOW VOYAGER

I liked Roger Nichols's review of the Yamaha ProMix 01 in December's *EQ*. Yamaha dropped the audio industry on its head by providing advanced digital mix functions at analog prices. Such innovation is good for the industry.

Voyager Sound, however, has a way to make the ProMix even better! An audio engineer can usually adjust only two or three mix parameters at one time. Consider what would happen if coordinated operation of multiple Yamaha ProMix 01 units became possible via the movement of a single icon. Voyager Sound has the only practical way to do that.

Our technology will be able to link together up to four Yamaha ProMix units and provide synchronous control over 64 channels. It will allow virtual allocation and control of ProMix resources. It will provide the

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But we also wanted to satisfy the Official Musician's Minimum Daily Requirements for microphone inputs. For sampling. For vocals. For live single and duo club acts.

So we supplemented the LM-3204 with two of our highly-regarded mic preamps. They have the same very impressive specs, can't-bust-'em headroom and switchable phantom power as our 8•Bus, CR-1604 and MS1202 mic preamps. Each can be patched to any of the LM-3204's 16 stereo channels.

If you currently have more inputs than channels to put them in, call us toll-free today. We'll send you detailed information on the mixer that packs the most inputs into the least space ever.

The LM-3204 from the rain forest fanatics at Mackie Designs.

NEW & NIFTY! Source Alt 3/4 switch routes Alt 3/4 bus to AUX 3 returns, creating 2 submix buses for remixing back into the main L/R buses.

Sealed rotary controls. All-metal chassis.

4 AUX sends per ch. *accessed via two knobs & SHIFT button. AUX 1 & 3 are true stereo; 2 & 4 are mono.*

5 RACK SPACES

LM-3204

Solo level control *and conspicuous, Rude Solo LED*

Aux Return to Control Room *switch routes AUX 4 returns to separate Control Room/Headphone bus so you can "wet monitor" (listening with effects without applying them to the main L/R outputs) or play along with a cue track without having it go to tape.*

Hypersensitive –20 dB Signal Present LED.

3-band EQ *(80Hz, 2.5kHz & 12kHz like our CR-1604).*

MUTE ALT 3/4 *doesn't just mute...it assigns the channel to a separate stereo bus. Especially handy when multitracking.*

Stereo In-Place Solo *monitors channel without affecting main or AUX outputs. It also lets you read channel operating levels via the LM-3204's 13-segment LED meters.*

Forgiving UnityPlus *gain structure, adds headroom, cuts noise & gives you 30dB more gain above Unity.*

Studio-quality, high-headroom, low-noise balanced mic preamps *with –129.5dBm E.I.N. Complete with trim controls and switchable phantom power, they're assignable to any LM-3204 stereo channel via 1/4" TS Mic Out jacks.*

Not shown but extremely important in terms of noise & headroom: Professional +4dBu internal operating levels *throughout (versus wimpy, hobbyist –10dBV levels found in many competitive line mixers).*

Both 1/4" & RCA-*type* Tape Inputs *and* Tape Outputs.

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Control Room outputs *so you don't have to tie up your headphone output to drive a monitor amp.*

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*32 individual inputs plus 8 AUX inputs.

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WHAT'S IN A NAME?

In a press conference at this year's AES, TASCAM and Sony introduced the new term and logo for anything dealing with their Hi8 digital multitrack recording format: Digital Tape Recording System, or DTRS. And while this certainly describes what it is, we at *EQ* feel it doesn't roll off the tongue easily enough — an important quality considering the number of studio pros who will be dropping the name throughout the world.

DTRS
DIGITAL TAPE
RECORDING SYSTEM

Both ADAT and DTRS indicate that, for the first time in history, we do not have a single tape standard in pro audio. At least this gives us an easy way to identify our incompatibilities — right?

This is the reason why *EQ* is asking you for help. We want to rename DTRS with something a bit more catchy. To start the ball rolling, we nominate 8-TAPE. What do you think? Like it? Hate it? Have you got something better?

Send your digital monikers to EQ/The Rename Game, 939 Port Washington Blvd., Port Washington, New York 11050 or drop us some E-mail at MPANDA@aol.com. The winner will receive something cool. We don't know what it is yet, but we know it'll make your friends jealous.

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ability to mix in both stereo and surround sound, multiparameter effects mapping, full-featured MIDI support, and much, much more, using a mixing methodology that is intuitively simple.

Judith E. Cole
Chief Executive Officer
Voyager Sound
Lake Orion, MI

GRATUITOUS PLUG

I am a recording engineer and small-studio owner researching equipment, some for home use and some for the studio. I am finding it difficult to look up independent test reports on a lot of the gear, and I'm wondering if you can help me with information on what gear has been reviewed in your magazine in the last few years so that I can order back issues or find them in a library. I suppose the best thing would be if you have a listing or index of the gear you have reviewed, or if you could tell me what publications index your articles.

Any help at all that might facilitate my search would be greatly appreciated.

Craig Johnson
Culver City, CA

[*We can do better than that, Craig. At the AES we debuted the* EQ *CD-ROM, which holds the articles from every issue of* EQ *— including the reviews, the product views, professional techniques, and more. Plus, we've got it so you can find product information by issue, type of equipment, and manufacturer. The* EQ *CD-ROM also has a sophisticated search function that lets you find exactly what you are looking for in a matter of seconds.*

In fact, the only problem with the dual-platform EQ *CD-ROM is that it's not ready yet! Fill out the form you'll find elsewhere in this issue and expect to get 30 issues of* EQ *on CD by April. —Ed.*] EQ

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RN EQ

The EQ
The tradition
The pedigree

" The SYSTEM 9098 EQ is a high performance Equalizer and Preamplifier designed to originate microphone signals of the highest quality and to process signals generally in terms of frequency response. The circuitry is based on the research I put into the 9098 console and the approach bears many similarities to that used in the 9098. Paramount importance has been given to the sonic quality of the audio path, taking great care to retain the highly-prized musical character of the famous old designs of this pedigree.

The SYSTEM 9098 EQ embodies the original curve shapes now enhanced by improved circuitry which provides swept frequency bands in place of the discrete switched steps of the past. Thus the EQ has become even more powerful yet remains a subtle and creative tool, using the same basic circuit configurations which have been successful over many years. However, new amplifying devices and better quality components have resulted in lower noise, lower distortion and the ability to handle higher frequencies.

The result is an equalizer which has the solidity and sound of Class A without the cost, heat and weight penalties and thus provides the 'best of both worlds'. We have also left behind cumbersome and expensive hand cabling, noisy connectors, heavy separate power supplies and outdated assembly techniques which contribute nothing but nostalgia. Apart from the robustness, repeatability and reliability, we have now made one of my designs more affordable than ever before."

Rupert Neve

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EQ&A

ONE TIN SOLDER

Q *Why does slamming dead gear with extreme level (i.e., quickly cranking up the volume) bring it back to life?*

Abdul Singen
Fort Worth, TX

A If the blasting technique is your sound recovery tool, the chances are good that there is a cold solder joint somewhere in the gear. Typically, a cold joint is the result of insufficient solder on heavily stressed items such as switches, pots, and connectors (pots are also susceptible to damage from stress).

Learning to spot a cold solder joint is key. Good joints should look smooth and shiny like the one at the bottom right corner of fig. 1. Counter-

FIGURE 1: The joint family.

clockwise, each joint gets progressively worse until the connection is broken.

Fortunately, permanent repair simply entails resoldering. Here are some soldering tips:

1. Make sure the tip size is appropriate for the task at hand and in good condition.
2. Keep your tip clean by wiping it on a clean, wet, cellulose sponge.
3. After cleaning, tin immediately with fresh solder.
4. Don't "paint!" Solder flows best when the work is hot.
5. Add solder to the work, not to the tip.
6. Check all heavily stressed components (connectors and switches).
7. Use a strong, nonglare producing light and a magnifier such as a jeweler's loupe.
8. Carefully reflow solder and inspect your work for shorts.
9. Work in a well-ventilated area.

After you are finished, remove the flux with denatured or anhydrous alcohol and a tooth brush (acetone works on stubborn flux). Be sure everything is dry before powering up your equipment.

Eddie Ciletti
Manhattan Sound Technicians
New York, NY

CHANNEL SURFER

Q *I want to control a guitar amp's channel switching via MIDI, but I need some kind of interface between the 1/4-inch footswitch jack and MIDI. Any suggestions?*

Karl Summers
Milwaukee, WI

A There are at least two solutions: MIDI Solutions' Relay Box ($99) has a reed relay whose terminals connect to a 1/4-inch phone jack and can plug directly into a footswitch input. You can turn the relay on and off via a single continuous controller, one controller to open and another to close, program changes, note velocity, or two particular notes to open and close. Another option is adding the Relay Expansion Board to the MIDItools computer, which then controls up to four single-pole, double-throw relays via continuous controllers. Contact MIDI Solutions at 1-800-561-6434; for the MIDItools computer, contact PAVO at 1-800-546-5461.

Craig Anderton
Technology Editor

SCREW UP

Q *My two questions concern rack-mounted gear. One: Is it necessary to use all four screws? Two: Why are some screws so tight?*

AZ
Madison, WI

A Though four screws are better than two, it's the lower pair that bear the load. To make your rack roadworthy, fill all of the holes. Forget the "diagonal" approach (i.e., a pair of screws, one upper and one lower) as this will warp the front panel, eventually breaking pots, switches, solder connections, and circuit boards.

The standard rack screw spec is 10-32, where 10 is the screw diameter and 32 is the number of threads per inch. Japanese gear often comes with its own mounting screws, but these are typically metric. As with all hardware, do not use force. Screws should thread with finger pressure. Excessive force will damage the threads in the rail, the screw head, and even the tip of the screwdriver. In addition, the screw may break off in the rail.

If you have any doubts about the rail, try a known, new 10-32 screw from the hardware store. If the rail is inconsistent, buy a 10-32 tap and retap the rail.

Eddie Ciletti
Manhattan Sound Technicians
aka eddieaudio@aol.com

DIGITAL SPLICING

Q *I'm interesting in graduating from analog and buying an ADAT, but I do a lot of splicing and I understand that digital tape is very difficult to edit. Are there any editors for ADAT, like there are for videotape?*

Lisa Bertelli
New York, NY

A There are two easy ways to edit ADAT tracks, but both require extra gear. Digidesign makes a hardware interface that lets you transfer eight tracks at a time between ADAT and Digidesign's Pro Tools or Session 8 hard disk recording systems; once in the hard disk system, editing is far easier than with analog tape. You can then blast the edited data back to ADAT for storage. Otari's RADAR system will soon offer a similar option.

But you don't necessarily need a hard disk recording system to do editing if you have more than one ADAT. The Alesis BRC, which coordinates multiple digital multitracks, lets you accurately bounce data between decks. For example, if most of a solo on Deck 1 works except for a short phrase, you can record that phrase several times on Deck 2, add the required amount of offset to play the right phrase at the right time, then

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PBM II

For more than three-quarters of a century, Tannoy has been designing and producing loudspeaker systems and components to meet the demands of the world's most demanding user. A philosophy of constant research and investment in state of the art materials, technology and processes enables Tannoy to ensure that every monitoring system we produce will re-produce absolute fidelity to the source, true dynamic capability, and most importantly, real world accuracy. This is why Tannoy systems are used in more of the world's professional facilities than any other brand.

In the North American marketplace, Tannoy has been the number one monitor of choice for several years according to the Billboard's international recording and equipment statistics. This clearly illustrates why Tannoy enjoys its reputation as the world's leading manufacturer of reference loudspeakers. In fact, **leading the market is what Tannoy is all about.** While other multi-faceted manufacturers, not dedicated solely to the art of reference monitor loudspeakers, scurry to produce products to compete with Tannoy's original highly acclaimed and award-winning PBM series, **Tannoy moves on.**

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HEAR
BELIEVE

The new PBM II series, once again, is setting new standards in the industry. Pioneering new technologies such as **variable thickness, injection molded cones with nitrile rubber surrounds** are but one fine example of our dedication to perfection. The new molded cones are stiffer than conventional cones producing more linear extended low frequency. They are better damped for reduced distortion and exhibit more naturally open and detailed midrange. They are immaculately consistent and durable for years of faithful trouble free use. From the high power polypropylene capacitors to the hardwired minimilist crossover, every component has been carefully selected for the new breed of PBM II series. When leading edge technology is so affordable, *Get Real.* Don't settle for second best.

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bounce the part over to Deck 1. Because digital decks allow rehearsal modes and gapless punching, you don't have to worry about "record punch-in anxiety."

Craig Anderton
Technology Editor

HOLY BASS

Q *We recently installed new speakers in our 500-seat church. Although we have four 15-inch woofers in our biamped system, there doesn't seem to be enough bass. The speakers are installed in a central cluster set into the ceiling of the church. I have been told that we would get better bass if the loudspeakers were installed as a stereo system on each side of the pulpit. It would be a lot of work to move them now. Is it really necessary?*

David Wrightson
Indianapolis, IN

A Moving the loudspeakers that far won't be necessary. Splitting the loudspeaker cluster into two parts could even reduce its low-frequency output. You may have to reposition the loudspeakers within the central cluster, though.

First, verify the electrical performance. Does the signal reaching the crossover have low-frequency information? Sometimes a bad solder joint or failed component can kill all the bass in the audio signal. Is the output of the crossover wired correctly, lows to low-frequency amp and highs to high-frequency amp? Are all of the loudspeakers wired for the same polarity? Use a 9-volt battery on each low-frequency loudspeaker line to ensure that all of the cones move in the same direction when a positive signal is applied to them. Then ensure that the wiring polarity (hot/positive and cold/negative) is consistent throughout the system — in this case especially after the crossover. If some of the loudspeakers are out of polarity, then they will be sucking up the bass of the other units.

If the electrical connection checks out OK, then take a look at the acoustical connection of the loudspeakers to the room. The loudspeakers should be mounted as close as possible to the grille. If they are set too far back and peer out though a hole in the ceiling, a considerable amount of low-frequency energy never gets into the room. This is similar to the way your home stereo seems to lose some bass when you walk through a doorway into the next room. If possible, the cluster alcove should be completely enclosed so that these relatively nondirectional low frequencies do not get lost in the ceiling void. Be sure to line this enclosure with acoustic foam or fiberglass to absorb the stray high frequencies that can bounce around in there.

Wade McGregor
Consultant
Barron Kennedy Lyzun & Assoc.
North Vancouver, BC

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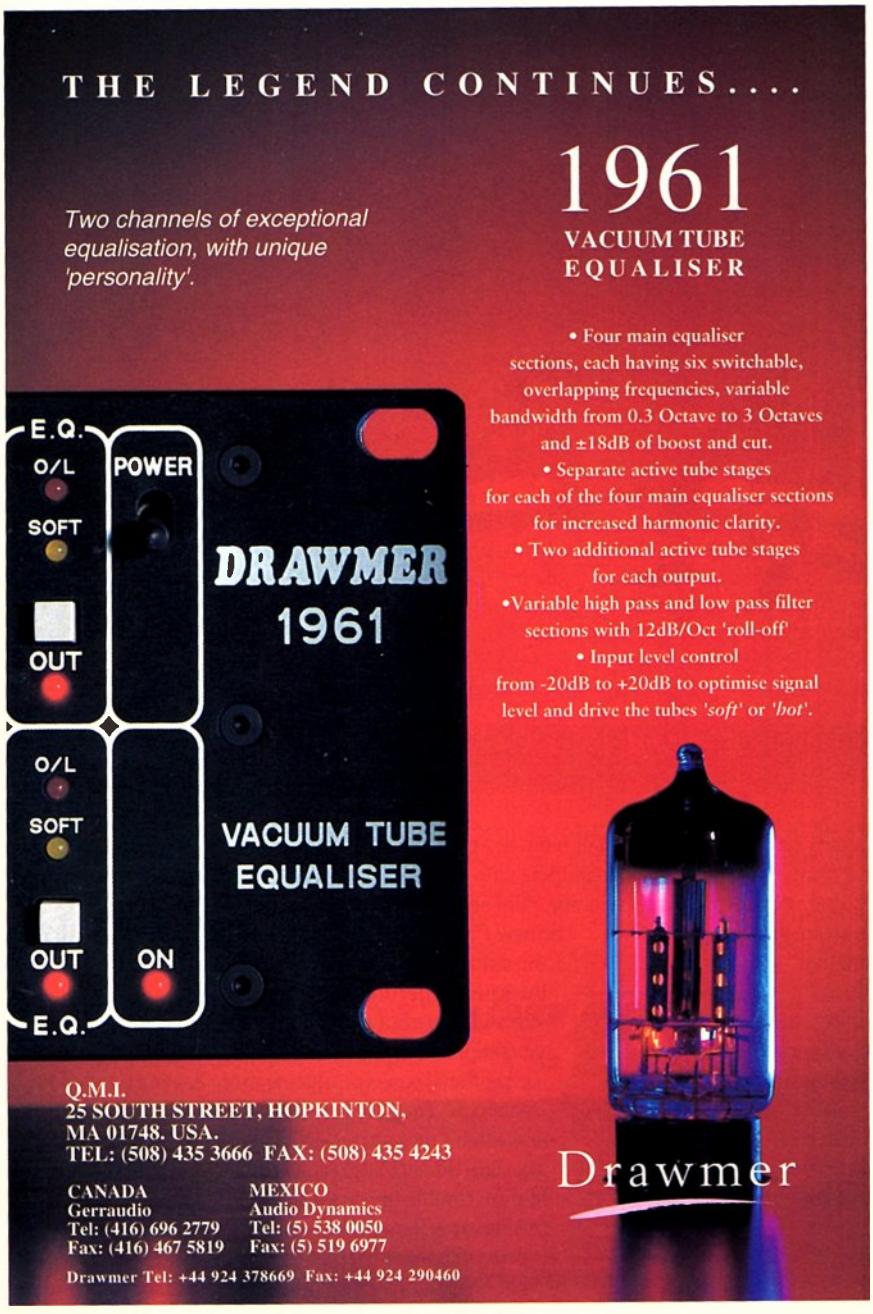

CIRCLE 24 ON FREE INFO CARD

World Radio History

"Obviously, These Guys Are Serious About Audio."

—D&R Orion Review, Mix Magazine

If you weren't aware of how popular D&R consoles have become, we understand. After all, we're not very good at making a lot of noise.

As thousands of D&R owners know, however, it takes more than our 20-bit-ready- noise floor to sound good. It takes more than our acclaimed Hi-Def™ EQs, and our RFI-killing, welded-steel chassis and stargrounding designs.

It also takes attention to a spec few console manufacturers are willing to discuss. We're talking phase coherency—which we tackle head-on by meticulously phase correlating each and every audio stage in every module in every console we craft. The result? Virtually no audible phase shift.

Is all our trouble worth it? Yes. You see, if we settled for "industry standard" phase specs, your music and audio could suffer up to 300% more phase shift. So thanks to our trouble your D&R will deliver sonic ecstacy. Not sonic smear.

Like the magazine said, we're serious. True, maybe we'd have to settle for industry standard performance if we stopped handcrafting consoles, and started assembling them. But we assure you that's another phase we won't be going through.

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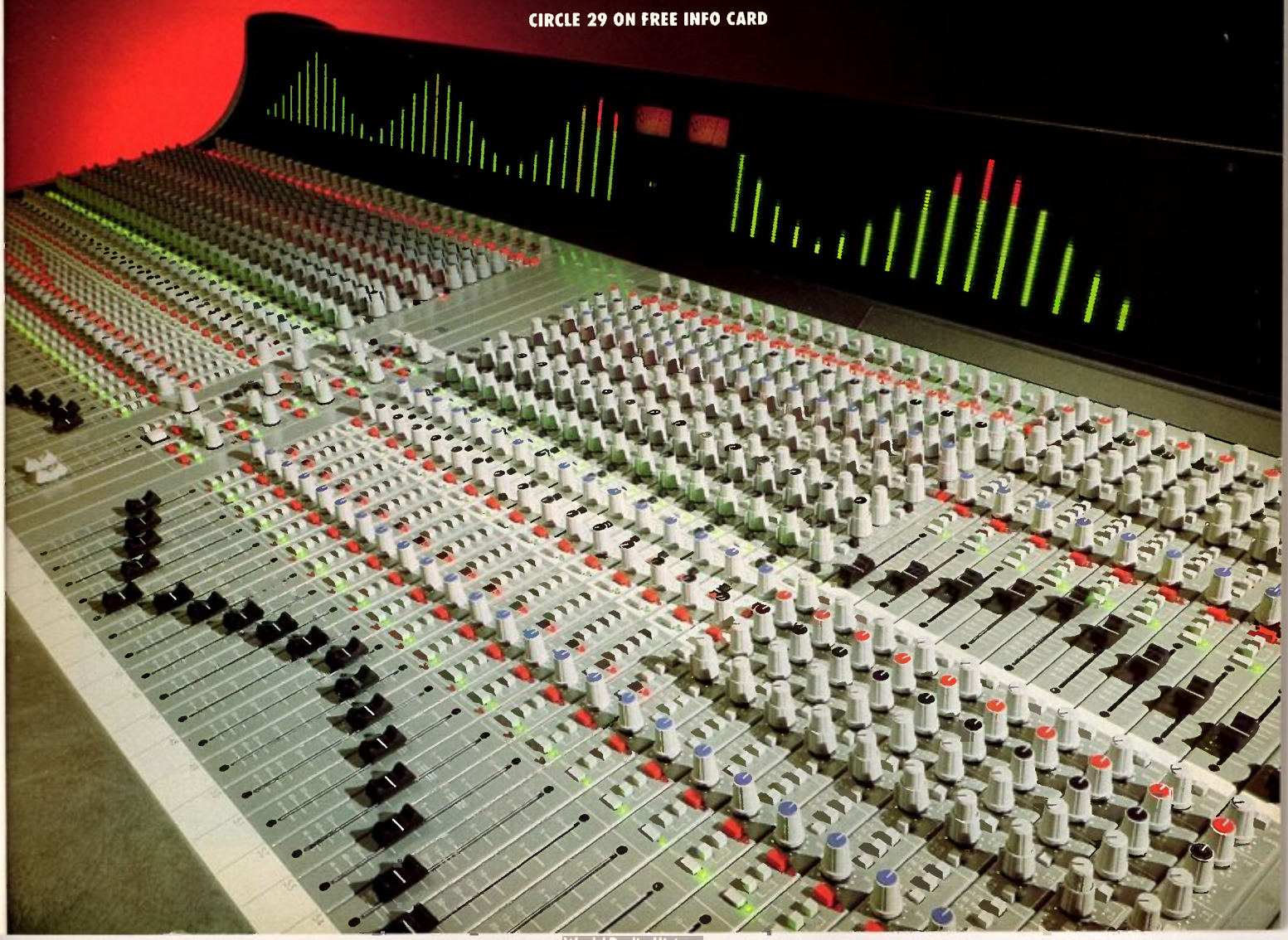


World Radio History

THE FOURTH ANNUAL

The AES Convention in San Francisco ket
latte buzz has worn off, here (in no partic
Ribbon Awards:

BEST OF SHOW

THE DUAL-FORMAT AWARD

TO RANE'S RC-24 PAQRAT

Rane's RC-24 PaqRat recording converter brings into the studio the ability to produce high-quality 18- to 24-bit masters. The RC-24 allows recording and playback of 18-to-24-bit stereo tracks using four 16-bit tracks from a digital 8-track machine such as the ADAT and the DA-88. The PaqRat will be available in two models, the RC-24T and the RC-24A. The "T" model is compatible with the DA-88, and the "A" model is compatible with the ADAT or Fostex RD-8. For the inside scoop, contact Rane Corporation, 10802 47th Avenue West, Mukilteo, WA 98275-5098. Tel: 206-355-6000. Circle EQ free lit. #101.

THE LITTLE BIT CAN GO A LONG WAY AWARD

TO DB TECHS' DB3000

dB Technologies has unveiled its new dB3000 Digital Optimizer, a digital audio processor for sample rate/data conversion, monitoring, and measurement. The 3000 features a sample-rate converter that has 96k of algorithm coefficients. The Acoustic Bit Correction feature offers a dynamic range increase to 18–19 bits on a 16-bit format. Retail price is $4350. For more details, contact Audio Intervisual Design, 1155 N. La Brea Ave., W. Hollywood, CA 90038. Tel: 213-845-1155. Circle EQ free lit. #102.

THE BEST SIBILANCE AWARD

TO THE SOUNDSCAPE SSHDR1

Soundscape has introduced its SSHDR1 hard-disk recorder. It's a 16-bit PC-based system that utilizes professional-quality A/Ds and D/As for both pre- and postproduction applications. The user can expand the SSHDR1 from 8 to 128 tracks. Each unit has 2-track recording with 8-track playback through four outputs, which are configured as two stereo pairs. A maximum of 16 tracks can be used together, synchronized to sample accuracy providing up to 128 tracks. [See an upcoming issue of *EQ* for a full review.] Retail price is $3250. For complete details, contact Soundscape Digital Technology, 705A Lakefield Rd., Westlake Village, CA 91361. Tel: 805-495-7375. Circle EQ free lit. #103.

THE "LESS IS MORE" AWARD TO THE APHEX 107 MIC PREAMP

Aphex has introduced the 107 tube dual-channel microphone preamp. To optimize audio quality, Aphex has designed the 107 to be transformerless in the front end, while high-quality capacitors are used throughout the signal path. A patent-pending tube circuit is used in an intermediary stage in the 107. Equivalent input noise is at –128 Bu. Each preamp channel has its own set of controls, and the front panel has XLR inputs and 48-volt phantom power capability. The 107 preamp is compatible with all microphones and is suitable for both recording and live sound applications. For more details, contact Aphex Systems, 11068 Randall St., Sun Valley, CA 91352. Tel:818-767-2929. Circle EQ free lit. #104.

World Radio History

AL EQ BLUE RIBBON AWARDS

ket our editors and contributors busy. But now that the rticular order) are EQ's picks for our fourth annual Blue

THE WHAT'S UP DAC AWARD

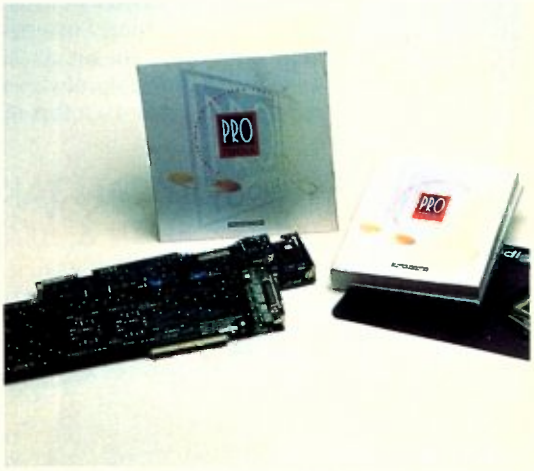
TO TOA'S DACSYS II

TOA has debuted the DACsys II line of digital audio products. DACsys II is capable of supplying over 20 different types of signal processing functions, signal routing, and level control. The computer-controlled line is comprised of two signal processing devices (DP-202, DP-204) and a digitally controlled 8 x 8 analog/matrix mixer(DX-0808). The DP-204 possesses processing functions such as 1/3-octave equalizers, signal delays of 1.3 seconds on each input and output, polarity reversals, full-functioned compressor/limiters, 8- and 16-band parametric equalizers, notch filters, crossover filters, attenuation/gain controls, noise gates, high/low-frequency shelving filters, and CD horn equalizers. It's got both analog and digital in/outs and will have software that is available for MS-DOS, Windows, and Macintosh platforms. The DP-202 has essentially the same features. The only difference lies in the inputs and outputs; the 202 has two of each. For more information, contact TOA Electronics, 601 Gateway Blvd., Suite 300, South San Francisco, CA 94080. Tel: 415-588-2538. Circle EQ free lit. #105.

THE DON'T CALL IT A CLONE AWARD

TO SONY'S PCM-800

Sony has introduced its new 8-track digital audio recorder, the PCM-800. The PCM-800 features both AES/EBU digital and XLR analog inputs/outputs and has external synchronization capability with SMPTE/EBU timecode. Supporting the DTRS audio recording format that utilizes Hi8 tape, the PCM-800 can record eight discrete channels of 16-bit PCM audio at 48 or 44.1 kHz sampling rates. By using the Sony DABK-801 interface board, as many as 16 PCM-800 recorders can be linked together. List price is $5995. For the full story, contact Sony Electronics, Business and Professional Products Group, 3 Paragon Drive, Montvale, NJ 07645. Tel: 1-800-635-7669. Circle EQ free lit. #106.



THE PAT REILLY THREE-PEAT AWARD

TO DIGIDESIGN'S PRO TOOLS III

Digidesign announced Pro Tools III, the latest addition to the Pro Tools series of digital audio workstations. It provides up to 48 tracks of record/play and 64 analog or digital channels of I/O. Included on the Pro Tools III system is one Disk I/O, a NuBus card that supports SCSI hard-disk connection for up to 16 tracks of record/play for one or more hard disks, and one 8-channel audio interface. Also, you get the Pro Tools III application software, TDM-enabling software, and DAE, the Digidesign audio operating system. Disk tracks are added in 16-track increments by purchasing a Pro Tools III Expansion Kit that includes a Disk I/O card and DSP Farm. The Expansion Kit expands your existing system by 16 tracks of record/play capability. Retail price for the Pro Tools III system is $6995. For the inside scoop, contact Digidesign, 1360 Willow Road, Menlo Park, CA 94025. Tel: 415-688-0600. Circle EQ free lit. #107.

BLUE RIBBON NOMINATING COMMITTEE

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THE DELAYED REACTION AWARD
TO THE YAMAHA D5000

Yamaha is offering the new D5000 digital delay, which packs 20-bit AD/DA conversion and new features like sampling capabilities, delays, and on-board effects. Each delay has delay times of up to 5200 milliseconds in stereo mode or 10,400 milliseconds in mono mode. The D5000 offers three independently programmable delays per channel in stereo mode or six delays in mono mode. The Capture mode allows the engineer to save a portion of a performance on the fly and trigger it for insertion into a live or recorded program. The Sample and Hold feature gives the engineer freedom to set certain parameters specifying when to begin recording and by what specifications the segment should be recorded. Retail price is $1499. For further details, contact Yamaha Corporation of America, P.O. Box 6600, Buena Park, CA 90622. Tel: 714-522-9011. Circle EQ free lit. #108.

THE YOU CAN TAKE IT WITH YOU AWARD
TO THE ALLEN & HEATH GL4

Allen & Heath unveiled its new front-of-house desk, the GL4. Aside from its FOH functions, the GL4 can operate as a full-function monitor desk offering 10 mixes plus wedge/cue mix. The console is available in 24-, 32-, and 40-channel models. There are eight subgroups and eight programmable mute groups that also offer external MIDI control. All inputs feature a high-pass filter, four bands of full-sweep EQ, and 10 aux sends per channel with 10 separate level controls. The first four auxiliaries are selectable pre or post via a switch on the front panel, as are the second four, and the final two. To find out what else the GL4 can do, contact Allen & Heath, 8760 South Sandy Parkway, Sandy, Utah 84070. Tel: 801-568-7660. Circle EQ free lit. #109.

The Lexicon Reflex Dynamic MIDI reverberator.

Our new **Reflex Dynamic MIDI™ Reverberator** is one *serious* piece of Lexicon gear that gives any studio the famous Lexicon sound on a project studio's budget.

Reflex offers the famous Lexicon sound, with **eight stunning algorithms** to bring new dimensions to your recordings. There's reverb, rich chorusing and echo effects, flanging, multi-tap delays and a **unique resonator** program — a total of **112 Presets.** And **128 User Registers.**

The new Hall algorithm includes two elements derived from our top-level processors, for **the most realistic reverb available** in its class.

Lexicon's randomization process **reduces coloration** and improves the character of longer reverb tails. Additionally, a pair of early reflections is available, allowing you to increase the audibility of a stage or walls, resulting in **incredibly realistic hall and room simulations.**

Reflex also incorporates

World Radio History

THE ESI DOES IT AWARD

TO E-MU'S ESI-32

E-mu Systems has released the ESI-32, a 32-voice digital sampling instrument featuring Emulator IIIx audio resolution. The ESI-32 can be expanded to 32 MB of RAM. It features compatibility with Emulator IIIx, EmaxII and Akai S1000/S1100 sound libraries; two channels of 128x oversampling sigma/delta analog-to-digital conversion; 32 4-pole digital resonant filters; and more. The user can expand the unit by using a 270 MB 3.5-inch SyQuest removable media drive, RAM memory, and the inclusion of a SCSI 50-pin port and S/PDIF Digital I/O. Retail price is $1495. For complete details, contact E-mu Systems, Inc., 1600 Green Hills Road, P.O. Box 660015, Scotts Valley, CA 95067-0015. Tel: 408-438-1921. Circle EQ free lit. #110.

THE GREAT VU AWARD

TO THE PEAVEY DELTA VU METERING SYSTEM

Peavey has released the new Delta Vu metering system. The Vu provides a simultaneous view of the peak and average (Vu) characteristics of a signal. On the front panel is a display of linear LEDs that are illuminated when a signal reaches full peak value. The average value of the signal is then used to turn off the LEDs. The result, as Peavey states, is a floating bar of illuminated LEDs, with the top of the bar indicating the peak value and the bottom of the floating bar indicating the average value. The frequency response of the Delta Vu is 20 Hz to 20 kHz, with an input range of –10 dBv to +4 dBu. For details, contact Peavey Audio Media Research, 711 A Street Meridian, MS 39302-2898. Tel: 601-483-5376. Circle EQ free lit. #111.

THE SOUNDS OF SILENCE AWARD

TO CEDAR AUDIO'S DH-1

CEDAR Audio has launched the DH-1, a rack-mount device that removes broadband noise in real time without using signal-destructive filters and without the need for encoding/decoding. The DH-1 shares the following standards with the DC-1 De-Clicker, CR-1 Crackle Remover, and the AZ-1 Azimuth Corrector. The frequency response on the DH-1 is 5 Hz –24 kHz, with THD at <.005. To get the inside scoop, contact Independent Audio, 295 Forest Ave., Suite 121, Portland, ME 04101-2000. Tel: 207-773-2424. Circle EQ free lit. #112.

The affordable new standard in reverberation.

Lexicon's Dynamic MIDI™, allowing real-time control of effects parameters via MIDI. For example, the mod wheel on your keyboard can control Reverb Decay Time, or alter the pre-delay from a drum machine snare hit. Plus, Reflex lets you slave delay times to MIDI tempo and do MIDI bulk data dumps. Reflex works with any existing LXP-1 editor, such as our MRC MIDI Remote Controller.

Of course, Reflex is at home not only in the studio, but in musician's racks as well. Reflex is part of the same Performance Series as the Alex, JamMan and Vortex — all extraordinary processors which maintain Lexicon's impeccable standards for sound quality.

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THE WHAT THE HELL'S AN AXIOM AWARD

TO THE SSL AXIOM

Solid State Logic introduced the Axiom Digital Production System. The Axiom is a fully automated and digital mixing console, with frame sizes ranging from 48 to 96 channels. There is an integral hard-disk audio storage/editing management system that provides multiconsole access to central I/O resources. SSL's DiskTrack offers recording, playback, and editing of up to 95 channels of digital audio, and enables multiple control rooms to share access to analog and digital I/O resources. Integrated reverb and delay effects are standard features in the Axiom. All 95 tracks can simultaneously be in record and playback, doubling the number of useful tracks. For information, contact Solid State Logic, 320 West 46th Street, New York, NY 10036. Tel: 212-315-1111. Circle EQ free lit. #113.

THE ALL CAPS AWARD

TO THE BSS OMNIDRIVE SPEAKER MANAGEMENT SYSTEM

BSS has announced its new OMNIDRIVE Loudspeaker Management System. OMNIDRIVE includes two channels of four-way crossover, parametric equalization, phase correction, delay line, and limiters in a 2U chassis. The system offers no less than 60 user-programmable memories for storage of system/venue setups that can be password protected. With OMNIDRIVE, the automatic adjustment of delay times as ambient temperature changes and the correction of HF response with humidity changes are an option, when using the Meteorology Probe, a plug-in device. The system offers a dynamic range of better than 105 dB and accepts analog or digital signals through a choice of input/output cards. For more details, contact BSS Audio, 8500 Balboa Blvd., Northridge, CA 91329. Tel: 818-894-8850. Circle EQ free lit. #114.

THE HEY, DIDN'T IT WIN LAST YEAR TOO AWARD

TO THE FOSTEX FOUNDATION 2000RE

Fostex's Foundation system won last year, but this year's award is for the project studio version, dubbed the Foundation 2000RE digital audio recorder/editor. The unit is a full-featured 16-channel, 8-output digital audio device that shares the same Removable Project Environment (RPE) file format common to all Foundation systems. It allows facilities to share data between satellite 2000RE editors and fully configured Foundation 2000 editing and mixing "mother ships." Retail price is $8995. For the inside word, contact Fostex Corp. of America, 15431 Blackburn Ave., Norwalk, CA 90650. Tel: 310-921-1112. Circle EQ free lit. #116.

THE TOTALLY AUTOMATED AWARD

TO THE SOUNDTRACS TOPAZ AUTOMATION SYSTEM

Soundtracs is introducing a new VCA fader and mute automation system for its Topaz 24- and 32-channel consoles. This system is capable of running on any 386-or-faster PC in the Windows environment. Synchronized to MIDI timecode, the system can replay fader events with frame accuracy, and mute events with 1/4-frame accuracy. Off-line editing facilities allow the user to zoom in on any fader and independently edit its fader graph and mute on/off events. To get the inside word, contact Samson Technologies, P.O. Box 9068, Hicksville, NY 11802-9068. Tel: 516-932-3810. Circle EQ free lit. #115.

Z-MISSING LINK AWARD

TO Z-SYSTEMS' Z-LINK

Z-Systems has released the z-link and z-link+ sample-rate converters. Both converters share the same audio path as the Z-System z-1src sample-rate converter, but in a smaller package. The z-link and z-link+ are based on the Analog Devices AD1890 asynchronous sample-rate-converter chip. Digital audio inputs at any sample rate between 25 kHz and 55 kHz are accepted by both units. The digital audio output is at 44.1 kHz or 48 kHz in either professional (AES/EBU) or consumer (S/PDIF) mode. One feature that sets the z-link+ apart from the z-link is its ability to synchronize to an external AES/EBU or S/PDIF reference signal. Retail prices are $349 and $549, respectively. For more information, contact Z-Systems Audio Engineering, 4641-F NW 6th Street, Gainesville, FL 32609. Tel: 904-371-0990. Circle EQ free lit. #117.

World Radio History

"ONCE YOU'VE REACHED THIS STAGE, YOU'D BETTER HAVE YOUR ACT TOGETHER."

After more than 20 years of touring with **Pink Floyd**, monitor engineer **Seth Goldman** has some firm opinions about music and microphones.

"Pink Floyd's live performances are complex, both technically and artistically," says Seth. "There's just no margin for error. For this tour, I'm using 48 Shure microphones on stage, including eight Beta 87s for vocals. Their extended highs are outstanding. So is the gain before feedback. And reliability is a given. I have full faith in every one. They've earned it."

Shure Beta. It may be just what you need to reach the next big stage in *your* career.

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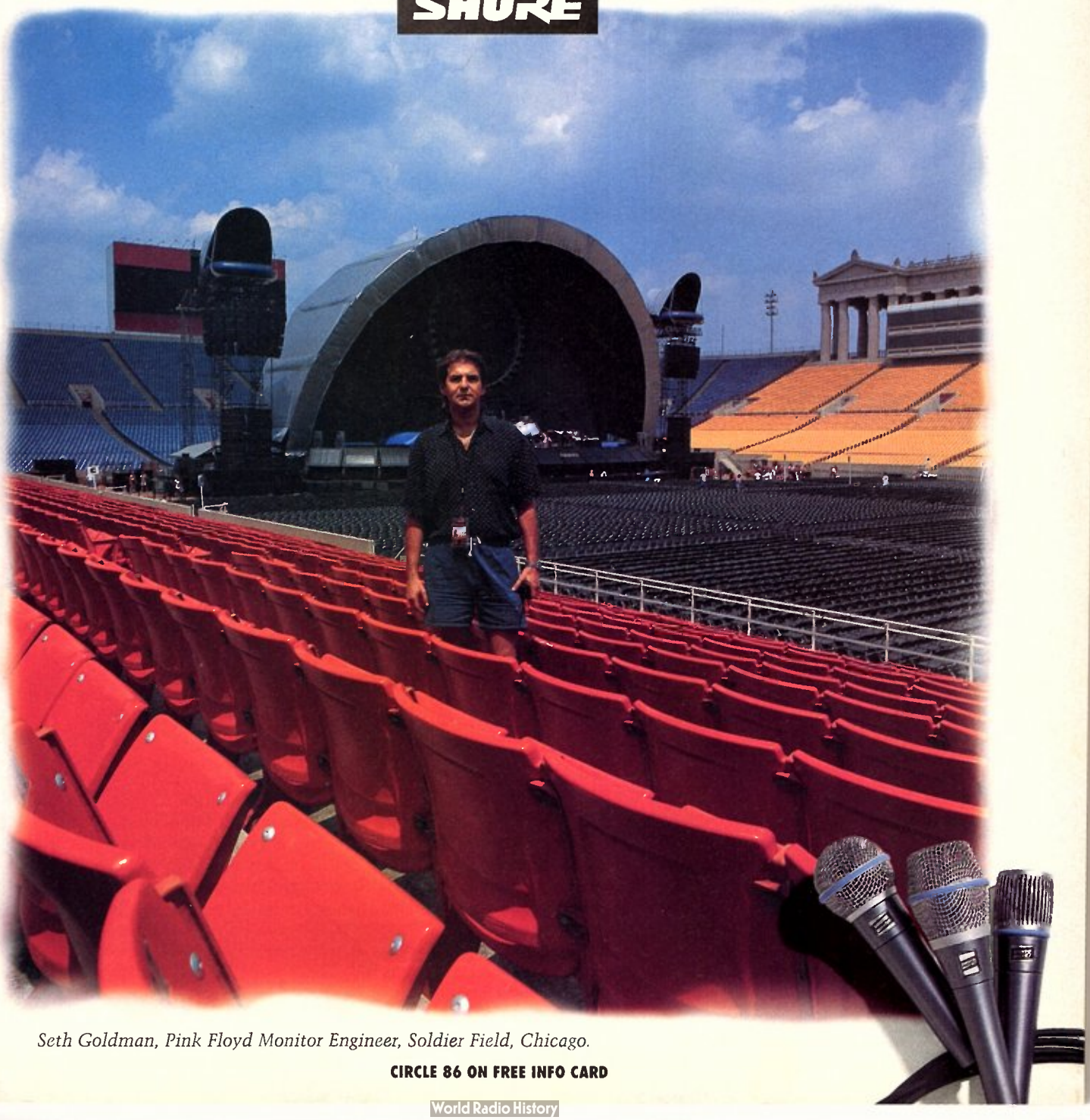


Seth Goldman, Pink Floyd Monitor Engineer, Soldier Field, Chicago.

CIRCLE 86 ON FREE INFO CARD

World Radio History

THE PORT-A-DAW AWARD

TO THE ROLAND DM-800

Roland unleashed the new DM-800 multitrack hard-disk recorder. The DM-800 is an 8-track system that is fully portable. In one chassis lie the 8-track recorder and 12-channel mixing system — the unit weighs in at a little over 12 lbs. An optional ADAT communication bus, video display output, an optional RS-422 interface, 300 virtual tracks, full dynamic automation, MIDI integration, and time compression are noteworthy features on the DM-800. The large LCD allows the user to see meters, time location, waveform, and edit and track information. Outputs for S-Video, Composite, and RGB are on the rear panel if you need a larger display. Support for both NTSC and PAL are standard. Other featured highlights on the DM-800 include pitch correction; music editing by bars and beats, EQ, and pan; and 24-bit nondestructive internal track bouncing. To get on track, contact Roland Corporation U.S., 7200 Dominion Circle, Los Angeles, CA 90040-3696. Tel: 213-685-5141. Circle EQ free lit. #118.

THE HERTZ SO GOOD AWARD

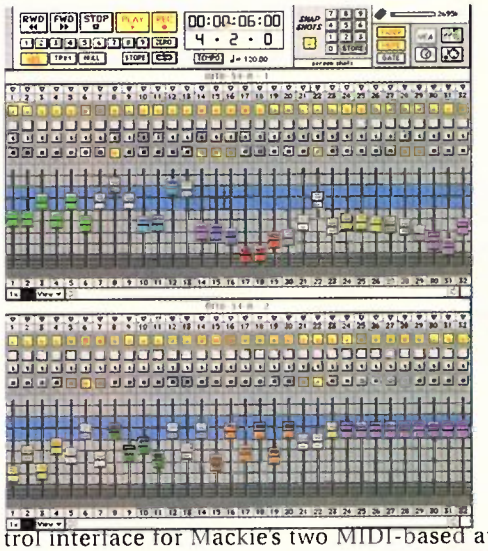
TO THE PIONEER D-9601

Pioneer has debuted the D-9601, its new professional DAT machine that boasts a 96 kHz sampling frequency. The ability to operate at 96 kHz overcomes the band limitations of the standard CD format. The D-9601 has a frequency response of 2 Hz to 44 kHz. Three types of playing modes are offered: standard, long play, and wide bandwidth. Recording and playback of characters (titles, performers' names, etc.) can be arranged based on the character pack format. The D-9601 provides recording and playback of the table of contents with high-speed search. For more details, contact Pioneer Electronics Inc., 2265 East 220th Street, Long Beach, CA 90810. Tel: 213-PIONEER. Circle EQ free lit. #119.

THE HOLD ME, THRILL ME, SQUEEZE ME AWARD

TO THE SYMETRIX 488

Symetrix has released the 488 DYNA-Squeeze, an 8-channel compressor/interface for use with today's new generation of digital recorders. The 488 allows the user to optimize recording levels and "squeeze" more information into the recorder's dynamic acceptance window while providing eight channels of level-matching interface (+4 dBu to –10 dBu). To help prevent the A/D converters from clipping, the 488 controls levels that are too high, allowing for more signal to be "pushed" toward the recorder for optimum recording volume. Levels that are too low fall into the digital noise range and can be recorded with resolutions as low as 4-bit. Retail price is $579. For more details, contact Symetrix Inc., 14926 35th Ave., W. Lynnwood, WA 98037. Tel: 206-787-3222. Circle EQ free lit. #120.



THE BUT WHEN WILL WE SEE IT AWARD

TO MACKIE'S ULTRA-MIX PRO AUTOMATION SOFTWARE

Mackie Designs has introduced UltraMix Pro, a new automated mixing software program for the Macintosh. UltraMix Pro provides a control interface for Mackie's two MIDI-based automation hardware modules, OTTO-1604 and OTTO-34. The new software offers simultaneous playback of standard MIDI files. UltraMix also supports all the multitasking features of Opcode's OMS 2.0. Features on the UltraMix Pro include graphic fader curve adjustment, full graphic editing of all mix data, a two-page monitor facility, the subgrouping of any or all channels, a multilevel event editor, simultaneous control of OTTO-1604 and OTTO-34 modules, and full multitasking capability with popular hard-disk recording systems. For the inside word, contact Mackie Designs Inc., 16620 Wood-Red Road, Woodinville, WA 98072. Tel: 800-898-3211. Circle EQ free lit. #121.

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WHEN LESS MEANS MORE!

Introducing THE PEAVEY DPM® C8p

A SMALLER, MORE PORTABLE VERSION OF THE ACCLAIMED DPM® C8 MIDI CONTROLLER ~ FOR LESS.

For years the Peavey DPM C8 has been the industry standard for MIDI controllers. And its beautiful craftsmanship and superior software have kept it at the top ot the list.

Now Peavey introduces a stream-lined version of our acclaimed C8... the DPM C8p. Like the C8, the C8p has the same Peavey reputation for top quality performance. The BIG difference is that the C8p has a more compact design AND A LOWER PRICE TAG.

The C8p was designed for situations where room and carrying space are a concern. It would be great to have that beautiful C8 on stage every where you play, but we are aware of some of the obstacles musicians find on the road.

On the C8p, we've taken off the bulk of the wood, removed non-essential hardware*, rearranged some of the features (like placing the control wheels on top of the unit), and simply made it more sleek and compact in the process.

The C8 architecture has become so popular that we want to make it more available to everyone, by not only chopping the chassis down a bit, but also the price.

So drop by your local Peavey dealer now and ask to see the new C8p. Another Peavey family member with more bang for the buck.

* Disk drive not included.

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Look for Cable Up! at your dealer today—"Your Best Connection For The Best Connection."

CABLE UP

STUDIO PROVEN ACCESSORIES

CIRCLE 63 ON FREE INFO CARD

THE CAUSE OF EFFECTS AWARD

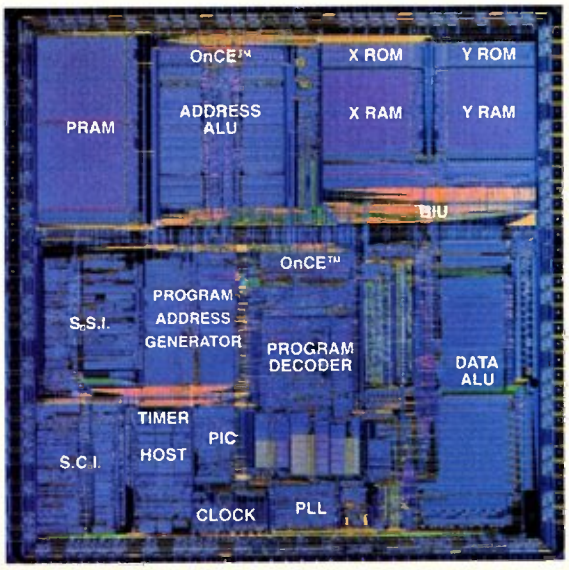
TO THE LEXICON PCM-80

Lexicon unveils its latest digital processing unit, the PCM-80 reverb and effects processor. The unit is a true stereo effects processor that has both digital and balanced analog interfaces, 18-bit conversion, and a 24-bit internal digital bus. Digital and analog inputs can be mixed together. Breathing life into the PCM-80 is the Lexichip II, which runs in tandem with Motorola 56002 chip, a fellow Blue Ribbon winner. A proprietary digital audio and control bus links the two chips together, controlled by another Lexicon chip. The PCM-80 has 200 presets that cover an array of applications. A new feature called the Dynamic Patching maps and custom scales control data from any of the 143 external and internal control sources to any effects parameter. The PCM-80 also offers a pair of dynamic spatialization processors that enable the user to place delay effects and reverbs virtually anywhere — even beyond the speakers. List price is $2500. For details, contact Lexicon, 10506 Rockvale Rd., Rockvale, TN 37153. Tel: 615-274-2261. Circle EQ free lit. #122.

THE SPEEDY GONZALEZ AWARD

TO THE MOTOROLA 56002 DSP

Motorola introduced the new and improved version of its 56002 DSP. The updated version of the 56002 operates at a speed of 66 MHz and is geared toward speed-hungry applications such as digital audio. The 56002 delivers 33 million instructions per second or 198 operations per second with a 30.3-nanosecond instruction cycle time. Also added to the updated version is a 24-bit timer/event counter that Motorola boasts can eliminate the need for an external timer. A 512-word on-chip program RAM, two 256-word data RAMs, and two preprogrammed data ROMs are standard features on the 56002. Peripherals include a host interface, a synchronous serial interface (SSI), an asynchronous serial communication interface (SCI), and an integrated phase-lock loop-based clock circuit (PLL). Confused? Just know that this thing is fast! For details, contact Motorola, 6501 William Cannon Drive West, Austin, TX 78735. Tel: 408-764-0782. Circle EQ free lit. #123.



World Radio History

SCENE ON THE AES FLOOR

Our opinionated view of what's happening in the recording and sound biz at the dawn of the new year

Once again, San Francisco seemed to be the right home for the audio engineering community to pow-wow in, with attendees buzzed from innumerable lattes and cappuccinos and with the new Moscone Center building setting the stage for the audio businesses merger with the nearby Silicon Valley and Multimedia Gulch...Yeah, this was the show that proved that the age of digital is upon us big time. Just one look around the floor proved that the 24-track analog/digital multitrack has some stiff competition, with few machines being used anywhere except at those expected displays at **Studer, Sony, TASACAM,** and **Otari**...ADATs and DA-88's were everywhere, both to demonstrate equipment and to make the news...Big news for **TASCAM** was the announcement that **Sony** has joined the 8mm camp with its own model and a new format called DTRS (catchy, huh?)...Meanwhile, those clever rock 'n' rollers at **Alesis** had their own surprise up their sleeves with the announcement that **Panasonic Professional** was joining the ADAT format with a forthcoming hyper-drive Super-VHS model expected this spring...Meanwhile, everybody and their brother were announcing one allegiance or another, with innumerable announcements of interfaces for transferring multiple channels of digital audio in the project studio. **Digidesign, Otari, Kurzweil, Roland,** and a zillion other companies announced that they are hooking into both types of affordable digital multitracks...And while nobody is about to proclaim that 2-inch tape is dead, there seemed to be an increasing number of alternatives cropping up throughout the business, in all formats...A new generation of DATs has arrived, having thrown off the last vestiges of being a consumer product. The new **TASCAM** DA-30 MKII and DA-P1, **Panasonic** SV-4100, and **HHB** portable DATs are thoroughly professional 2-tracks...With it being San Francisco, it was not surprising to see that the hard disk is also becoming a serious alternative to tape-based systems. In addition to the completion of **Otari**'s RADAR (finally!) and the new **Avid** AudioVision DPR, **Roland** and **Digidesign** introduced hard-disk recorders of their own. Exciting news from **Fostex** was its Foundation 2000RE, an 8-track hard-disk recorder that comes complete with software, 8 x 8 analog I/O, MIDI Machine Control, and an edit controller. And even though it was pricey, you can't ignore **SSL**'s entry into the hard-disk market with its DiskTrack Digital Hard-Disk Recorder/Editor, really an audio server for the platinum studio of today and tomorrow (did anybody notice that two of SSL's sales of its new J Series console were to project studios for **Whitney Houston** and **Reba McEntire**?)...Talking storage, one of the biggest stories at AES actually took place the day after the show in Las Vegas at COMDEX (another computer coincidence) where **E-mu's** parent company, **Creative Labs,** shocked the pants off the PC dweebs and the record business with the announcement of an under-$2000 Digital Edge write-once external CD-R deck for multimedia PCs without Serial Copy Management System. E-mu isn't talking about a pro unit, but imagine what smart audio/computer companies such as **Digidesign, TimeLine,** or **Spectral Synthesis** could do with an add-on box like this?...**Peter Gotcher**, **Digidesign's** president, was looking mighty prosperous, as you'd expect, while Pro Tools III again looks extremely appealing with a maximum 48 tracks of record/play capability and up to 64 channels of I/O. Then again, this is not a one-horse race by any means. **Spectral Synthesis** is back on track with an exciting new interface developed by **Stephen St. Croix** who put on the best demo of the show (other than **Phil Ramone** at the **AT&T** booth)...And keep an eye on the **TimeLine** crew, which, under the direction of **Gerry Block** and **Steve Smith,** gets our Phoenix Award for having risen from the ashes (or should that go to **Fairlight** and **Wayne Freeman**?)...A few more words on computer stuff before we stray...Automation is an increasing presence in the project studio market as evidenced by **CAD,** which premiered the MegaMix 500 Series (inboard) as well as the MegaMix MR Series of automation systems. **Mackie** was showing its Ultramix program for the 8-Bus Series in a private hotel demo (it looks amazing, but when will it finally ship?), while **Soundtracs** was on the floor and ready to sell its automation package for the Topaz. **JLCooper** introduced the VDesk automation system, which can be hardware-retrofitted to many consoles...Computer-controlled audio processing also made a strong showing at Moscone with the DACsys II from **TOA,** the Platform system from **JBL/UREI,** and a multitude of Pro Tools-compatible software plug-ins from **Apogee Electronics, Waves, Lexicon,** and **Jupiter Systems**...More bits! That's what everyone was talking and that's what everyone at AES seemed to want. Slowly but surely, the industry is shifting from 16 to 20 bits. This is crucial if digital is ever going to reach dynamic-range parity with quality analog systems. Did anyone catch the 22-bit A/D converter from **dB Technologies**?... While the prices of multieffect units have been steadily dropping, many users have found that the reverberation quality from such devices is not as smooth as it might be from a stand-alone unit. At this year's AES, several manufacturers introduced new reverb-only boxes with simple operation, high-quality reverb, and at an extremely affordable price tags. Product intros came from **Yamaha** (the REV100), **Lexicon** (the Reflex), and **dbx** (the Model 290)...Talking signal processing, what about those tubes? Everybody's favorite space heater is making a major-league comeback for the project studio market (not everybody has $3000 to blow on a **Pultec** EQ). Filling this niche are several new products. **Groove Tubes** showed a new line of tube gear, which included the MP1 mic pre, the CL1 compressor/limiter, and the EQ1 equalizer. **TLAudio** introduced two new models, the Dual-Valve Mic Pre-Amp/DI and the Dual-Pentode Valve Pre-Amp. **RSP Technologies** introduced the Saturator, touted as the "only product designed specifically to provide warmth for digital recordings." If you are running short on rack space, have a listen to the **Aphex** "Tubessence" mic preamp, which packs two channels of thermionic mic pre into a single rack space. And you might have missed a new company named **Rolls,** which was showing its RP2230 2-channel valve mic preamp that lists for only $500...And before we close we can't help tooting our own horn. **EQ** previewed our first CD-ROM, containing 30 back issues packed onto a single CD, with an easy-to-use interface and a dual-platform design. **EQ**

World Radio History

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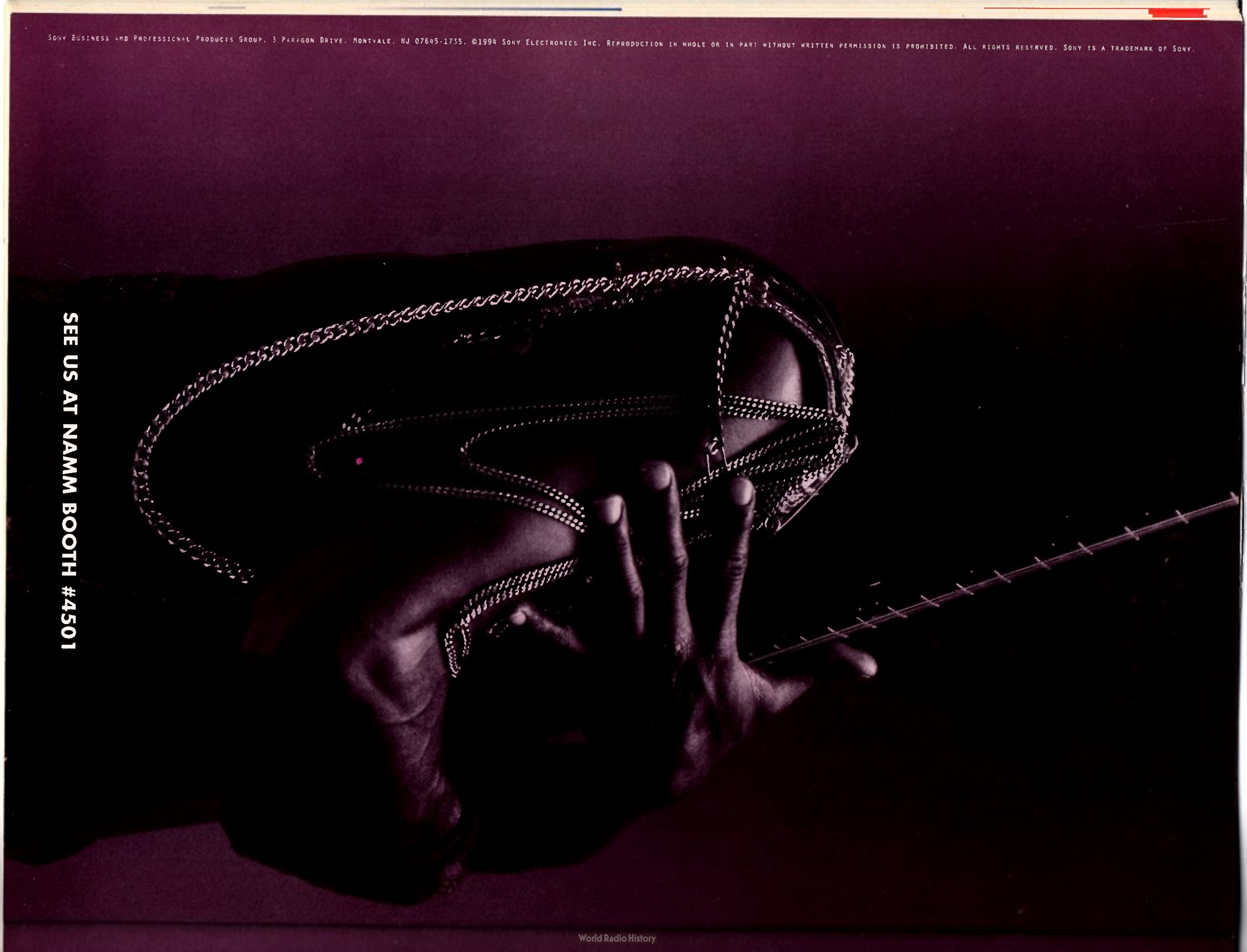

SEE US AT NAMM BOOTH #4501

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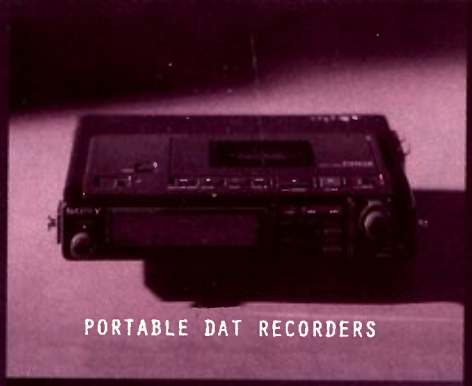
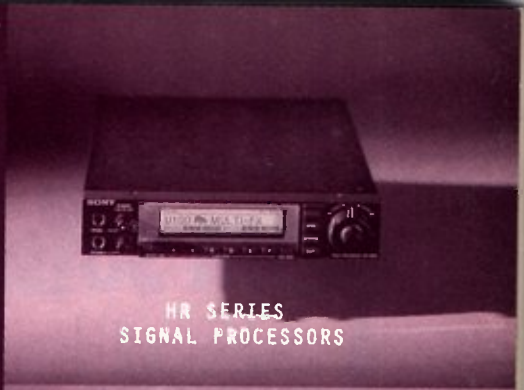


PORTABLE DAT RECORDERS



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World Radio History

MDM Software Upgrades

Alesis and TASCAM have both introduced new software for their digital multitrack systems. Here's what the upgrades mean for you...

BY CRAIG ANDERTON

Modular digital multitracks continue to evolve, not only to remain competitive with other formats, but in response to customer feedback. Now, both Alesis and TASCAM have released new software for their respective digital multitracks and synchronizers.

ALESIS ADAT SYSTEM 4

Alesis's ADAT System 4 and BRC System 2 software enhance the operation of multiple ADAT machines under control of an external synchronizer (e.g., the BRC). Since the update changes how the synchronizer and recorders communicate, if you upgrade one you must upgrade the other.

The main reason for users of standalone ADATs to upgrade is the ability to use T-180 tapes (made by Ampex and Maxell), which yield 62 minutes of recording time at 48 kHz (67 minutes at 44.1 kHz). This is particularly useful for video postproduction applications, since projects often run over 40 minutes (ADAT's previous limit).

QUICKER LOCKER UPPER: TASCAM DA-88

MORE TIME WITH LESS TAPES: With the new software, ADATs can now use T-180 tapes.

System 4 also adds these features:

- Optional recording over write-protected tapes.
- The AI-2 can now serve as a master sync source. Using ADAT's front panel transport controls causes the AI-2 to generate timecode (LTC and MTC).
- Compatibility with Digidesign's SMPTE slave driver. This can be important when using Digi's ADAT interface to transfer digital audio between ADAT and Digidesign's hard-disk recording products.

System 2 for the BRC adds these features and capabilities:

- Optional one-button recording — just hit record while in play mode to punch in.
- Park Point offset. This helps the BRC and slave ADATs lock to external SMPTE timecode by allowing them to keep playing for up to 6 seconds after timecode reception has stopped. This compensates for video decks that stop sending timecode before the transport actually stops, causing the video deck to "park" ahead of the ADATs. The offset lets the ADATs park in the same place, thus minimizing "catch-up" time.
- You can record-enable tracks on the ADAT, and the BRC will reflect this.
- Locate indicator — the fast forward and rewind buttons flash until all ADATs have completed a locate.
- Copy song can now include a SMPTE start offset time.
- Improved ability to read external SMPTE sync; MTC generation now holds to a consistent 1/4-frame boundary, free from 1/4-frame (8 ms) static offsets.

Both updates are free to units under warranty, otherwise there's a nominal charge. BRCs below system 1.04 and ADATs below system 3.06 need some hardware modifications in addition to the software change; for newer units, a chip change is all that's required. Contact Alesis at 3630 Holdrege Avenue, Los Angeles, CA 90016. Tel: 310-558-4530. Circle EQ free lit. #124.

TASCAM DA-88 UPDATE

TASCAM has been listening to its DA-88 users, and software version 3.03 is the result. This update adds several features, such as

- Faster lockup time and dropout protection in chase mode.
- Faster tape formatting, and slaves can format while chasing the master machine in a multimachine system.
- Streamlined operating system to improve access to advanced features.
- Reduced cleaning time.
- Improved autolocation and automated operations (e.g., easier entering of in and out points, the ability to enter rehearsal mode, and auto in/out at any time).

There is also an update (version 3.06) to the SY-88 sync card that provides full implementation of the Sony P-2/9-pin protocol (including VTR emulation) for direct interface to video editors. The update also offers improved lockup time thanks to a Park Position offset parameter, and the ability to accommodate a variety of MIDI Machine Control messages.

The software updates themselves are free, but there are shipping and handling charges of $15 for the first DA-88, $10 for each additional unit, and $15 for the SY-88. Contact TASCAM at 7733 Telegraph Road, Montebello, CA 90640. Tel: 213-726-0303. Circle EQ free lit. #125. EQ

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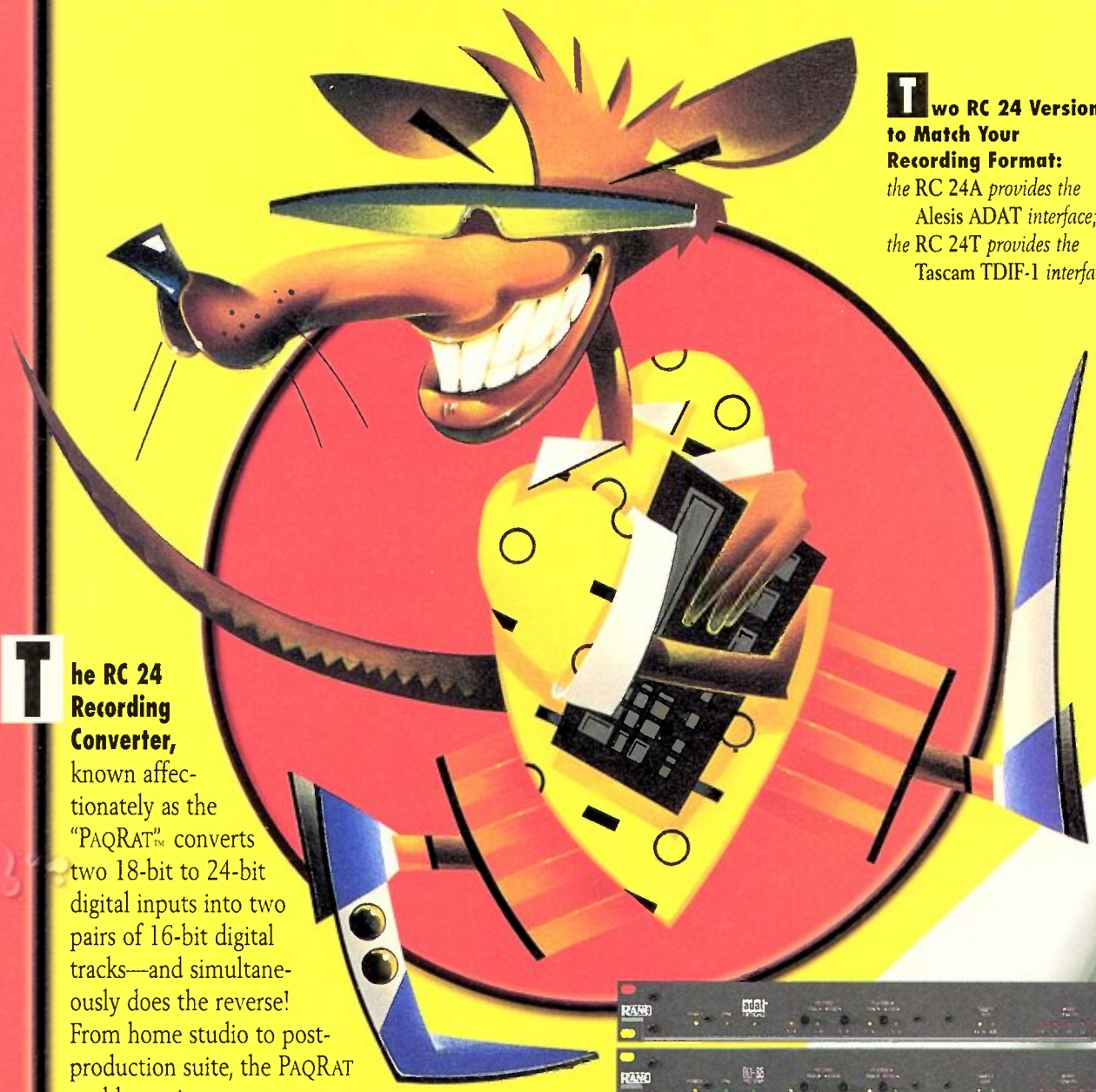
INTRODUCING

PAQRAT™

Record 18 to 24 Bits On Your 16-Bit Multitrack Recorder



Two RC 24 Versions to Match Your Recording Format:
the RC 24A *provides the* Alesis ADAT *interface;*
the RC 24T *provides the* Tascam TDIF-1 *interface.*

The RC 24 Recording Converter, known affectionately as the "PAQRAT"™ converts two 18-bit to 24-bit digital inputs into two pairs of 16-bit digital tracks—and simultaneously does the reverse! From home studio to post-production suite, the PAQRAT enables an instantaneous quantum leap in digital capability from these recorders:

- Create 20-Bit Masters On Your 16-Bit Recorder
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The Truth About Yes's "The Calling"

The secrets behind Yes's hit song are revealed by producer/band member Trevor Rabin

EQ: In the introduction to the song "The Calling" there are two guitars playing, each panned to one side. The guitar on the right sounds like it could have been an electric guitar taken direct, but it doesn't have the characteristic tinny quality of a DI'd guitar.

Trevor Rabin: I think it's partly because I hate that sound [laughs] that I try to steer away from, but it is a DI. My studio is one big room and in order to record live guitars I would have to put on headphones and duct tape them to my head to get any isolation. I used to go to an outside studio to do guitars but that became creatively counterproductive. I wanted to be able to pick up a guitar, plug in, and get any sound I wanted. So I tried a variety of guitar processors such as the Zoom unit and the Korg A-series to simulate the sound of my guitar-amp combination. I decided on the Korg A3 and proceeded to spend many weeks programming the unit with facsimiles of my different amp sounds. I would record a sound from the amp and A-B it to the Korg unit. Although there are a limited amount of parameters on the A3, I was really diligent about it. I actually got to the point where the sound from the A3 was almost identical to the real thing. This allowed me to record guitars in my control room. I programmed about 20 presets of my own that are exactly the way my guitar would sound through my amplifier.

I usually DI the guitar and split it so that it comes up on several channels of the console. I route the guitar into the A3 and sometimes into a Korg A1 as well. The A1 is used for reverb and the signal sent into it is a direct, heavily compressed sound that is otherwise unprocessed. The A1 is a higher quality unit, but for some reason it doesn't do what the A3 does. The signal going into the A1 has very little to do with the actual guitar sound coming out of the A3. You might have noticed that on some songs I have a big, heavy sound but the reverb is different. It's from the same guitar, but the signal feeding the reverb is not the same as the actual guitar sound that you are hearing. I also EQ'd it pretty severely using my DDA console (which I am really happy with). The signal from the A3 is routed to the multitrack and I can add the reverb signal from the A1 into that if I choose. On the left hand side is an acoustic guitar that is also compressed and DI'd.

Was there a pickup on the acoustic guitar?

Yes, and the acoustic guitar also goes through the A3. I have some presets I have designed for acoustic guitar as well.

You can hear the attack from that guitar a lot more than you might on a miked acoustic guitar.

In order to get that quality I compress it pretty heavily, but the attack is not absolute. It's quite fast but just slow enough so you can get the initial "tick" of the guitar. Immediately after the attack hits, the compression happens

In the chorus of the song there is a really distinctive sounding strummed guitar.

There are two acoustic guitars; one on the left and one on the right, and also one electric on the left. I use very light gauge strings and tune the guitar up a fifth (rather than using a capo) just to get real tension with light strings. The "E" string is actually sounding a "B."

I just transpose the guitar part and it gives the 12-string feeling without there being the confusion of 12 strings. EQ

JUST SAY YES: The cover to Yes's latest album *Talk*.

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Even with 512 user-adjustable programs, 2-octave pitch-shifting, true stereo operation and more, the most amazing thing is how it sounds.

SOUNDS. The reason Zoom is a recognized leader in digital signal processing worldwide.

To get those sounds into the new Studio Reverb, Zoom engineers sampled the world's finest audio environments to create powerful new algorithms*. They also insisted on a CD-standard 44.1 kHz sampling rate and massive 24-bit internal processing to ensure the highest level of audio over the full 20 Hz to 20 kHz bandwidth†.

Then they added the kind of features that just don't exist in a processor this affordable. Like 512 user-adjustable programs (32 different effects including reverbs, delays, gates, tremolo, chorus, flanging and more) with two dedicated edit controls that affect selected parameters. Giving you literally *thousands* of sound variations.

Plus a smooth 2-octave pitch shift for new harmonic possibilities. And true stereo operation so you can run stereo effects or two discrete mono effects. 2-band EQ. And Zoom Noise Reduction to keep everything studio-quiet.

The Zoom Studio. What it does will surprise you. How it sounds will amaze you.

**Our algorithms are complex, step-by-step computational procedures painstakingly created by Zoom digital engineers that ultimately determine the depth and sound quality of each environment (halls, rooms, etc.).*

†Yes, we know you've heard this before, but definitely not in a reverb costing $249.99.

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WHEN IT COMES TO RECOR
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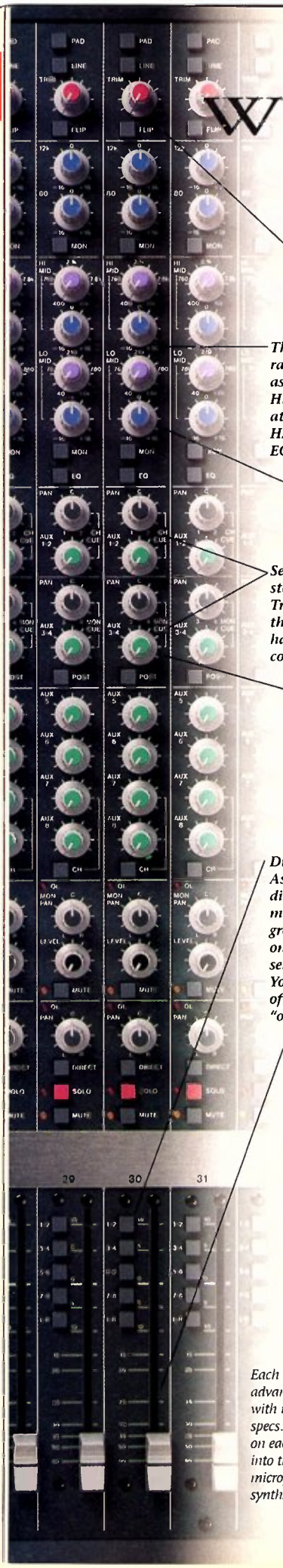


Balanced mic and unbalanced line inputs with phantom power and 20dB pad accommodate the widest range of input signals.

The only console in this price range with true Split EQ, each assignable to monitor or channel. High-frequency shelving control at 12 kHz, low frequency at 80 Hz for smoother, more musical EQ results.

Dual sweepable mids on each channel let you apply 16dB of boost or cut at critical frequencies.

Setting up two independent stereo cue mixes is no problem. Try this with other mixers in this price range, it just won't happen or you'll have to compromise something.

The most versatile AUX section in its class; rivaling expensive high-end consoles. 8 sends total, 2 in stereo. Send signal in stereo or mono, pre- or post-fader. Available all at once. Return signal through any of 6 stereo paths.

Direct channel input switching. Assign to one of eight busses, or direct to tape or disk, or to the master stereo bus. Because the group and direct-out jacks are one and the same, you can select either without repatching. You won't find this kind of speed or flexibility in a "one-size-fits-all" board.

Feel those 100mm faders! Turn those smooth and responsive knobs! They feel and work better than any other in its class. The M-2600's physical design takes the aggravation out of recording and lets you focus on the process of creating music. Everything is 'right where it ought to be'. Try it for yourself.

Each M-2600 channel features advanced-design mic pre-amps with incredibly low-distortion specs. Plus you get phantom power on each channel. Feed anything into the M-2600 from condenser microphones to line input from synths and sound modules.

For your personal or project studio, don't settle for anything less than a dedicated recording console. Some may try to convince you that a "multi-purpose mixer" works fine for multitrack recording. But don't take their word for it. The compromises, hassles and workarounds just aren't worth it.

Want proof? Ask your salesman how a multipurpose mixer handles these common recording situations. But listen carefully for workarounds, repatching schemes and other compromises. Then compare it to how easily the M-2600, a *true* recording console, sets up and does things.

SITUATION Separate headphone mixes for the talent and the producer. The talent wants a reverb-wet mix, but the producer wants it dry. Everyone wants it in stereo.

Compromise: Multi-purpose mixers require you to sacrifice 4 AUX sends and tape returns to get 2 stereo headphone mixes; but you need those sends/returns for outboard effects! What a dilemma.

M-2600 Solution: With a few buttons, assign up to two, independent stereo AUXs to be used as headphone mixes. Everyone hears the mix they want — and you've still got four AUX sends and returns free for signal processing gear.

SITUATION You're EQing tape tracks to get just the right sound. You're using the shelving EQ for the monitor mix, and the sweepable mids for the channel buss. Still, the drummer wants a certain frequency out of his mix — a job for the sweepable mids.

Compromise: Few multi-purpose mixers have EQ assignment. You're stuck with the shelving EQ on the monitor mix, and the sweepable mids on the channels *(if they even have split EQ)*. You've got no choice. Good luck trying to explain this to the drummer.

Available with 16, 24 or 32 inputs, the M-2600 is optimized for digital recording. Don't wait till your first session to discover the compromises and hassles other boards will put you through.

M-2600 Solution: Assign the shelving EQ, the sweepable EQ, or both to either the monitor or channel buss as necessary. The entire EQ section is splittable and assignable and can work in tandem.

SITUATION Mixdown. You're sending tracks to effects units for added studio polish. You want to take advantage of true stereo effects. How do you do it?

Compromise: Most multi-purpose mixers have fewer AUX sends than the M-2600's eight. Usually only in mono. And, some sends are linked, so you can't send them to different signal paths. So you settle for only a few effects, or forego stereo effects altogether.

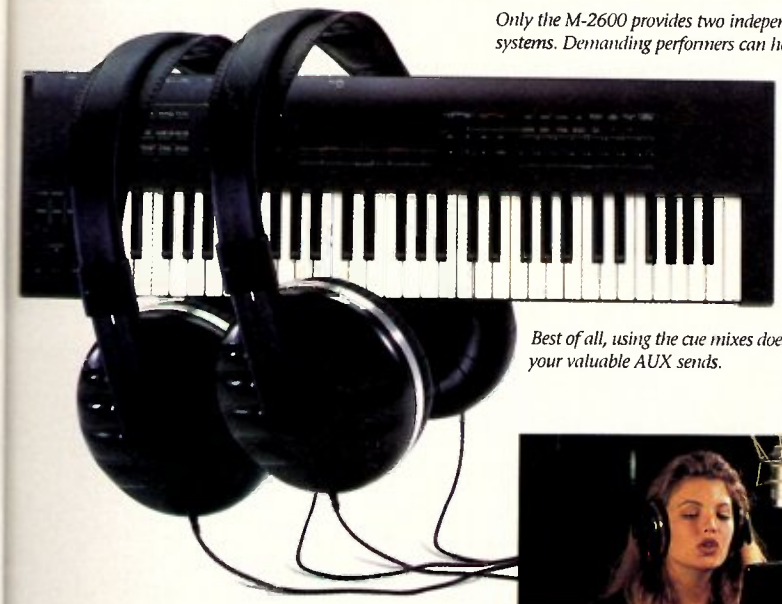
M-2600 Solution: Pick one: 8 mono sends or 1 stereo and 6 mono sends or 2 stereo and 4 mono sends. Each with its own level control and separate output jack. So you can use true stereo effects and still have sends left over for effects. Send the effects signals back via 6 stereo returns.

That's not all! The M-2600 doesn't compromise sound, either. You'll appreciate the new TASCAM sound — low-noise circuitry and Absolute Sound Transparency™. It all adds up to the perfect console for any personal or project studio — combining great sound with recording-specific features you'll need when recording, overdubbing and mixing down. Features you can get your hands on for as little as $2,999 *(suggested retail price for the 16-input model).*

So forget compromises. Invest in a true recording console. The TASCAM M-2600.

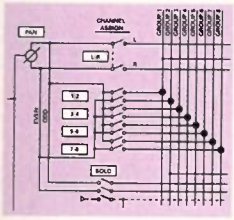
World Radio History

R DING, MOST OTHER CONSOLES O MPROMISING SITUATION.



Only the M-2600 provides two independent stereo cue systems. Demanding performers can hear the submix or scratch tracks the way they want, so they'll perform better. Meanwhile, the control room or producer's mix is unaffected. You can accommodate everyone involved in the production — without interrupting the creative flow. Best of all, using the cue mixes doesn't involve tying up your valuable AUX sends.

Use more effects/signal processing gear on more tracks with the M-2600. Use two (count 'em) true stereo send/returns to support stereo effects units. Plus, you still have 4 fully-assignable AUX sends left over for other gear. A total of 8 AUX sends — more than nearly any other console — anywhere. Better yet, you can use them all at once. No compromises. At mixdown, you can actually double your inputs so you can mix in all those virtual tracks. Just press the "Flip" switch. No repatching. No need to buy expensive and space-eating expansion modules.*



The incredibly flexible design of the M-2600 means signal routing is versatile and accomplished by the touch of a button, instead of a tangle of wire. Our decades of mixer experience has resulted in an ergonomic design that's exactly what you need: a board that speeds and facilitates recording and mixdown. Everything is where you intuitively think it should be. Dedicated solo and mute indicator lights on every channel, on master AUX sends, stereo returns, and each of the 8 busses so you always know exactly what you're monitoring. Plus, SmartSwitches™ protect you against redundant or canceling operations.

ABSOLUTE SOUND TRANSPARENCY AST

TASCAM M-2600: THE CONSOLE DESIGNED SPECIFICALLY FOR RECORDING.

Of course, the M-2600 sounds great. It's got totally redesigned low-noise circuitry, Absolute Sound Transparency™ and tremendous headroom. No coloration and virtually no noise. You will hear the difference. So, even during long mixdown marathons, you'll hear an accurate representation of what's been recorded.

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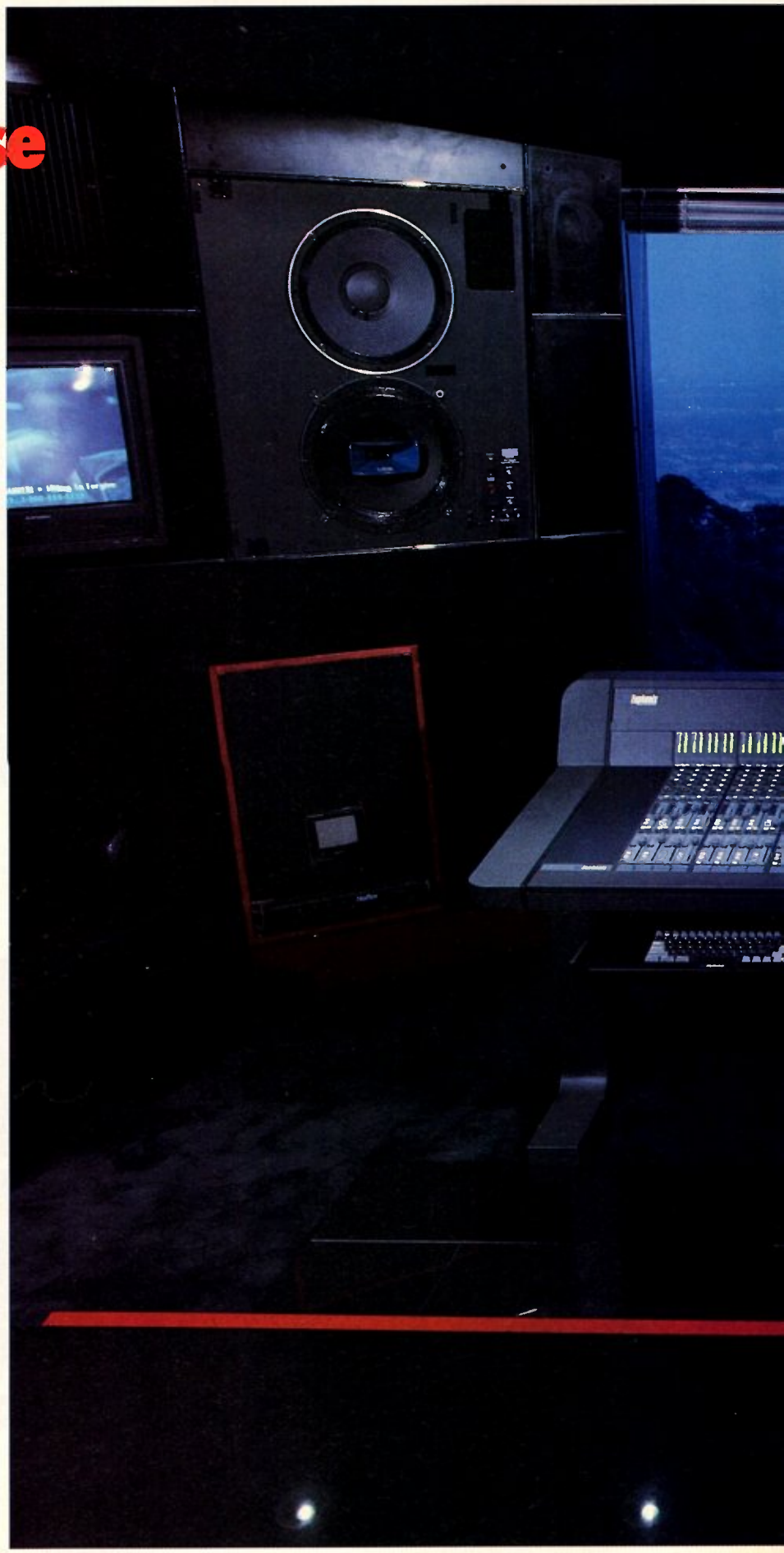
The Icehouse

Rap star Ice-T keeps cool in his scenic Los Angeles-based project studio



LOCATION: Los Angeles, CA
KEY CREW: Ice-T, owner
BANDS RECORDED: Body Count
CONSOLE: Euphonix CS2000D-3-48 with DSC Digital Studio Controller
ARCHITECTURE AND ACOUSTICS: studio bau:ton
BUILDER: Pirate Acoustics
RECORDERS: Otari MX-80 24-track; Panasonic DAT
SPEAKERS: UREI 813 main monitors; Tannoy System 10 nearfields
AMPLIFIERS: Hafler
MICROPHONES: Neumann U-87's
KEYBOARD: Roland D-20
SEQUENCER: Akai MPC-60 sampler/drum machine/sequencer
OUTBOARD GEAR: Lexicon reverb and digital effects
PERIPHERAL EQUIPMENT SUPPLIER: Coast Recorders
STUDIO NOTES: Ice-T's project studio is truly a room with a view, perched on a hillside with a panorama of Los Angeles and the Pacific Ocean. A jewel box with a Euphonix console at the center of the mix room, it includes an overdub booth with a lounge area in between and a machine room to the side housing the Euphonix audio tower.

Finishes and special elements provide the individual touch and makes the spaces unique. Opposite the views, the control room features an 11-foot-wide by three-foot-deep shark tank — complete with a sound-diffusing cover over the glass.

Walls and ceilings are covered in red-and-black-coated plywood and blue fabrics. Joints are expressed with polished chrome strips, and windows are filled with sparkling cracked glass, illuminated by halogen lights. EQ

World Radio History

Photo by Ed Colver

CAD Equitek E-100

This new mic keeps the juice flowing — even when the power is removed

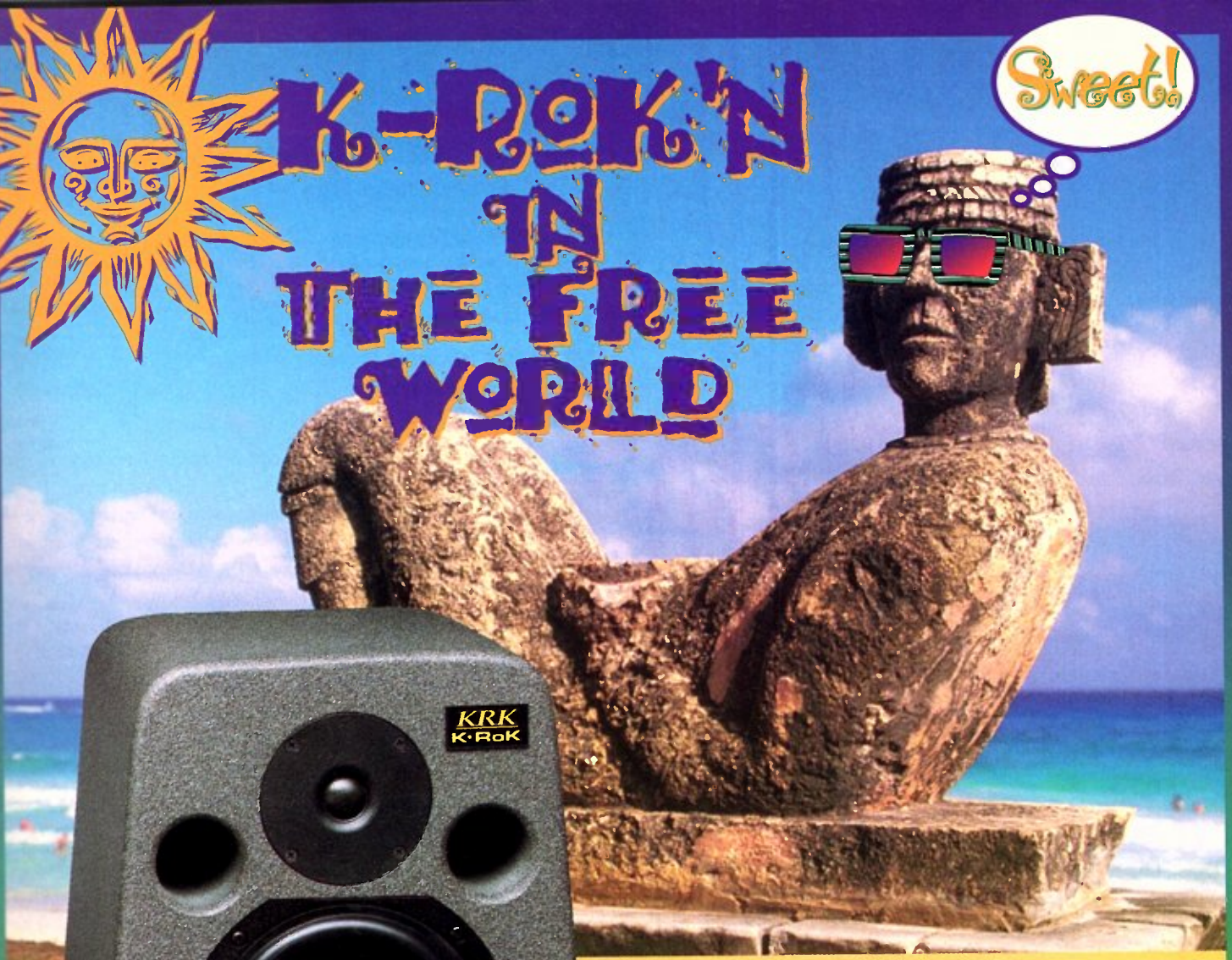
MICROPHONE NAME: CAD Equitek E-100
PRICE: $399
TYPE OF MIC: Electret condenser
POLAR PATTERN: Super cardioid
FREQUENCY RESPONSE: 10 Hz–18 kHz
SENSITIVITY: 17.8 mV/Pa at 1 kHz
RATED SOURCE IMPEDANCE: 200 ohms
SIGNAL-TO-NOISE RATIO: 78 dB with a 94 dB SPL
EQUIVALENT NOISE LEVEL: 16 dB Equivalent SPL, A-weighted, without pad
DYNAMIC RANGE: 132 dB
MAXIMUM INPUT SPL: 148 dB (with –20 dB pad)
POWER REQUIREMENTS: 48–52 Volts DC phantom supply
DIMENSIONS: 2.45" (width) x 6" (height) x 2.175" (depth)
WEIGHT: 18 ounces
MIC NOTES: The Equitek E-100's ability to handle very high sound pressure levels allow it to be used in situations that are normally reserved for moving coil mics (such as miking a kick drum). The microphone's state-of-the-art servo head amplifier eliminates interstage coupling capacitors, resulting in a reduction of phase anomalies and feed-through distortion. The performance of the E-100 is further enhanced by the use of a non-capacitive 20 dB pad and high-pass filter. The mic's internal H-frame suspension of the capsule virtually eliminates the need for external shock mounts and an internal swivel adapter is included.
USER TIPS: The E-100's high output will allow engineers to set their mic input at a lower-than-normal level for a better signal-to-noise ratio. Because it will perform to spec for up to six hours on its two NiCad batteries, the E-100 is a good choice for remote DAT recording. EQ

Photo by Ed Colver

World Radio History

K-RoK'N IN THE FREE WORLD

Sweet!



The new KRK K-RoK close-field monitor looks as if it's been carved out of solid granite. These bizarre-looking little monsters feature a unique box design that produces better linearity and low-end punch than any monitor in their class.

Featuring a powerful 7" long-stroke woofer, a 1" silk-composite dome tweeter and fanatical KRK engineering, the affordable K-RoKs ($449.00 per pair) deliver the smooth response and high power handling capability that have made KRK monitors legendary.

Perfect for the home studio, K-RoKs provide world-class performance without blowing your budget. Why settle for some cheaply-constructed mini-monitor when you can own an authentic KRK reference monitor for about the same dough? Contact your local KRK dealer for a K-RoK demonstration. K-RoK, fanatical by design.

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CIRCLE 37 ON FREE INFO CARD

Photo by Ed Colver

World Radio History

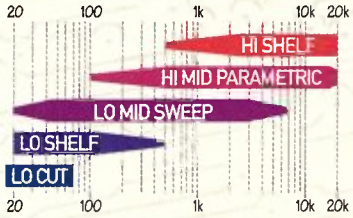
WHY MACKIE IS YOUR BEST 8-BUS

Lately, several big pro audio companies have gone out of their way to "mention" us in their own 8-bus console ads. Many satisfied Mackie owners have urged us to shoot back with hardball comparisons of our own. But that's not our style.

Greg believes that if a product is really good, it should speak for itself — without resorting to slagging the competition. First in a series, this ad details some of the features that we believe make our 8•Bus the best recording or PA console value available today for under $20,000.

Comprehensive equalization for creativity and problem-solving.

To quote Electronic Musician[1], *"It's no secret that the versatility and pristine sonics of the 8•Bus EQ have astonished jaded pros and home hobbyists alike. The 4-band EQ section includes two shelving controls fixed at 12kHz and 80Hz; parametric high-midrange EQ with a 500Hz to 18kHz sweep and a bandwidth that can be adjusted between three octaves and one semitone; and low midrange EQ with a 45Hz to 3kHz sweep. A full 15 dB of boost or cut is provided for each band. In addition, an 18 db/octave low-cut filter is set at 75 Hz. That's a heck of a lot of firepower!"*



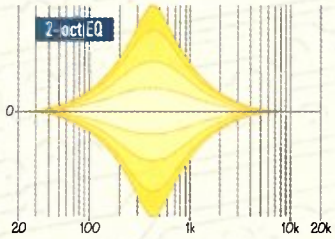
No kidding. But we also like that part about pristine sonics. One of the reasons that the 8•Bus Series took so long to ship was that Greg was determined not to compromise EQ sound quality. Cheap circuitry can create all sorts of sonic grunge that may add distinctive "character" to a console's EQ...but Greg's goal was clarity, not eccentricity.

To further quote Electronic Musician, *"In all applications, the 8•Bus EQ was extremely musical and transparent... One of the engineers summed it up best by saying, 'The 32•8 is so clean that you don't really hear the EQ; everything sounds deceptively natural, which is really great.'"*

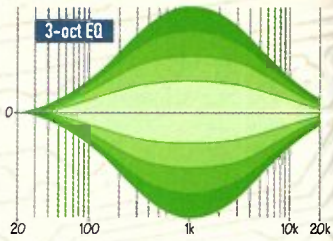
We wouldn't have it any other way.

What parametric EQ means to you.

The biggest gun in the 8•Bus' EQ arsenal is its true parametric high midrange EQ. Conventional sweepable midrange (like our 8•Bus' *low* mid), has a fixed bandwidth of about 2 octaves. No matter how high or low in frequency you sweep it (or how much you boost or cut it), 2-octave EQ's *contour* stays the same. While extremely useful, it's just one tonal "color." Having to rely on swept, 2-octave midrange alone is like being asked to paint a picture with only a bucket of bright yellow paint.

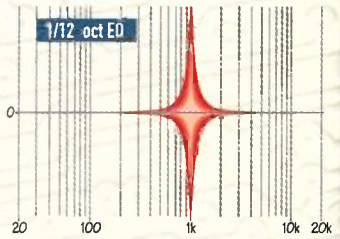


By letting you vary the bandwidth, parametric EQ gives you the equivalent of a full rainbow of tonal "colors" in your artistic pallet. Spreading high midrange EQ over three full octaves transforms it into an extremely subtle — yet extremely dramatic — effect[2]. Sweet and natural-sounding, it can unobtrusively change the character of a track without noticeable tonal intrusion. If you're used to conventional 2-octave swept midrange, you'll be surprised at how much 3-octave EQ you can add without things starting to sound obnoxious.



On the other hand, there are times when you want what can only be called surgical EQ. At its narrowest, our parametric Hi Mid is four times as precise as a 1/3rd-octave graphic equalizer. It's like having a delicate artist's brush and a magnifying glass for erasing or enhancing tiny details.

Between three octaves and 1/12-octave is a vast range of tonal colorations, nearly all possible only with parametric equalization. And, since our "HI" mid's sweep range extends from 18kHz all the way down to 500Hz, your creative palate extends over six octaves – to our knowledge the widest midrange sweep currently available[3].



Above Left to right: 32•8 console with MB•32 meter bridge, 24•E Expander with MB•E meter bridge, and The Sidecar.

Apparently we're not alone in our belief. In competition with many of the very consoles that keep "mentioning" us in their ads, we recently won the coveted *MIX* Magazine TEC Award for Small-Format Consoles. As well as *LIVE! Sound* magazine's Best Front of House Mixer Award.

To learn why, call us toll-free for our detailed, 24-page 8•Bus brochure.

[1] September 1994 issue, page 64, in a sidebar to an article on The British Invasion (of consoles). We urge you to read the whole thing so that we don't get in trouble for quoting stuff out of context.

[2] This is what we meant when we used the phrase *"Expensive British Console Sound"* in our first 8•Bus ads: Classic English desks were the first to offer extremely wideband (i.e. greater than 2 octaves wide) equalization. Obviously we didn't make ourselves clear on this point, because everyone from our competitors to at least one reviewer has taken us to task over this phrase. Okay, we apologize to all of you Anglophiles. We were merely trying to explain why we consider wide bandwidth EQ such a powerful tool and where we got our inspiration for including it...not attempting to rekindle the Revolutionary War.

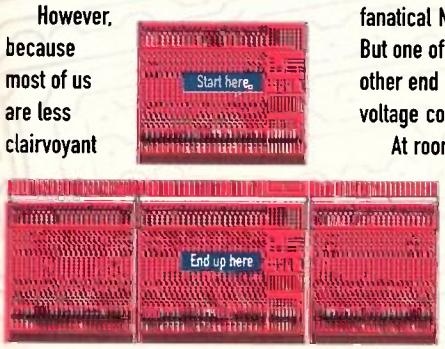
World Radio History

CONSOLE CHOICE

An expandable console system.

If you can successfully foretell the future, you might as well play the commodity futures market, make a zillion bucks and buy a 128-channel SSL console.

However, because most of us are less clairvoyant and a lot poorer, we've designed a system that can grow with your needs and budget. Start with our 24•8 or 32•8 console[4]. Then, when your tax refund comes back, add an optional meter bridge[5]. When you land that Really Big Project That Pays Actual Money, add more input channels (and tape returns) in groups of twenty-four with our 24•E Expander console[6].



You can keep right on growing your Mackie 8•Bus console system up to 128 channels or more.

And, beginning this spring, you can automate the whole shebang with our extremely affordable Universal MIDI Automation system. It consists of the OTTO-34 VCA gain cell unit, wicked-fast Ultramix™ Pro software and the innovative OTTOpilot™ control interface. Both the hardware and the software were debuted in final form at last Fall's AES Convention. They received rave reviews from seasoned pros who are used to working with "mega-console" automation systems.

Very Low impedance Circuitry (VLZ) for very low noise.

We like to say that the 8•Bus console's monster 220-Watt Power Supply was a product of typical, fanatical Mackie over-engineering. But one of our real motives lies at the other end of the power supply's multi-voltage connecting cable.

At room temperature, all electronic components create thermal noise. Cumulatively, this can become audible and objectionable. We design around thermal noise by making internal circuit impedances as low as possible in as many places as possible. For example, resistor values in our mix bus are 1/4 the value of those typically used — hence thermal noise is proportionally lower. Another advantage of VLZ is that low-impedance circuitry is far more immune to crosstalk problems.

VLZ isn't easy to achieve. All circuitry must be thoroughly buffered. Plus, console current consumption goes way up, requiring a beefy power supply. Such as the massive, 31-pound, power supply we ship with each 8•Bus console.

Powersupplyus Humungoidus

+4dBu operation throughout.

This is a biggie in terms of overall noise and headroom. There are two current standards for console operating levels: –10dBV and +4dBu. Without knocking our competition, let's just say that +4dBu is the professional standard, used with all serious recording, sound reinforcement and video production components. This higher operating level effectively lowers the noise floor and increases dynamic range. Our 8•Bus consoles operate exclusively at +4dBu (although their tape outputs and returns can be switched to –10dBV to match other semi-pro/hobbyist gear you may still own).

Built like tanks.

Our 8•Bus Series consoles have been in the field long enough to gain an almost legendary reputation for durability. For example, a lot of them absorbed the impact of toppling monitor speakers during last year's Los Angeles earthquake with little more than a few broken knobs. Others have survived drops off loading docks, power surges that wiped out whole racks of outboard gear and beer baths, not to mention hundreds of thousands of air and semi trailer miles with major tours[7]. Read our 8•Bus tabloid/brochure to learn about the impact-absorbing knob/stand-off design, fiberglass circuit boards and steel monocoque chassis that make our consoles so rugged.

Bottom line: You simply can't buy a more dependable console. Maybe that's why *LIVE! Sound* magazine readers voted us their 1994 "Best Front of House Console."

We could go on this way for pages.

If we got into the details of 8•Bus features like special RFI protection, triple tape bussing, in-place stereo solo, constant power pan pots, or the extra 15dB of gain available at the 8•Bus's aux sends and returns, this ad would have even teenier type than it already has.

For these and other facts, call us toll-free (8:30AM-5PM PT) and ask a real live person for our obsessively-detailed, 24-page 8•Bus brochure.

OUR 8•BUS CONSOLES REALLY WORK, THE UPDATE:

Ricky Peterson mixed ☥'s recent hit single, *"The Most Beautiful Girl in the World"* entirely on his Paisley Park Studio 32•8 console.

Queensryche's new platinum album, *Promised Land*, was totally tracked on Mackie 8•Bus consoles (with help from OTTO-automated CR-1604s). A sonic (and musical) masterpiece, it has the tight bass, crisp highs and ear-boxing dynamic range that's becoming an 8•Bus console signature. Need more proof as to why pros prefer Mackie? Buy this superb CD.

3 ...on a comparably-priced 8-bus console. Oops! We're starting to sound competitive.

4 $3,995 (24•8) and $4,995 (32•8) suggested retail. Slightly higher in Canada.

5 $795 (MB•24) and $895 (MB•32) suggested retail. Slightly higher in Canada.

6 $2,995 suggested retail; MB•E meter bridge $695...Yadda yadda, Canada, etc. etc.

7 Including the latest Rolling Stones, ZZ Top, and Moody Blues tours. (Footnote to the footnote: Mention in this ad denotes usage only, not official endorsement).

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World Radio History

Change of Program(ming)

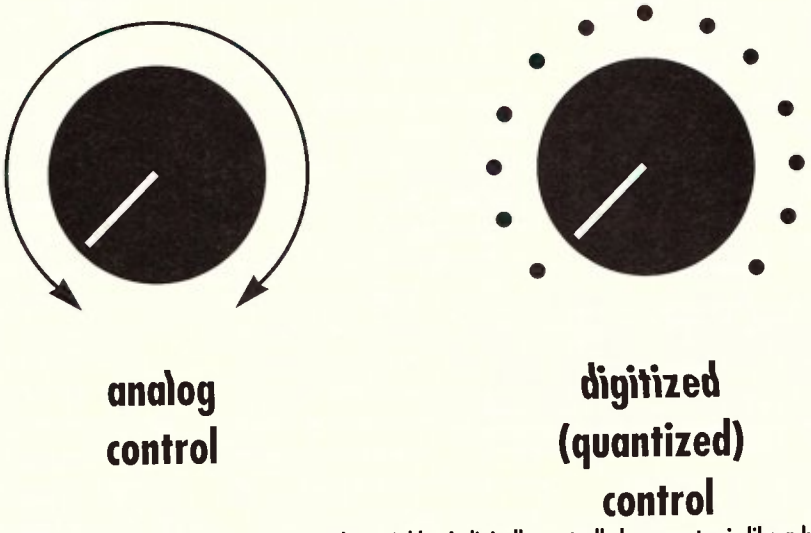


FIGURE 1: Analog controls are continuously variable. A digitally controlled parameter is like a knob that has been divided (quantized) into a series of discrete steps.

Hang in there — creating your own multieffects program is not as hard as you may think

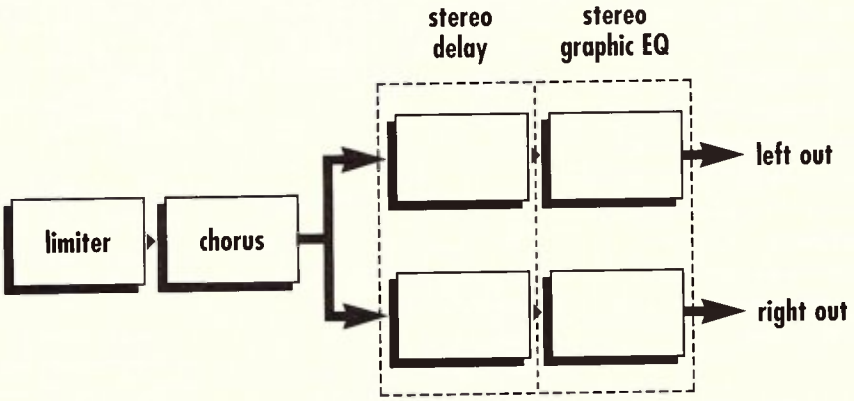
BY CRAIG ANDERTON

Programmability made its big splash when synthesizer players became fed up with trying to change sounds rapidly on stage. Programmable synthesizers let you dial up a particular sound, then press a button to store the control setting information as a program in memory. Reselecting that program at a later date produced the same sound as when you laboriously adjusted the controls in the first place.

As signal processors became more complex, they also became more difficult to adjust in real time. Multieffects now have literally hundreds of parameters, but all their settings can be recalled at the touch of a button. There is a tradeoff, however: programmable effects sacrifice the convenience of instant recall for the inconvenience of time-consuming programming prior to using the effect. This tradeoff is too much for some people, who give up and just use factory presets. But if you grasp a few key concepts, you can program almost any signal processor quickly and fairly painlessly — even if you don't have the manual around.

THE COMPUTER CONNECTION

A multieffects includes a computer program that tells the multieffects's built-in computer how to create chorus, reverb, distortion, and other effects. When you're programming a multieffects device, you're entering data into the program to tell it what to do. (Note that "program" has two meanings: the software that runs the



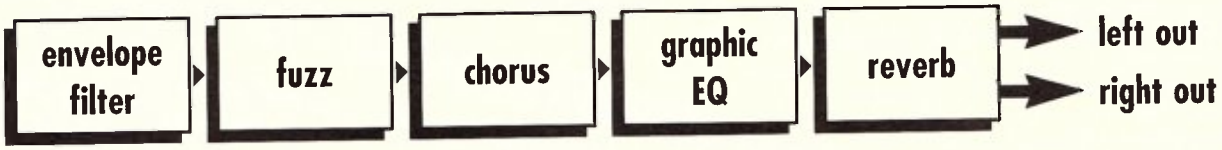


FIGURE 2: Two different algorithms. Each creates a different type of effect and has variable parameters so you can alter the sound.

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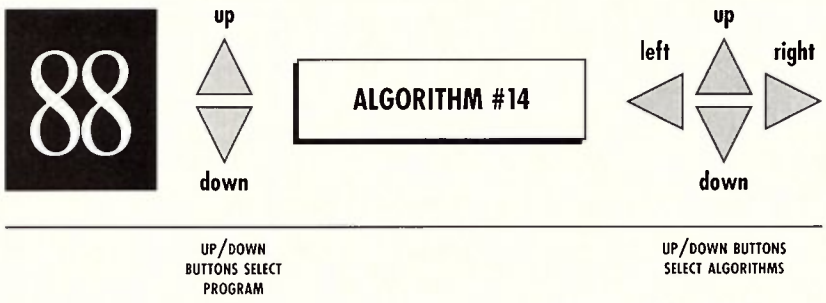

FIGURE 3: Program and algorithm selection with a generic multieffects.

multieffects and the "patch" you create by tweaking buttons and switches.)

For example, echo consists of delaying a signal, feeding some of the delayed output back to the input to create additional echoes, and mixing some echoed sound in with the straight sound. So, a multieffects's echo program would tell the computer to "delay a signal for X milliseconds, feed back Y percent of the delayed signal back to the input, and mix in Z percent of echoed signal." The echo sound will change according to the data for X, Y, and Z. A larger value of X means more milliseconds, thus a longer delay. If we feed back a small amount of signal (small Y value), we'll hear only a few echoes; larger Y values feed back more of the signal, creating more echoes that take a longer time to fade out. Z determines the straight/processed mix.

Upon entering the data necessary to get the sound you want, you've created a program (or at least a variation on a factory preset).

ABOUT PARAMETERS

Each adjustable element of an effect, whether analog or digital, is called a *parameter*. For example, the variable parameters on an analog delay line might include initial delay time, feedback, etc. Analog effects boxes had one control (switch or knob) per parameter, so changing parameter values was simple. But knob-based effects also had problems: changing a sound took time, trying to get it back later on could be difficult, and knobs and switches are expensive components.

Digital electronics largely eliminates knobs. Remember our echo unit example earlier with the X, Y, and Z parameters? With a digital effects unit, each parameter would be given a unique number (so you could identify it for editing), and be *quantized* into a series of discrete steps (fig. 1). For example, delay time, instead of being continuously variable and selected by a knob, might be quantized into 1-millisecond steps and selected by keying in a three-digit number with a numeric keypad.

By quantizing parameter values and identifying them numerically, the internal computer can store these values in memory. This lets us call up a particular program at any time. For example, suppose we told the comput-

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CIRCLE 58 ON FREE INFO CARD

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Of course, you wouldn't be having this anxiety attack if you used new **BASF 900 *maxima*** High Output Mastering Tape. With 3 dB more output and 2 dB less noise than standard analogue mastering tapes, it is identical to the MOL and the signal–to–noise ratios of other high output masters. But it has the reel–to–reel reliability and consistency of BASF 911. Low rub off. Precision–manufactured. It's classic BASF. The kind of BASF tape studios have been relying on since 1934. As you turn to face the band (gulp), you make a vow. If you survive the next ten minutes, the first thing you'll do is contact BASF, 1–800–225–4350 (Fax:1–800–446–BASF); Canada 1–800–661–8273.

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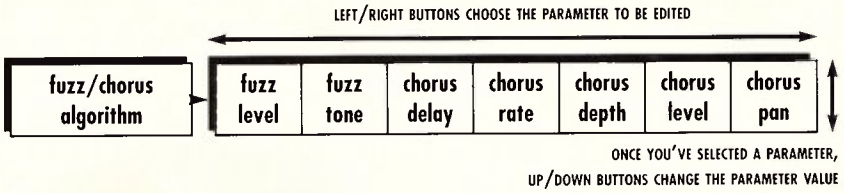


FIGURE 4: Each algorithm will have several parameters whose values you can change.

er that our echo program's X parameter was 210 milliseconds, its Y parameter 50 percent feedback, and its Z parameter a 35 percent echo mix. The computer can remember this group of numbers as a program; once you give the program itself a number, like 26, the computer will file all this information in its little brain under "26" so that next time you ask it for program 26, all parameters will be reset as you specified.

ACCESSING PARAMETERS

Most computerized musical devices don't have multiple knobs for changing sounds; instead, you need to find individual parameters and alter their values, usually by some kind of button pressing.

Fortunately, there are only so many ways to accomplish a given task. If you're creating a sound from scratch or editing an existing sound, you're almost always going to use the same basic procedure for any device:

1. Specify the program (patch) to be edited. This reserves a memory location where your editing work will be stored.

2. Select the program's structure, called an *algorithm*. The algorithm determines the sound's overall character. You may have a choice of several fixed algorithms (distortion —> filter, distortion —> chorus —> reverb, chorus —> delay, etc.) or you may be able to choose the order and type of effects. Figure 2 shows a of couple representative algorithms that define an effect's structure.

3. Specify a parameter that you want to change within the algorithm (echo time, amount of fuzz, noise gate threshold, etc.).

4. Enter a new parameter value and observe what effect this has on the sound.

5. Repeat steps 3 and 4 until all the parameters have been adjusted to give the type of sound you want.

The most common data entry tools are a calculator-style keypad for entering numbers and scrolling or "arrow" keys to help locate the different parameters (we'll soon see how this works).

SELECTING DIFFERENT PROGRAMS

A basic function on all units is calling up different programs. When you turn on a digital multieffects unit, you'll probably see either the last program you selected or a default program (e.g., program #01). Depending on the unit, to select a new program you might punch in a certain program number with the keypad or scroll through the different programs with the arrow keys.

You can think of the programs as forming a list, with a window — moved up and down by the up and down arrow keys — that scrolls over what's on the list. For example, if you're on program 14, pressing the up arrow key selects program 15; pressing the down arrow calls up program 13. Some units may instead use a knob to select programs. Then again, some devices may arrange

continued on page 136

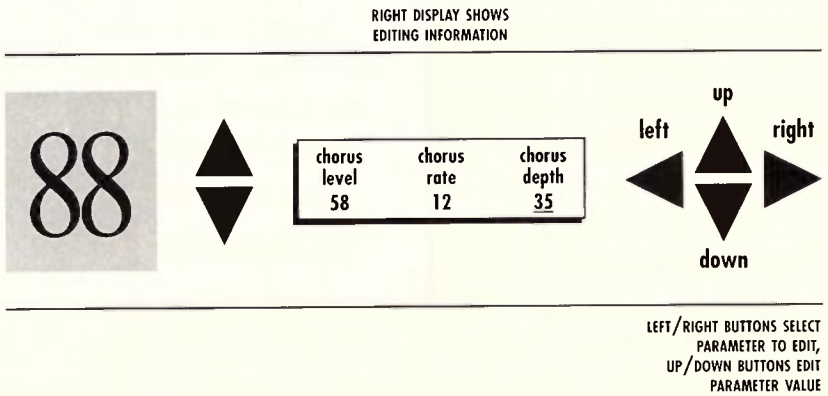
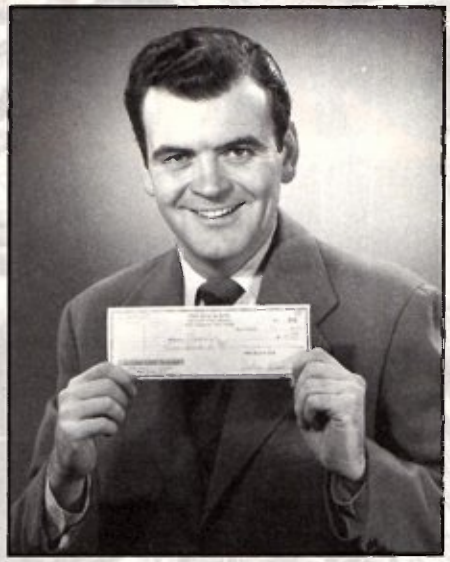


FIGURE 5: The display shows several parameters. You select one for editing with the left/right buttons; the one being edited has an underline (cursor). In this case, it's chorus depth, which has a value of 35. The up/down buttons change the parameter value.

World Radio History

Upgrade your old amp...



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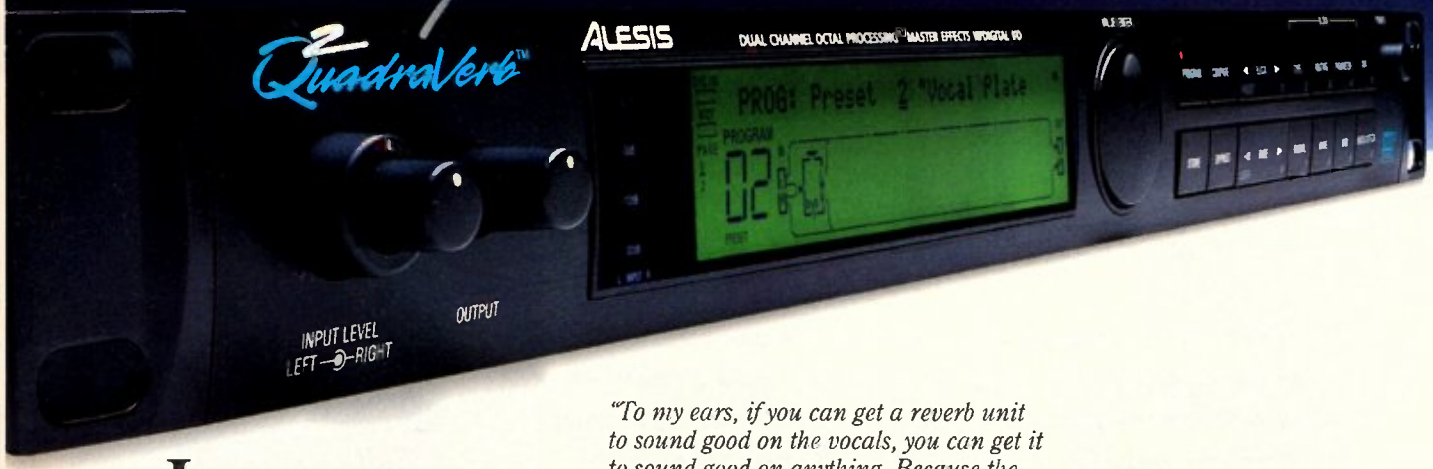

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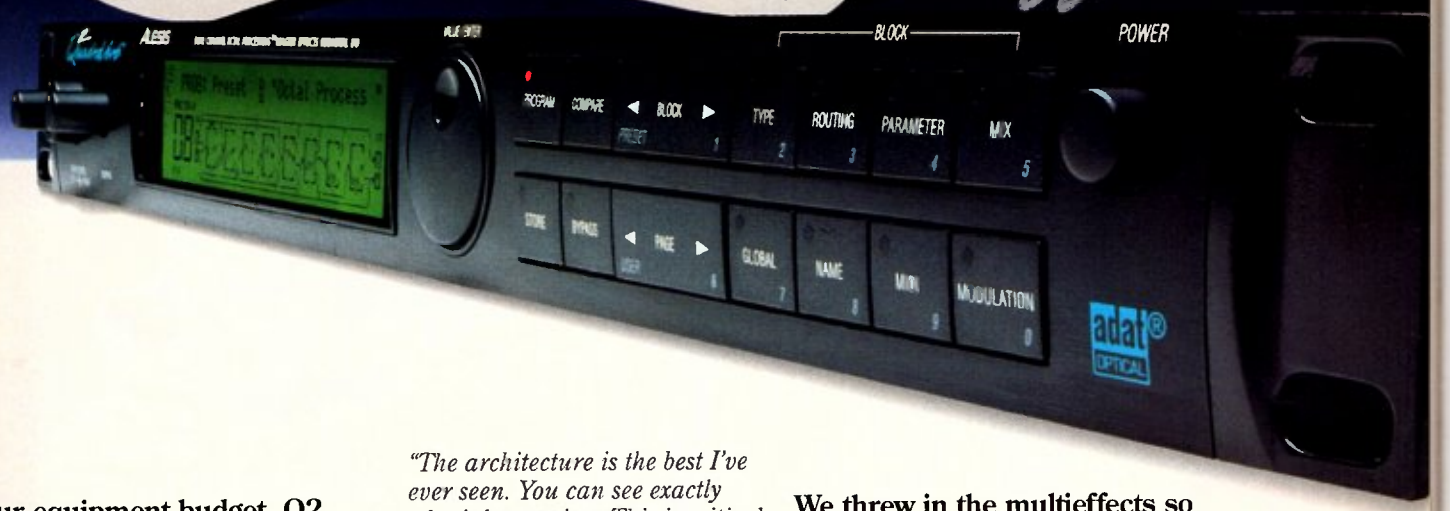

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ALESIS
STUDIO ELECTRONICS

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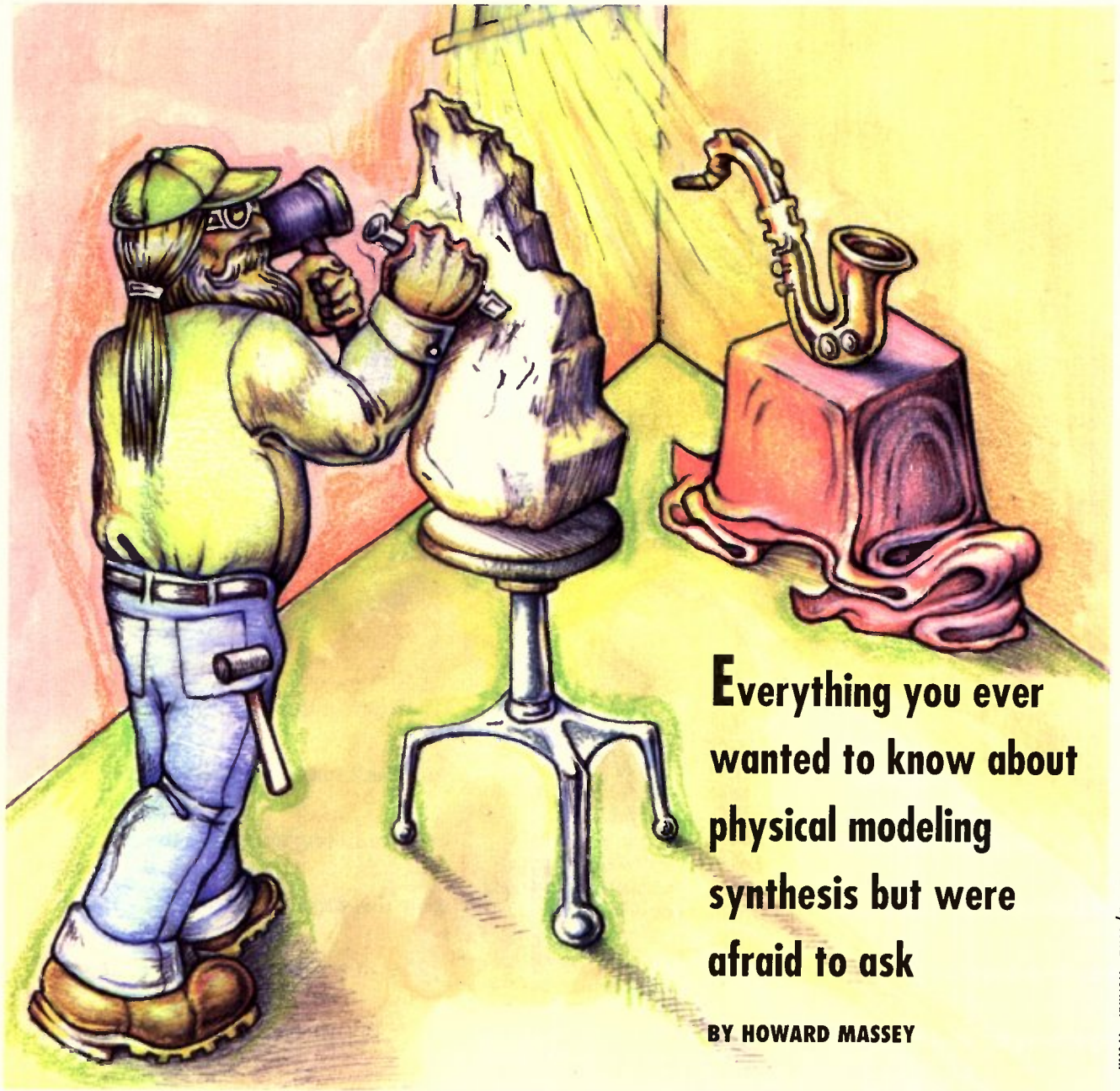
World Radio History

Let's Get Physical

Despite the never-ending hype turned out by marketing departments, true milestones in the music technology biz are few and far between. More often there's simply a cosmetic makeover and a few new features tacked onto an existing chipset, and, voilà! The latest "next big thing" makes its appearance.

With that having been said, you should know that we are, in fact, on the verge of a real revolution in synthesizer technology and that the tip of this particular iceberg is already beginning to appear. What sort of impact is this technology, called physical modeling, likely to have on you?

In the beginning, man created analog synthesis...and he saw that it was good. Good, but not great. Though analog synths were capable of creating all sorts of amazing sound effects that no acoustic instrument could produce, they were, conversely, awful at creating accurate replications of acoustic sounds. What's more, because the electrical components in these synths were highly sensitive to changes in temperature (and, to a lesser extent, to humidity and other envi-



Everything you ever wanted to know about physical modeling synthesis but were afraid to ask

BY HOWARD MASSEY

Illustration by Fritz "Normal" Welch

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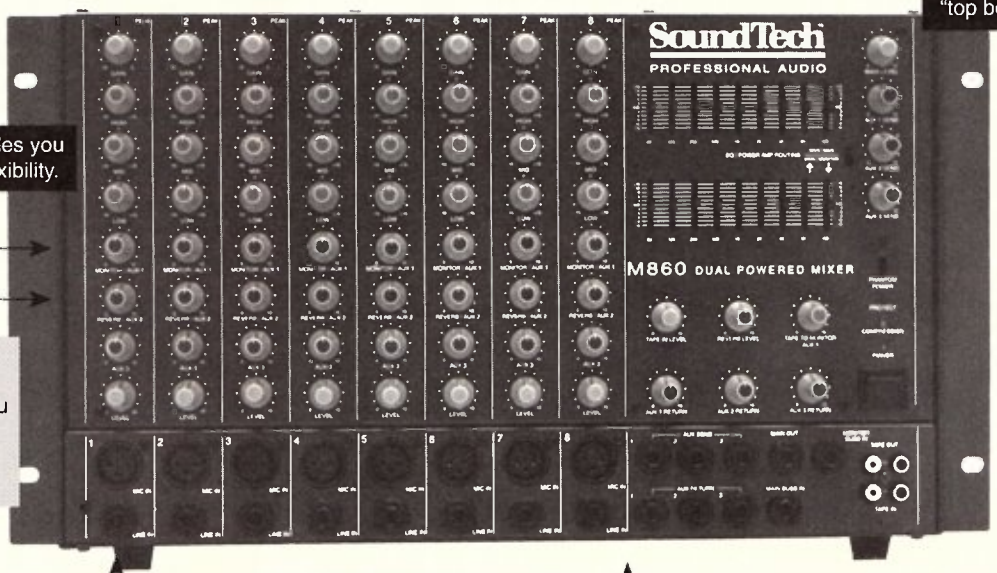

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ronmental factors), they had a tinge of unpredictability that many musicians — particularly those using analog synths in live performances — found unacceptable. This was cured to a degree by the digital control provided by later analog synths such as the Prophet, but the overall limitations remained.

Then came the digital revolution of the 1980s. For the first time, all-digital instruments such as samplers provided the degree of realism, control, and reliability that brought synthesizers into the modern age. This was followed by the bombshell release of the Yamaha DX7, which not only made polyphonic digital synthesis affordable, but also utilized a brand-new technology (FM synthesis) that yielded a whole new range of sounds. The success of the DX7 spawned a whole range of other "X" instruments — though, like their analog forebears, these still could not accurately emulate many acoustic sounds.

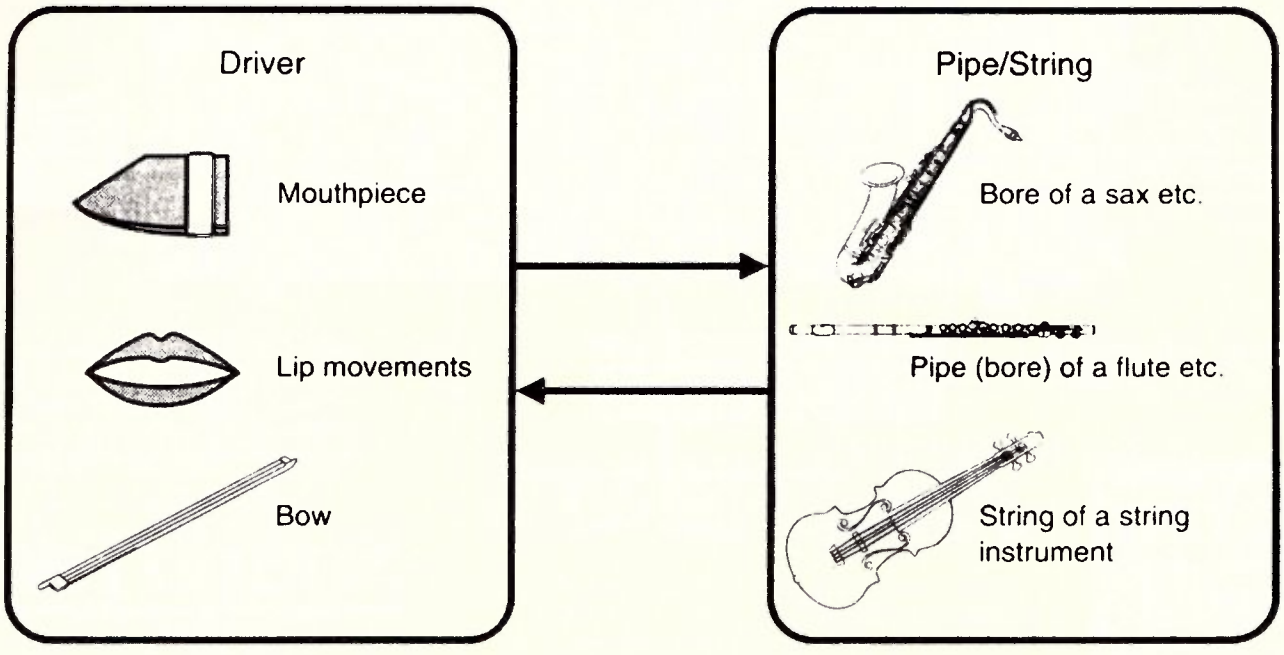
Because the FM process was licensed exclusively by Yamaha, competing manufacturers were forced to find a new means of utilizing digital technology. This led to the birth of "wavetable" synthesizers (as originally popularized by the Roland D50, Korg M1, and Ensoniq ESQ1), in which prerecorded samples are played back by digital oscillators and then modified by simple processors such as filters and envelope generators — pretty much the state of the art in electronic instruments today. The main strength of these instruments is that, provided the original sample is of high enough quality, acoustic sounds can be emulated with remarkable precision as long as a single note is played. But there are major limitations, too: enormous amounts of memory are required to store all the samples, and only a very limited expressivity (that is, an ability to change the dynamics or timbre of a sound in real time) is possible. True articulations such as slurring or legato are difficult, if not impossible, to achieve. And when the pitch of a sample is shifted, the timbre changes dramatically, too (this process, which simply doesn't occur in acoustic instruments, is sometimes referred to as munchkinization). The result of this pitch shifting can be a less-than-convincing sound and the occasional generation of unpleasant digital artifacts.

Physical modeling takes a completely different approach. First of all, there are no oscillators. Instead, mathematical models of actual acoustic instruments are stored in memory (in essence, creating "virtual" instruments) and very high-speed digital signal processing (DSP) circuitry is used to generate the sound in real time, under the direct control of the user. These models are created based on the painstaking analysis of real acoustic instruments and on the immutable laws of physics and acoustics.

If you think this sounds something like the "virtual reality" buzzphrase we've been hearing so much about, you're right. A virtual reality system uses a computer to create an artificial environment based on physical realities. What's more, that environment can change — in real time — as user feedback is continuously entered into the system. For example, as a user turns his head, sensors in a headpiece route that data to the system and the view changes. In a physical modeling synth, as the user "plays" a preprogrammed virtual instrument — not only by depressing keys on a keyboard but also by continuously manipulating real-time controllers — the DSP chip computes how the sound of that instrument would change if it existed in reality. It then outputs the equivalent stream of numbers to a digital-to-analog converter, where the stream ultimately ends up as an electrical signal that drives a loudspeaker.

FOR EXAMPLE

To demonstrate how this works, let's take a closer look at the virtual instrument used by the Yamaha VL1, which



PICTURE THIS: In the example of a sax player, the Driver corresponds to the mouthpiece and the Pipe/String corresponds to the pipe (bore) of the sax.

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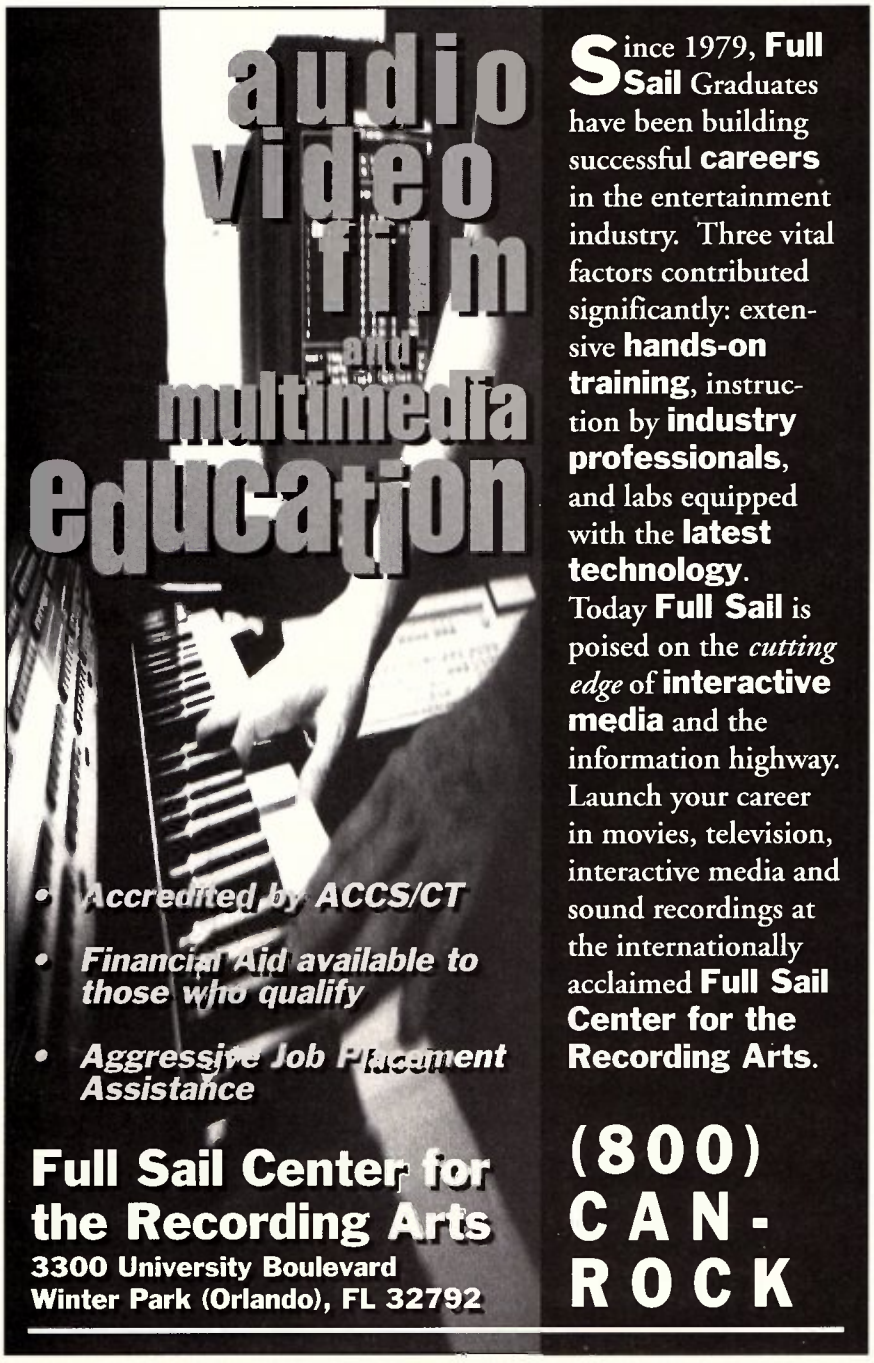
is the first commercial incarnation of a physical modeling synthesizer (the VL1 will have a full review in a future issue of *EQ*). Other manufacturers may implement physical modeling in future instruments in different ways, but the basic procedure is likely to be similar. Using what Yamaha calls "S/VA" (Self-oscillation type Virtual Acoustic) synthesis, the VL1 has been designed from the ground up to model the sounds of acoustic instruments that require a continous application of energy in order to sustain a sound, such as those in the wind, reed, and bowed families. The VL1's virtual instrument utilizes two basic components: a driver and a pipe/string.

The "driver" corresponds to the physical device in a real acoustic instrument that causes the initial excitation of air that gives birth to a musical sound. In a wind instrument, this would be the mouthpiece; in a stringed instrument, the bow. The "pipe/string" corresponds to the physical component in a real acoustic instrument that resonates and amplifies the initial excitation of air. In a wind instrument, this would be the bore (that is, the inside area of the pipe); in a stringed instrument, the string, bridge, and body. In theory, any driver can be grafted onto any pipe/string, so that you could, for example, create the sound of a bowed sax or of a violin played with a reed. However, bear in mind that if such an instrument wouldn't make a sound in reality, it won't make a sound when modeled in the synth, either. The driver and pipe/string components are also interactive, just as they would be in a real acoustic instrument — the vibrations of air that are amplified by the body always have some feedback effect on the mouthpiece or bow that is causing those vibrations in the first place.

Of course, the story doesn't end there. Continuous real-time input from the user not only allows different pitches to be played, but also allows dozens of variables to be altered as the note is played. This input can come from the keyboard or from any standard MIDI controller, such as a wheel, slider, footpedal, or breath controller. For example, the breath or bow pressure amount can be altered in real time, resulting in the same timbral change that would occur in the corresponding physical instrument (a virtual wind instrument can be overblown just like a real one, or a virtual violin can be made to sound scratchy). Additional modifiers such as dynamic filters, envelopes, and the like are used to further add realism to the sound, and a mixer allows the relative amounts of driver and pipe/string signal (as well as a user-defined "tap" along the length of the pipe/string) to be blended together. Finally, a series of "modifier" components and an onboard multieffects processor allow the timbral content of the virtual instrument to be further altered.

There are many advantages to physical modeling synthesis as opposed to contemporary sample-playback synthesis. For one thing, the process allows an enormous degree of real-time user control, making it truly expressive. This in turn leads to a sound that is much more realistic, since each note played can exhibit the subtle differences that a trained musi-



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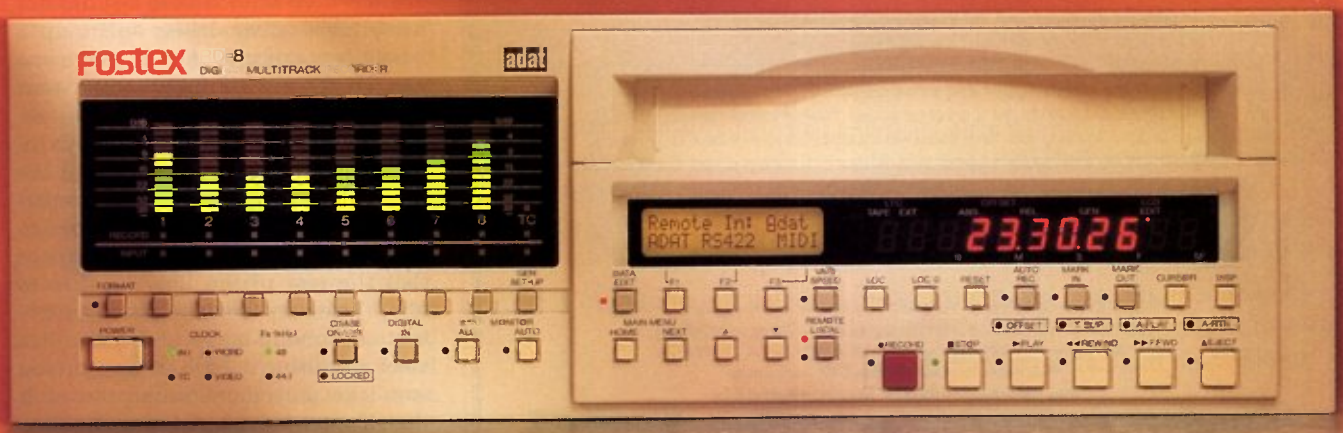

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cian can coax out of a true acoustic instrument. Second, note-to-note transitions are under the direct control of the user, just as they are in an acoustic instrument — a very important feature that again lends tremendous realism to the sounds produced. Third, there is no munchkinization problem at all, since each note is being created from scratch. And last but not least, physical modeling opens up a whole new range of sounds, since you can create virtual instruments that have never actually been built — or, owing to the physical limitations of materials, could never be built in the "real" world. Bear in mind again that the model is generally programmed to obey the same natural laws of physics that the rest of the universe has to obey. If you try to construct, say, a 20-foot saxophone made of 3-inch thick steel and using a 2 x 4 as a reed, you won't get any more sound out of it than if you tried to build the real thing. On the negative side, the two major drawbacks of these instruments are that they require an enormous amount of real-time processing power (though relatively little memory), and that they demand a good deal of time and effort on the part of the musician — almost as much, in fact, as any acoustic instrument. (Remember the first time you ever blew into a trumpet or sax? You'll probably sound just as bad the first time you play a VL1.)

In the months and years ahead, there's a good chance that physical modeling synthesizers will become the de facto standard, just as sample-playback synths are today. Already, Yamaha has released the VL1, which probably represents a sneak preview into future Yamaha products (just as the GS1 and DX1 preceded the DX7). The company has also announced the imminent release of the VP1 synth, which utilizes "F/VA" (Free-oscillation type VA) synthesis, designed to emulate acoustic instruments that require only an initial burst of energy and then resonate for the duration of the sound, such as percussive and plucked instruments. This synth will provide 16-note polyphony (as opposed to the two notes provided by the lead instrument-oriented VL1). The cost of the VP1 is yet to be announced, but it is expected that it will be in the upper stratosphere of synth pricing. One can only speculate that future Yamaha

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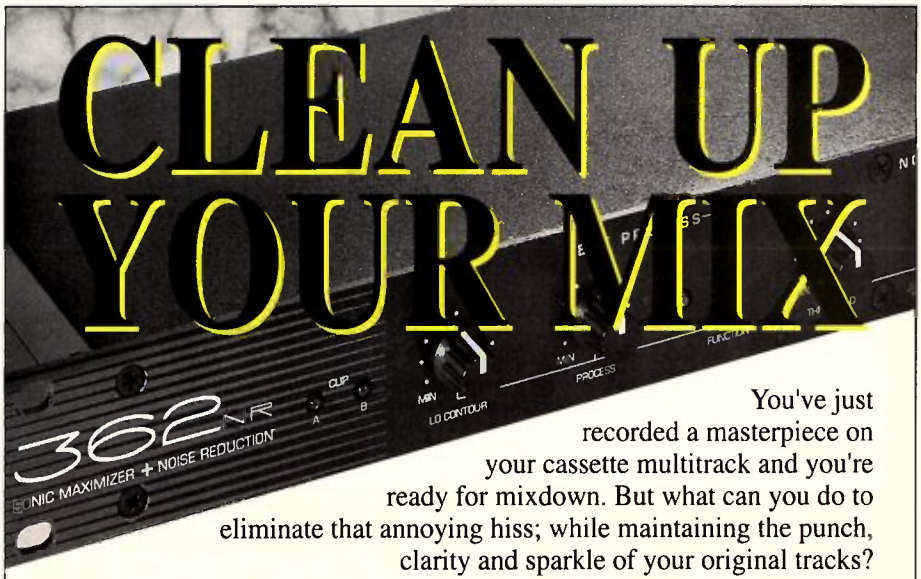
physical modeling synths will become available at lower price points, though possibly with different feature sets.

Other manufacturers have also invested time and money into developing physical modeling systems (unlike the case with digital FM, there is no exclusive license involved here). Korg has announced it will shortly be releasing a product called the WaveDrum. This unique percussion instrument resembles a practice drum (it uses a standard drum head — the tension of which can be adjusted — and a steel rim for rim shots), and its physical modeling algorithm enables it to respond instantaneously not only to the force with which you strike it, but also to the location of the strike. The WaveDrum will even respond to the use of brushes, mallets, and different types of sticks — just the way a real acoustic drum does! In addition, a foot controller enables further real-time control by the user.

MediaVision also has announced that it plans to release a PC sound card that uses physical modeling technology to produce preset voices. This product — which is expected to cost little more than standard PC sound cards utilizing wavetable or FM synthesis — could help pave the way for physical modeling to dominate the consumer as well as professional synth markets. And research into physical modeling continues, not only by manufacturers, but in academic centers such as Stanford University, where papers have been published describing physical modeling systems for mallet instruments (such as vibes, marimba, and glockenspiel) as well as the human voice.

Where it once may have seemed hazy, the future of synthesis now looks clear. If you're tired of wandering in the wilderness of sample-playback synths, physical modeling provides a new horizon ahead for the musician who is willing to live on the cutting edge of technology.

***Howard Massey** virtually heads up On The Right Wavelength, a MIDI consulting company, and also runs Workaday World Productions, a full-service music company. He is the author of numerous books, including* **The Complete DX7** *and* **A Synthesist's Guide To Acoustic Instruments.**



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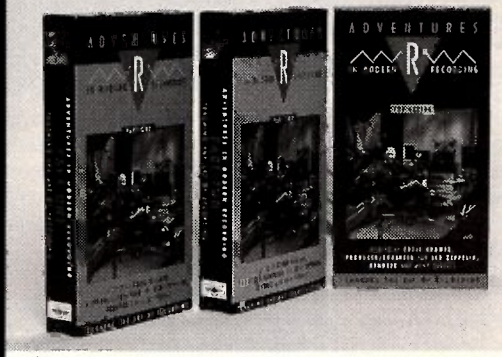

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Introducing the Alesis **Matica™ 500** and **Matica™ 900 High Speed Wide Bandwidth Dual Channel Power Amplifiers**. The first amplifiers to offer accuracy, precision and refinement with the performance of brute force audio machines. These are terms not often associated with professional audio amplifiers. But this isn't the first time Alesis has rewritten the rules.

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In the studio, the Matica amplifiers can handle the most critical reference monitoring situations. To accurately reproduce every nuance of today's digital recording, your amplifier must be able to keep up with the fastest audio transients. This ability is the slew rate of the amplifier. Matica's slew rate is a blazing 80 volts/microsecond and the frequency response is flat out to 80 kHz, for crystal-clear definition of high frequency detail without phase and amplitude distortion... a must for a great mix. The wideband noise is better than 103 dB below full output, A-weighted, and the typical midband distortion is better than .009%, making Matica an incredible amplifier for *any* recording studio application. Especially yours.

PRECISION

Matica amplifiers also have the muscle needed for professional live sound reinforcement. Most amplifiers have problems dealing with the low impedances typical of many live sound applications. We designed Matica amps to maintain their brilliant sonic characteristics while producing exceptional 2 ohm power ratings (350 and 680 watts for the 500 and 900 respectively). Matica uses the latest generation of ultra fast, linear power semiconductors, with high SOA (Safe Operating Area) ratings for improved reliability. Matica's high density, high efficiency, bobbin-wound power transformers produce more power and less heat than conventional units. When you're really rockin', Matica's high current output relays protect the amplifier (and your speakers) from turn on/off transients, over temperature, RF interference, DC offset, audio signals below 5 Hz, and excessively

Matica Power Output Rating — *Typical, 1kHz 1%THD, both channels driven.*

Amplifier	8Ω - 2 CH	4Ω - 2 CH	2Ω - 2 CH	8Ω - BRDG	4Ω - BRDG
Matica 500	162 Watts	250 Watts	350 Watts	500 Watts	650 Watts
Matica 900	270 Watts	450 Watts	680 Watts	900 Watts	1350 Watts

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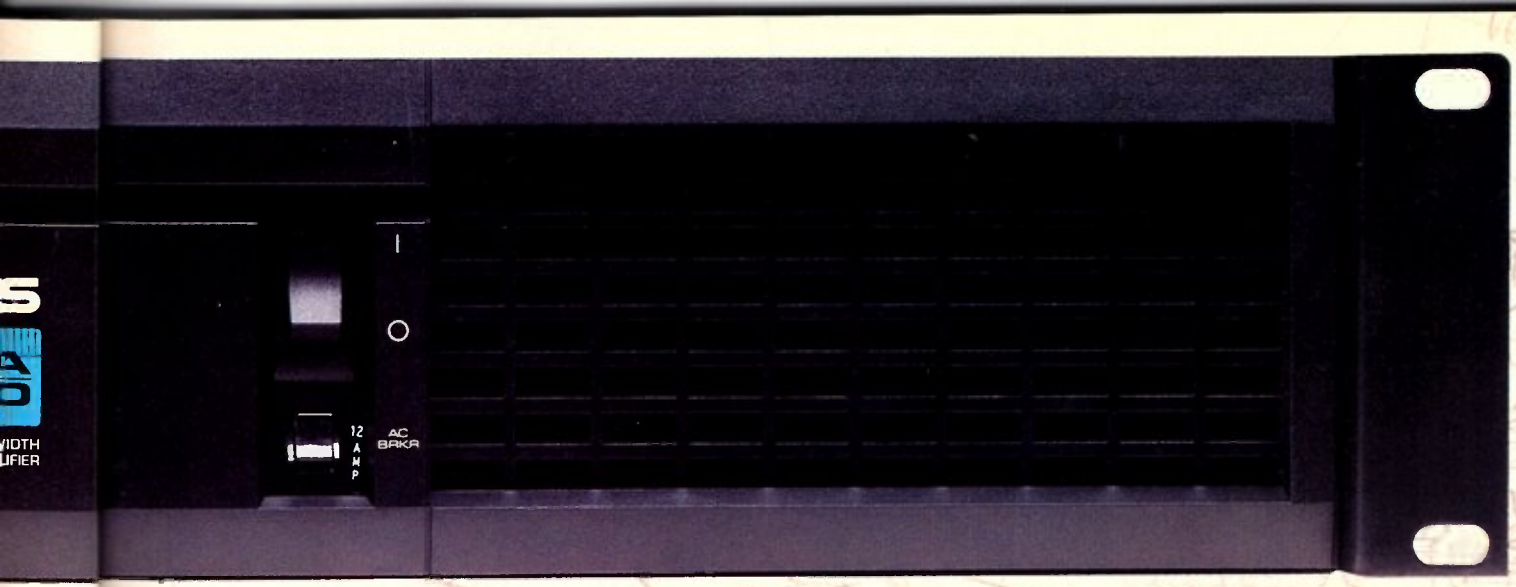

Power Amplifiers Machines

low line voltage, keeping all your gear (and your audience) happy. If something does go wrong, Matica's front panel resettable circuit breaker gets you back up and running in a hurry. In addition, Matica's rugged 19" two rack-space chassis is built to withstand the torture of the road. Serious amplification has never been so tough while sounding this great.

REFINEMENT

Matica amps employ balanced, 1/4" gold-plated TRS/XLR connectors and, for permanent installations, barrier strip inputs. Outputs are on five-way binding posts that accept heavy-gauge speaker wire and banana plugs. A recessed rear panel switch allows you to select stereo or bridged mono modes. Matica also features the new aLink™ Amplifier Interface, a 25-pin rear panel jack that is a platform for system level accessories from Alesis and 3rd party manufacturers. Future aLink interfaces will expand Matica's capabilities by allowing you to control levels, interface crossovers and signal processors, and monitor protection circuitry from a remote location. Finally, Matica's CoolSync™ (Patent Pending) Thermal Management System combines a whisper-quiet, dynamically controlled, brushless DC fan with a massive extruded aluminum heat sink to keep the operating temperature under control. CoolSync eliminates thermal cycling, which hinders both output power at low impedances and long-term reliability of other amplifiers. It makes Matica amplifiers cool by any definition.

The Matica 500 and 900 were designed by experienced engineers who have created extremely high-end reference amplifiers as well as bullet-proof touring amps. Now, with Matica, they've created what could be their crowning achievement. Gear up for the ultimate in amplification at your Alesis Dealer. Matica. The Power of Alesis.

CIRCLE 01 ON FREE INFO CARD

For more information on the Matica 500 or Matica 900, call 1-800-5-ALESIS or see your Alesis Dealer. Matica 500, Matica 900, aLink and CoolSync are trademarks of Alesis Corporation.

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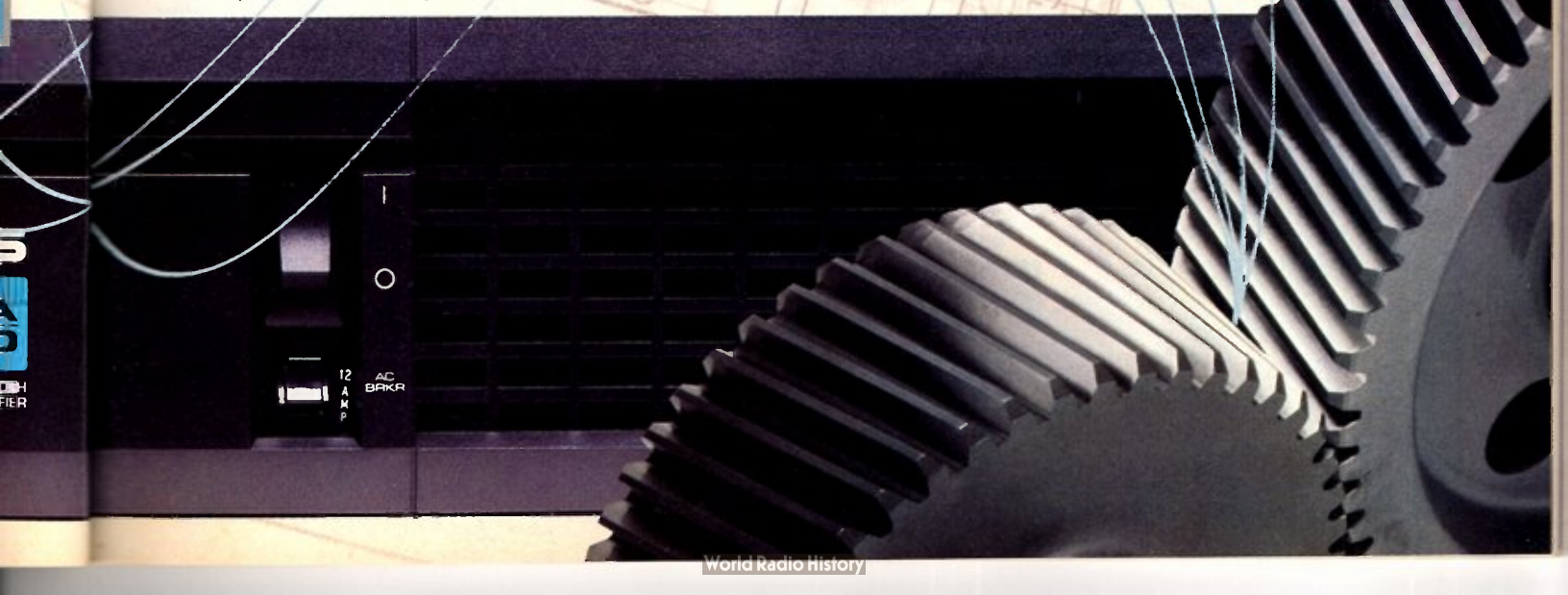

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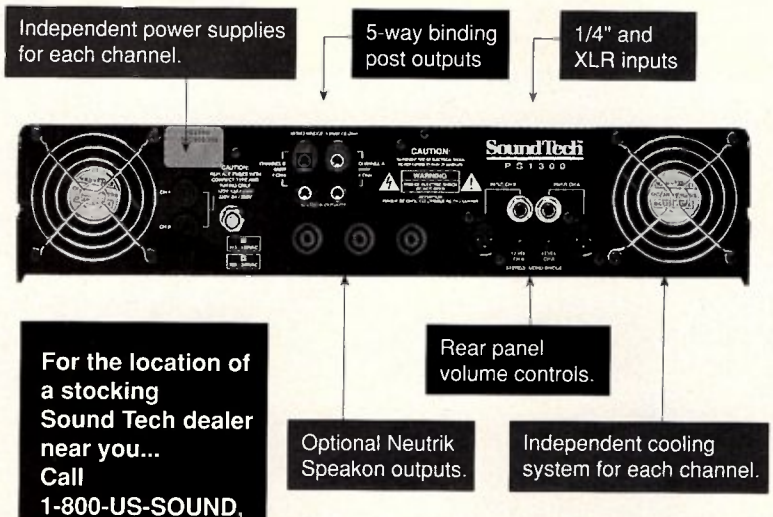

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BLOOD, SWEAT...AND MORE SWEAT

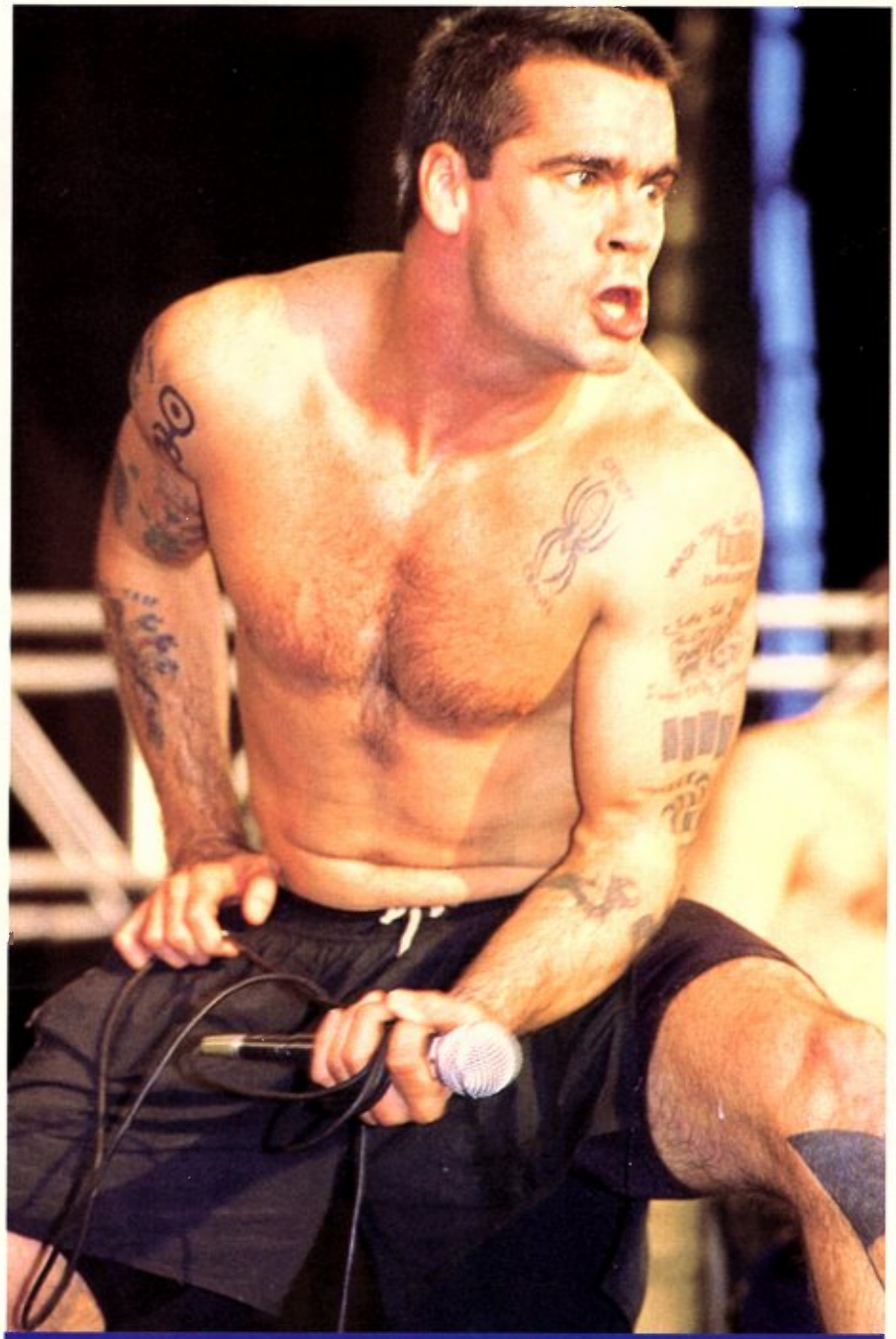

Photo by Justin Thomas

ROLLINS BAND'S SOUNDMAN AND ENGINEER, THEO VAN ROCK, TAKES *EQ* BACKSTAGE WITH THE BAND THAT GIVES NEW MEANING TO THE TERM "PLAYING WET"

BY STEVE LA CERRA

HENRY ROLLINS describes Theo Van Rock as "the only soundman this band has ever had." But Van Rock's involvement with the Rollins Band goes much deeper than just being a soundman. Van Rock produced *Weight*, the most recent release from the Rollins Band and, in the words of front-man Henry Rollins, Theo "knows when we do a good take and he knows how the band should sound. There's no one else who could have done it." *EQ* recently caught up to the man who best knows the sound of the Rollins Band to discuss the live aspect of the band's sound.

EQ: How did you hook up with Rollins Band?

Theo Van Rock: About 7 years ago I was producing a band called Gore — a really heavy instrumental band with just bass, drums, and guitar. They organized a three-month tour with the Rollins Band. At the time I had never heard of the Rollins Band, although I had heard of Black Flag [Henry Rollins's previous band]. I was going to do the live sound for Gore and I was asked to also do the sound for Rollins. I said, "Yes, why not?" I got a tape of the Rollins Band and I thought it was really cool. I did sound for them for three months and it worked out very well, so I have stayed with them ever since.

And you do their studio recordings as well?

Yes, whenever possible.

Then you would have a lot more knowledge about the band than the average sound person.

Probably yes. I'm also there for rehearsals as much as possible.

It sounds as though you are almost a band member.

You could call it that.

How do you handle bringing the studio sound of the band out live? Does the band try to sound live the way they do on their records?

I think it is the other way around. The live sound is what the band is all about and that is what should be on the record. Of course, when you work in the studio you have more possibilities and you use them. The basic sound of the band is what happens live.

And what is your approach to mixing them onstage?

My approach to mixing them is to translate what is happening onstage — to be able to hear every note as loudly as possible [laughs].

Are the musicians getting their sound from the instruments or are you doing effects from FOH?

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CIRCLE 85 ON FREE INFO CARD

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Photo by Justin Thomas

I do as few effects as possible. Their music tends to be very full-sounding. Melvin Gibbs, the bassist, has a 5-string bass that has a wide frequency-spectrum range. The guitar player, Chris Haskett, uses a 6-string guitar with quite a few effects. He uses a wah-wah pedal, a phaser, an echo, and a whammy pedal. So I don't really need to put any more effects on top of that.

He is creating his effects onstage.

Yes.

What kind of rig is the bassist using?

He is using a Mesa/Boogie rig.

And you mic the rig?

I mic the rig, but I also use two Demeter tube DIs. Melvin has some effects as well, such as a Mutron unit, a distortion pedal, and a wah-wah pedal. One DI picks up the wet signal and the other picks up the dry signal.

What kind of mic are you using to mic the cabinet?

I use different kinds, depending on what kind of mood I am in. At this point I'm using an Audix D-Three dynamic mic. It sounds really warm, doesn't pick up much bleed, and is nice and tight in the low to midregister.

The effect output goes into one Demeter unit and a direct line is connected into the second Demeter unit. We split up the lines because he is using two amps. It's basically two rigs — one wet and one dry. The signals coming out of the Demeter DIs are routed straight into the board. So there are three separate channels happening: two DIs (one wet, one dry) and then one mic in front of the wet cabinet.

That's a pretty complex bass sound.

Yes it is. He is using one big cabinet with two 18-inch speakers in it, and he's using two 4 x 10 cabinets (mainly for the wet sound). All the cabinets are Mesa/Boogie.

How are you handling the guitar player's rig? Are you just putting a microphone in front of it?

Actually I use two microphones. Basically, Chris has one rig and I mic it with two mics. It depends what mood I'm in and what mic I like at the time, but I usually use Shure mics. Sometimes I'll use an Audix D-Three and a Shure SM-58 or a D-Three and a Shure SM-57. If I get tired of the 57 I switch the mics around, but they are all dynamics.

Does he have a stereo cabinet where he can run half wet and half dry?

No. It's all in one cabinet and it's mono as hell — and it is a hellish sound.

But it's appropriate to what the band is doing?

Oh, definitely. Chris is also using a clean sound for certain parts. He has a switcher so he can go to a nondistorted sound with no effects. That's on a separate amplifier with a 12-inch Celestion speaker and he switches amps with an A/B switcher.

What mics are you using on the drum kit?

It is a big kit — kick, snare, three rack toms, two floor toms, and four Octobans. Sim Cain, the drummer, uses a china [cymbal] on each side, two crashes in the middle, a splash cymbal, a ride cymbal, and the high hat. I am using Shure mics, except for the kick drum where I use the AKG D-112. I like the tight pick-up pattern of the D-112 mic and it can handle a lot of SPL. On the toms I use the Shure SM-98's because to me they are the most natural-sounding condenser mics.

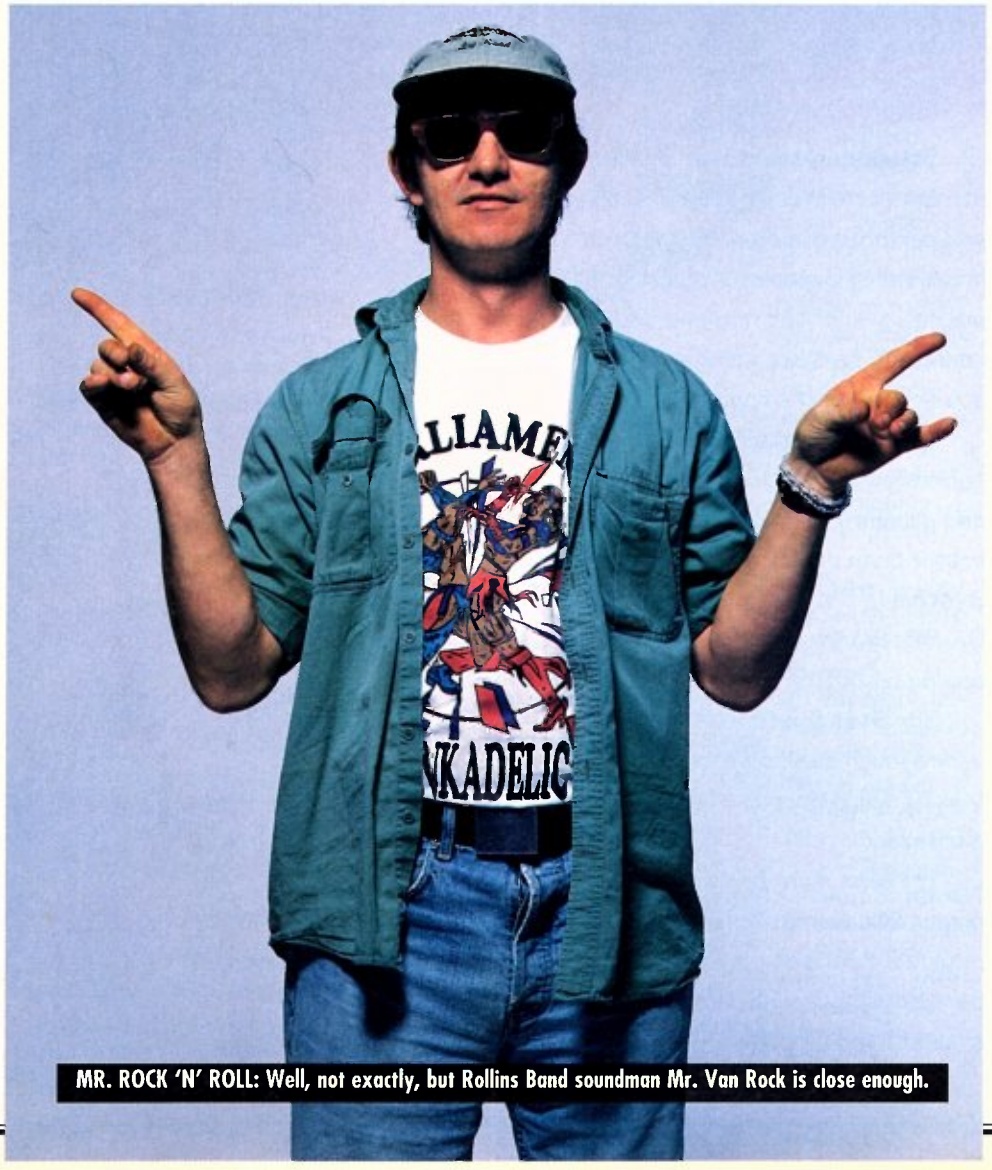
And they are easy to place...

You can put a little claw on each mic and place it just above the drum head.

Are you using them on the floor toms as well?

Yes.

Do they pick up the low end well?



MR. ROCK 'N' ROLL: Well, not exactly, but Rollins Band soundman Mr. Van Rock is close enough.

Photo by Ross Halfin

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Photo by Ross Halfin

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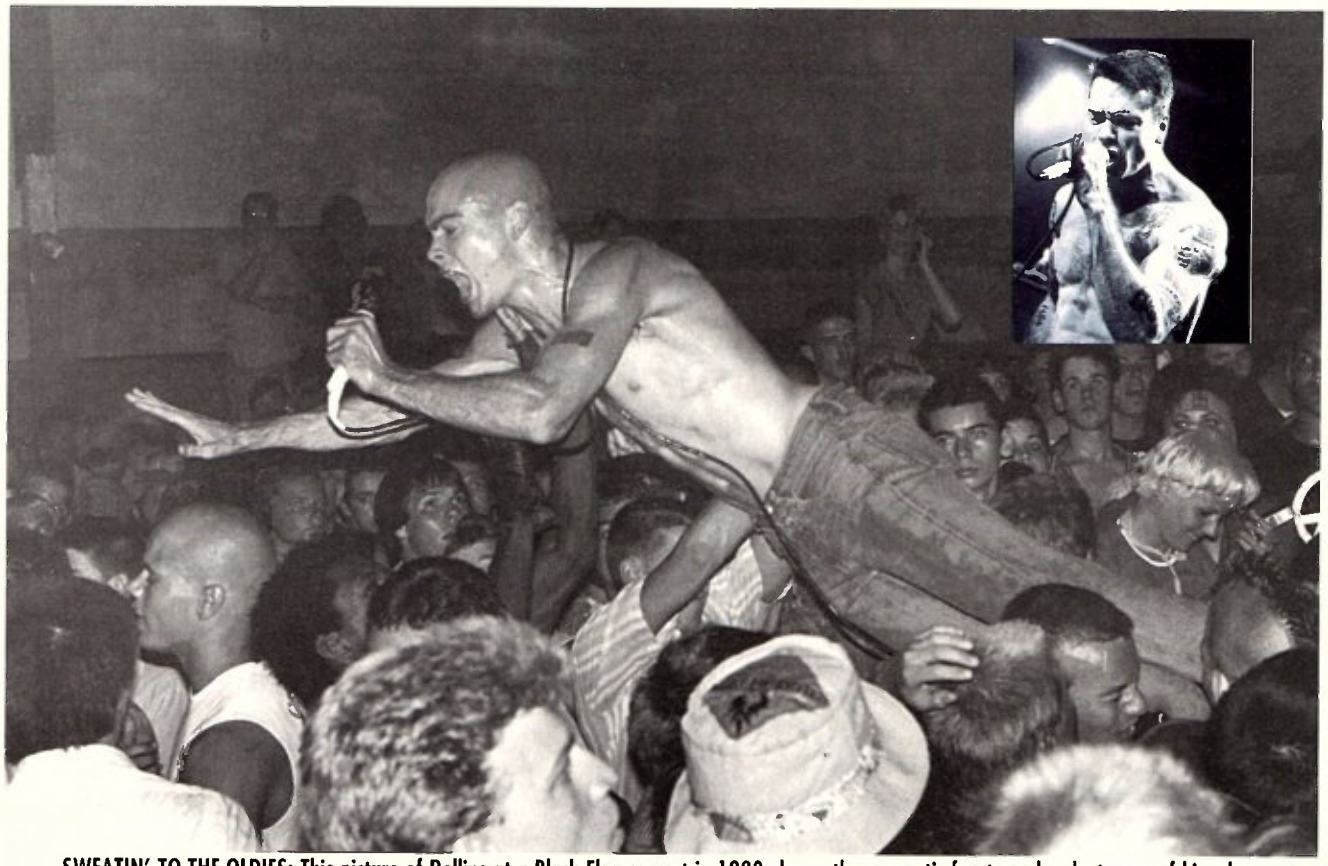

1980 photo by Ed Colver

SWEATIN' TO THE OLDIES: This picture of Rollins at a Black Flag concert in 1980 shows the energetic frontman has lost none of his edge; but has gained quite a few tattoos, muscle mass, and some hair.

Yes. I didn't think they would, but they do. And I don't particularly like the really low end of the floor toms — the 40 Hz and 60 Hz. I don't really need that because the [5-string] bass guitar as a whole (especially with a low B string) has such a rumble to it. The lowest frequencies from the toms would get lost in the sauce, anyway.

So if the mic rolls that off naturally, then it really is not a problem.

It's not a problem at all. It's just making room in the mix for the bass player.

Are you using an SM-98 on the snare drum as well?

No, I am using an SM-57 on top and a Beta 57 on the bottom. The Beta has more high-end character to it, which is good for the bottom of the snare.

What about the cymbal mics?

At this point I am using Shure SM-81's for the overheads and the high hat as well. The overhead mics are arranged as an X-Y stereo pattern. I mic it as straightforwardly as possible, and I don't use a lot of effects, either. The only efffects I use live are some very light plate reverbs on the toms — really light and not over-effected. I like the natural sound of a drum. Sim is playing with a lot of dynamics and I don't particularly like to overuse the effects. The only thing that I really use reverb on is the snare.

What unit are you using for the reverb sounds?

I've got a couple of Yamaha SPX990's now, but I'm pretty happy with an old Yamaha SPX90 II or Lexicon PCM-70.

How are you miking the lead vocal?

I use a Shure SM-58. I used to use a Beta 58 because it had a little more crunch to it. But Henry is a man who sweats a lot and spits a lot and I had to use four or five mics per gig. The Beta is made in such a way that sweat and spit eats away the element. After just one gig with the Beta 58 I can throw it away. It loses the high and low ends and takes on this nasal tone that causes a lot of feedback in the monitors, and out front as well. I went back to the old 58 and I still use at least four per gig, but I can reuse the old ones again. I dry them out, clean them, and let them sit for a couple of days.

Are these mics wired or wireless?

Wired. I have about 40 of those and some of them are hanging out to dry [laughs]. After about three gigs they're gone, so I send them back to Shure where they're refurbished and sent back to me.

Are you using any effect on Henry's voice in FOH?

Just some long echo in certain songs, like from 400 to 700 ms. I have a Lexicon PCM-42 for that and I do run compression on the vocals. I also run about a 4:1 compression ratio on the bass DIs as well. And I gate the kick and the two floor toms.

Are there any particular gates or compressors that you like to use?

In my rack I have some BSS units that I like because they sound natural. But when I'm on the road and I don't bring my own equipment I use all kinds of gear. I can use whatever comes up.

When you come into a new room is there a method you have for EQing or tweaking the system?

It depends on what kind of room it is and what kind of equipment is available. If I have an analyzer, I can ana-

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1980 photo by Ed Colver

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For more information about the full line of Behringer signal processing, please call (516) 932-3810, fax (516) 932-3815 or write to Samson Technologies Corp., P.O. Box 9068, Hicksville, NY 11802-9068.

Suggested retail price for Ultrafex II is $349.99.
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EQ LIVE

Photo by Justin Thomas

SELLING OUT: The Rollins Band plays to full capacity crowds.

lyze the PA. If not, I pick up a mic and talk into it, making various weird noises to find the ringing frequencies. Then I will EQ the system as I go, but I won't over-EQ the system because that only causes a lot of phasing problems. Also a soundcheck in an empty hall sounds a lot different from when the room is full of people.

So you are more likely to EQ on the channel than in the house?

Yes. I'd rather do that. Also I try not to take too many frequencies out, since the difference between the soundcheck and the gig is so great.

How loud are you pushing these shows?

About 110 dB. Sometimes the clubs have a dB limit and I'll keep it to 90–100 dB.

Have you run into situations where the club managements asked you to turn the PA down?

Yes. I easily respond to that and turn it down The thing is that you can play loud and you can play *loud*. You can play loud at 110 dB, but you can also play loud at 100 dB. The dB level does not necessarily mean that you are playing screechingly loud. I don't want to hurt my ears or anyone else's, so if my ears are hurting then it's my fault. There are a lot of PA guys who want to play loud because they feel they have to. But you listen to the sound and it screams in your ear. They are working on 110 dB or 120 dB, but they are killing people. I don't like to do that. I try to remove the frequencies that are screeching. I like to have tons of low end, but in order to do that you need a lot of power. Obviously when you have a lot of power you will play loud, but that doesn't necessarily mean that everyone's ears are bleeding.

You can still get people to feel it without hurting them.

Exactly. I'd rather get the feeling into your stomach than cause pain in your ears.

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The Basic Principle Behind Our New Compressor.

Photo by Justin Thomas

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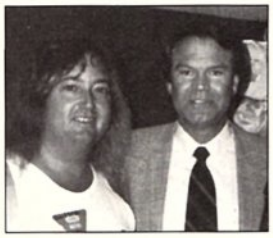

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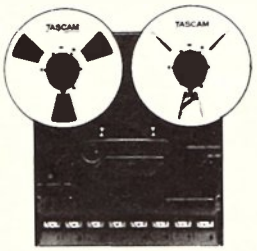

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EQ LIVE

Have you had any interesting technical problems come up?
The only technical problem I have is lousy PA systems — and there are a lot of those on the U.S. circuit. Other than that, I try to keep things as simple as possible. My motive is to translate what is happening on stage with a little bit of enhancement, and even if the PA is really bad, I can accomplish that.

How is the audience reaction to the Rollins Band shows?
Usually pretty good. They get rowdy sometimes. We don't particulary like stage diving and that kind of nonsense, so we try to keep the kids offstage and just blow them away with the music. As you know, the hectic music and the lyrics are really important to the Rollins Band, so people get nuts.

Has this ever been a problem?
Sometimes the kids get too excited or just plain stupid. For example, some guy jumped off a balcony and actually hit Henry. Henry just fell flat on the floor. It completely knocked him out. It stopped the show for a minute or two. It happened in the middle of a song and Henry was a bit shaky. He got up and shook his head, and said, "Well we're just going to continue from where we left off." And that is what they did. They finished the show.

How did Henry handle it?
He took it like a pro and decided to show those kids that nobody can stop the Rollins Band! So he finished the whole show. He was still a little groggy afterwards and it took him a couple of days to get over it completely. But we continued the tour. Stuff like that sometimes happens. That's rock and roll, and you can't stop the rock — otherwise my name wouldn't be "Van Rock." EQ

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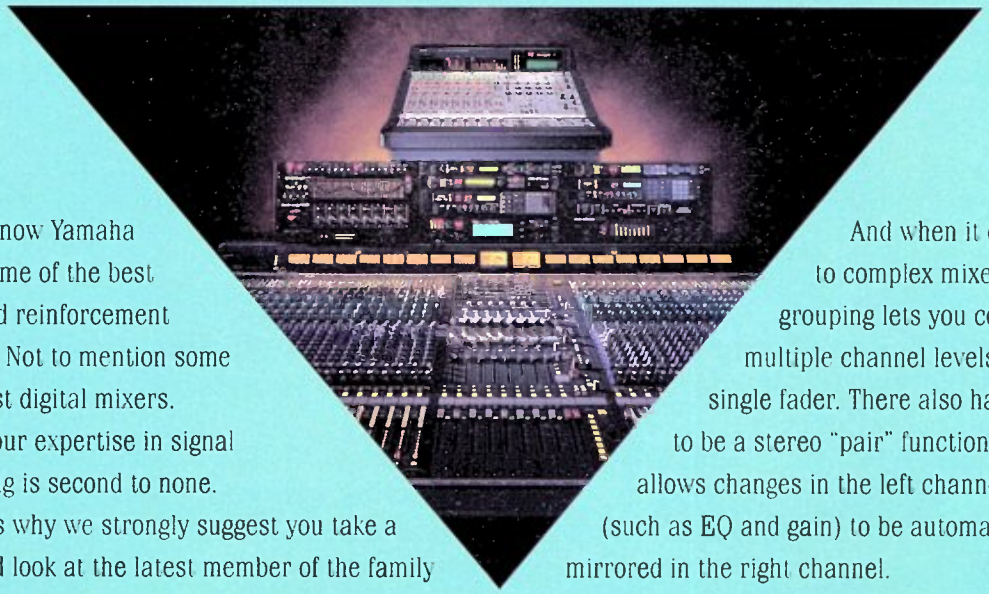

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PANIC ON THE ROAD

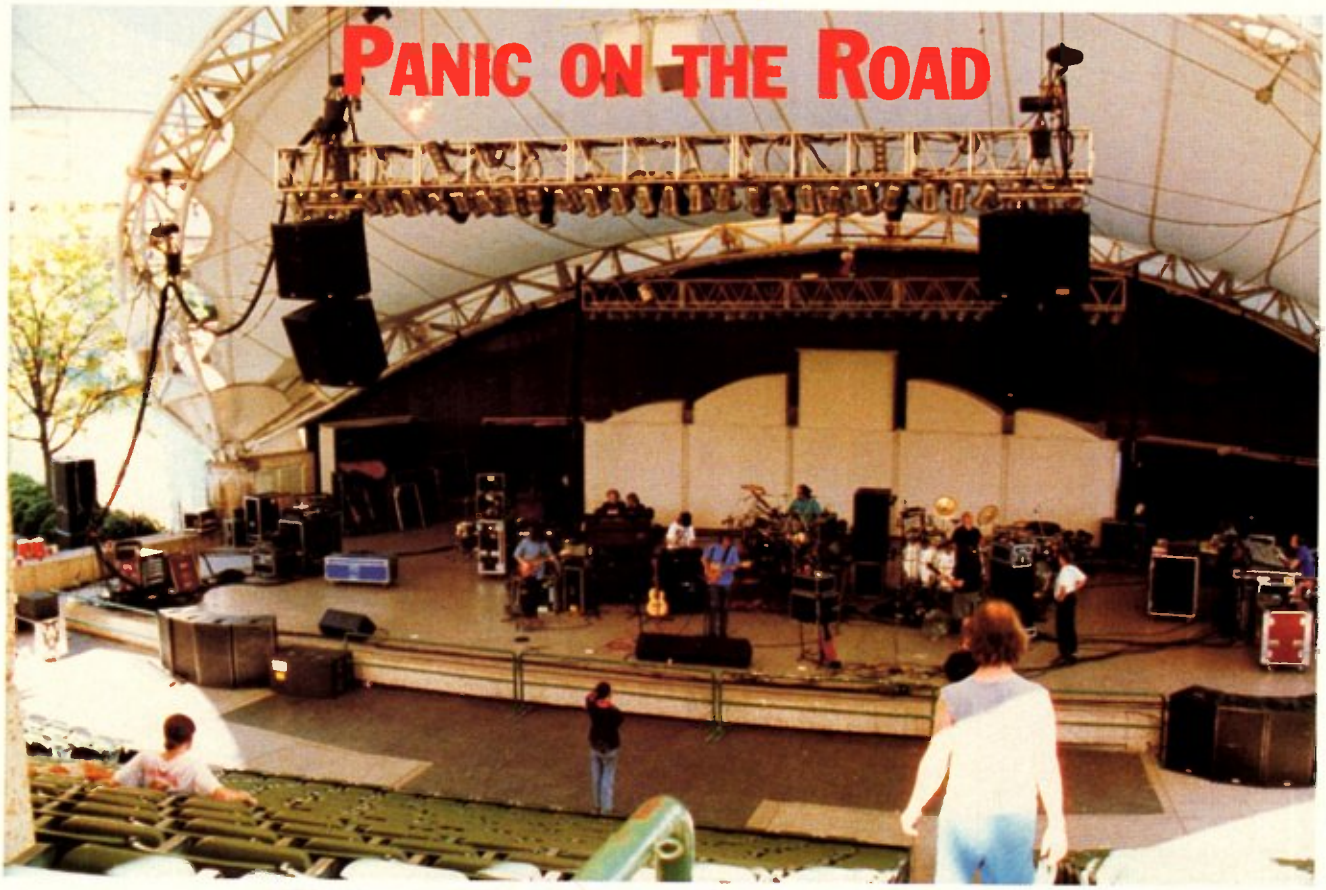

Photo by Daniel Friedman

PANIC BEFORE THE SHOW: Soundman Wes Delk makes sure the EAW rigs keep flying high.

WIDESPREAD PANIC MAKES LIFE GRAND WITH A RAMBUNCTIOUS SHOW, A SOLID TOURING RACK, EAW SPEAKERS, AND A FEW DINOSAURS

BY LIANA JONAS

FOR EIGHT years now, Widespread Panic has been on the road hitting clubs and colleges across the country. After two summers with the HORDE (Horizons Of Rock Developing Everywhere) tour, Panic is back out on the road again promoting their latest release *Ain't Life Grand* (Capricorn Records).

Wes Delk has been doing sound for Widespread Panic for three years. Before jumping on the Panic bandwagon, Delk engineered the front-of-house for the Indigo Girls, bands in the northern Georgia area, and other notables. For this tour, Delk and the Panic boys have traveled to venues in major market areas such as Los Angeles and New York, and are relying on the EAW KF850 three-way speaker system to relate the band's raw energy to the crowds in attendance. They are also using a solid touring rack that features a combination of new and vintage equipment. The engineering crew is made up of Bill "Gomer" Jordan on the monitor mix; Danny Friedman, systems engineer of Eastern Stage Productions; and Delk on front of house. Delk took some time away from the console to tell us what all the panic is about.

EQ: What is it like working with Widespread Panic, as opposed to, let's say, the Indigo Girls?

Wes Delk: These guys seem to have a little bit more fun with the show, not to say that the Indigos didn't. Everyone got started doing this because it was fun. The Panic guys play because they love to play.

What speakers are you using for the FOH?

We're using the Eastern Acoustic Works KF850's. I carry 16 tops and 12 subs, but on many occasions I cross-rent and augment the system.

What console are you using for the FOH?

I'm using the Gamble EX-56. Even though it's got 56 inputs, I'm already out of channels. I'm having to use matrix inserts for line returns. There are 47 or 48 lines coming from the stage and then the rest are evened up with effects channels. After the 56th channel I route some things through the aux returns. There are about 60 inputs going on.

What do you do if you have expired all your 56 inputs?

I've got the Mackie 1604 that I add into for extra inputs. It makes no noise — it's a beautiful little mixer.

What are you using for FOH effects?

We use a Lexicon PCM-70 PCM-42, and two LXP-15's, a Yamaha SPX990, and two Yamaha D1500 delays.

How are you monitoring the FOH mix?

I have two nearfield monitors out front instead of headphones. I use a Yamaha REV7 for delaying them. There are so many channels that I find it easier to solo stuff with the speakers and get a better idea of what the tone actually is. I just don't have time to go back and forth to the headphones.

How do the Panic guys like to sound to their audience? Is it a different sound from that of their album?

Well it's funny you say that, because the last album they

World Radio History

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Engineering Responds.

"Impossible," they answered. "Even marketing people should know you can't just 'cut down' an existing mixer to come up with a new one. It has to be designed from the ground up. Which takes a great deal of time and serious thought. We might even have to develop new manufacturing techniques to come close to your target price."

"Details, details," we answered. "You gotta look at the big picture, fellas. We know you're talented enough to pull this off if you really put your minds to it."

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When our chief engineer came in six months later with a prototype of the new MPL 1640, we weren't really that surprised. But when we listened to it, we all started rolling around on the floor and barking like dogs.

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Our technical support wizards will be glad to dazzle you with all the specifics about the MPL 1640 Compact Mixer and all of our visionary audio products.
*Actually "tricked" is more like it. †Suggested retail list price. $699.99. ©1994 SAMSON

CIRCLE 83 ON FREE INFO CARD

World Radio History

MONITORING WIDESPREAD PANIC

Bill "Gomer" Jordan is in charge of what happens on the stage at Widespread Panic's shows. He's running the mixes from the Crest LM 52 x 8 x 4 console. Four of the band members are using Future Sonics in-ear monitors, leaving three EAW SM-22 monitor wedges for the whole stage. Jordan had this to say about in-ear monitors, the monitor mix, and the whole Panic experience:

"In-ear monitors are the way of the future. They free you from having to stand in front of the wedges. Also, you don't get the ear fatigue that you get after a ten-week tour of listening to 115 dB SPL coming right back at your head. The best thing about the in-ears is that the mix comes out the same every night and you don't have to deal with a room's acoustics. The in-ears give the FOH engineer a lot less volume on stage to deal with so that he can mix better. By the next tour, we'd like to have all the band members using the in-ear monitors.

"To give the band some ambiance, we run a couple of PZMs on each side of the stage. They can hear the crowd, a little bit of the PA, and so on. For the in-ear mixes we use the Aphex Dominator as a stone-wall limiter. It basically takes away anything over 106 dB. I wouldn't stick ear plugs in anybody's ear without that.

"For my monitoring purposes I go back and forth between the wedges and the in-ears. I listen to a cue wedge for the non-in-ear musicians and I listen to a pair of headphones for in-ear musicians.

"This tour is being recorded live onto six TASCAM DA-88's and the recording is done off the Crest console. We have an extra DA-88 in case one shuts down. We make sure that we get a good signal and that it's not too hot. The recording is done pretty dry, and we'll take it to the studio later on to mix it all down. What we use this live recording for depends upon how good it sounds!"

did (*Everyday*) was produced by a friend of ours and sounded like a "studio" album; the tones were real clean, and so on. On this last album we had a new producer, John Keane (who had produced band's first album *Space Wrangler*), who brought it back to sounding like a live show. The new album is a lot more raw and in-your-face. So we wanted the live shows to sound like the record, and it's pretty much getting to that point. It's a pretty rambunctious little show.

What are you doing to capture that live sound from the album?

This is the funny part. I tend to like old dinosaur equipment. I go around and try to find antique gear. I have these two dinosaur Roland 201 Space Echoes, and I use them for the guitars. I believe they are from 1978. And that's an integral part of what the guitar sound is. The guitar player, Michael Houser, likes to play along and off of the delay, but he doesn't like fooling with it from the stage so we just do it from FOH. The Space Echoes are so much warmer than any digital stuff that I've ever been able to find. Local groups get a kick out of the dino equipment. When we roll this rack in, they're like, "Man, I used to have one of those."

Where did you dig up these extinct dinosaurs?

One of these units, the Roland Space Echo, came from a guy's attic. He was the building manager at Littlejohn Coliseum in Clemson, South Carolina. He saw the one that I had and said, "I've got one of those too." I asked him how much he wanted for it, and he told me that he'd take 75 bucks. That's the unit that I use on the tour.

Got any more dinosaurs?

I've got some old Eventide instant flangers and an old 910 that I use. Just recently I found this ART MXR-01a digital reverb, and we're using the daylights out of it. The instant flanger I basically use on the bass, and I've been using the MXR on the rack toms. Even though the MXR is this old dinosaur, it sounds great.

Is there an effects setup that's a bit out of the ordinary?

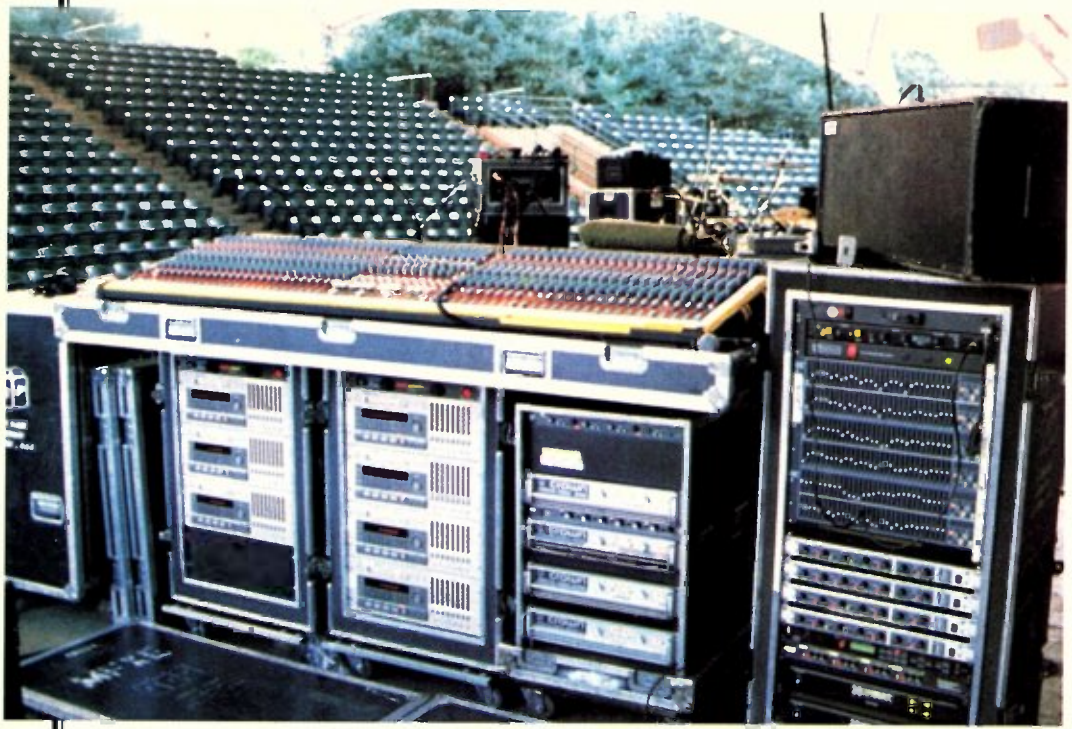
Dave Schools, the bassist, has an LXP-15 integrated into his bass rig. It's hard-wired into his amp through an effects loop. It sounds great.

Have you run into some acoustically troublesome venues?

Indoor field houses at the colleges. They're the size of a football field and are usually made out of cement and metal, which are every sound guy's "best friend." For those shows, I tend to mix pretty strangely. I usually sharpen the top and bottom of the whole lot, and there's usually a lot of cuts in the midrange area. Low mids are horrible in these places. The rooms are usually rectangular and cause standing waves, and you just have to deal with those. I don't like those buildings. I love theaters.

Have you experienced any technical disasters on this tour?

We were at a field house, see, I don't like those field houses! Anyway, they had wanted us to tie our distribution into a wire that was not much bigger than a lamp cord. It ran the length of this field house — about 350 feet — so we wouldn't do it. We tied in with the lights to this generator that they had. The generator went flaky during the show. All of a sudden the amps started going on and off at their will, and the lights went out. The generator just freaked out. The show was down for less than five minutes when we tied into somewhere else. There wasn't nearly enough current to do the job, but we pulled it off. EQ



PANIC BACKSTAGE: Widespread Panic records all their live shows onto seven TASCAM DA-88's.

Photo by Daniel Friedman

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CIRCLE 44 ON FREE INFO CARD

Photo by Daniel Friedman

World Radio History

EQ LIVE

MONITOR TROUBLES? STICK IT IN YOUR EAR, PART I

QUICK — think of your most important piece of equipment. Your 1959 Les Paul gold top guitar? Your vintage Mini-Moog synthesizer? Both excellent instruments for sure, but when you get down to it, your single most important piece of gear is your ears. And in case you haven't noticed, your ears may be the one piece of equipment that is irreplaceable. The weird thing is that there are a lot of performers out there who know this but *still* expose their ears to unnecessary abuse. While loud-playing musicians are often a source of this abuse, stage monitor systems (and monitor feedback) can be equally detrimental in cranking the onstage SPL up to harmful levels. When the band plays loud, the monitor level is typically increased as the vocalists desperately attempt to hear themselves over the other instruments.

DRAWING THE BATTLE LINES

Many musicians try to combat this problem by using ear plugs, and it's true that wearing ear plugs can reduce the SPL at the eardrum. Unfortunately, most ear plugs drastically change the timbre of the perceived sound, altering the instrument balance that musicians work so hard to achieve. Recently, "high-fidelity" earplugs that reduce the SPL while maintaining the tonal balance have hit the market, but their SPL-reduction ability may not be enough for some applications. Musicians using any kind of ear plugs should be aware that there is a natural tendency to increase the onstage SPL of their instruments, and this can be detrimental to band members or audience members who are not using ear protection.

The idea of using in-ear monitors for live performance is nothing new: artists like the Grateful Dead, Steve Miller, Phil Collins, and Gloria Estefan have been using such systems for several years. These systems have provided both hearing protection to performers and a means of obtaining studio-quality monitor mixes. But as with any new technology, their cost has been in the stratosphere and so accessibility has been limited to major performing artists. With the cost of in-ear monitor systems dropping into the realm of the club musician, safe, high-fidelity monitoring can be a reality for musicians of more modest means.

CMCI's C:MAX System.

WITH PRICES COMING DOWN, EVEN THE BAND-IN-A-VAN CAN MAKE THE MOVE TO IN-EAR MONITORS

BY STEVE LA CERRA

GETTING CONNECTED...

The source signal for an in-ear monitor system is basically the same as for any conventional monitor system: a send (or pair of sends in the case of a stereo mix) from the monitor console. Normally the monitor send would pass through an equalizer to a power amplifier and arrive at a stage wedge or side-fill speaker (positioned for a specific performer). When using in-ear monitors, however, the equalizer/power amp/speaker part of the monitor chain is eliminated and the send terminates at some sort of box that functions as a transmitter or controller for the system. This could be a rack-mounted unit or a stage box designed to sit near the musician. In a

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MEET THE MAKERS

Here is a listing of manufacturers who are currently producing in-ear monitor systems:

FUTURE SONICS
P.O. Box 187
1006 Holicong Road
Pineville, PA 18946-0187
Tel: 215-598-8828
Fax: 215-598-8827

CIRCUITS MAXIMUS COMPANY INC.
9017-B Mendenhall Court
Columbia, Maryland
21045
Tel: 410-381-7970
Fax: 410-381-5025

GARWOOD
c/o Firehouse Productions
176 Norman Avenue
Brooklyn, NY 11222
Tel: 718-383-5606
Fax: 718-383-8004

NADY SYSTEMS, INC.
6701 Bay Street
Emeryville, CA 94608
Tel: 510-652-2411
Fax: 510-652-5075

wireless monitor system, the box contains a transmitter that broadcasts the signal to a belt-pack receiver. If the system is wired, the box will connect to the belt-pack via an umbilical. In either case, the controller will have a series of audio inputs on the rear panel (usually left and right), providing transmission of a stereo signal to the belt-pack.

THE PROS...

The most important part of the in-ear monitor concept is that the "headphone" part of the system fits into the ear canal, as opposed to over it like a conventional headphone. The transducer device is fitted into a mold, usually custom-made for the person wearing it. The mold is intended to accomplish two things: to acoustically isolate the user's hearing from external noise and to increase bass response by coupling the transducer to the ear canal. Many manufacturers offer molds in flesh tones, making the ear monitor assembly less obtrusive. The connecting wires to the monitors terminate at a small-belt pack that (at the very least) provides the user with control over the volume level of the earpieces. On some of the more sophisticated systems (such as the Oracle Jr. from CMCI) the controller

BY SEALING OUT THE ROOM SOUND IN THE VENUE, VOCALIST CAN AVOID BLOWING THEIR VOICES OUT AND A CHANGE OF VENUE DOES NOT HAVE TO MEA A CHANGE IN THE MONITOR MI

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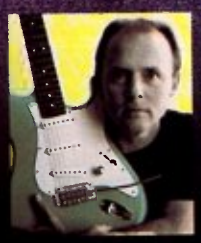
Recording Artist/ Producer



"IT'S RIDICULOUS! Excellent bass control, great harmonic detail, the 9505 Trans•nova is another level up in overall performance."

Tom Jung
DMP Records

"The new Hafler Trans•nova sounds great here at Capitol's Tower Mastering. Dependable as always - clear and detailed with wonderful bass response."

Wally Traugott
Tower Mastering
Capitol Records

"The first 20 Trans•nova 9505's ever produced are now in use at Warner Bros. Studios Facilities in Burbank, CA."

Claus Wiedemann
Chief Engineer

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CIRCLE 75 ON FREE INFO CARD

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WITH THE COST OF IN-EAR MONITOR SYSTEMS DROPPING INTO THE REALM OF THE CLUB MUSICIAN, SAFE, HIGH-FIDELITY MONITORING CAN BE A REALITY FOR MUSICIANS OF MORE MODEST MEANS.

may have an additional input for a microphone, allowing performer control over the mix via the belt-pack.

Since the mold seals the ear canal to outside noises, a performer can listen to the monitor mix at a much lower level than that previously needed to overcome the "free air" stage volume of the band. Because the monitor is now sealed within the performer's ear, the likelihood of monitor feedback is greatly reduced. For lead vocalists who like to run around the stage, a wireless in-ear system eliminates the worry of being in a spot on the stage where the monitors cannot be heard.

One thing that musicians will definitely notice is that the stage volume of the band will be lower because there won't be a lot of extraneous sound coming from monitors placed around the stage. For that same reason, the FOH engineer will be thrilled — he or she now does not have to deal with monitor mixes leaking into the mics and ruining the mix. By sealing out the room sound in the venue, vocalists can avoid blowing their voices out and a change of venue does not have to mean a change in the monitor mix.

Another advantage of the in-ear systems is complete isolation of each performer's mix. The dispersion pattern of a stage wedge or side-fill cabinet

PA for the 90's

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The Pulse 283 3-way cabinets and Pulse 12M 12" 2-way monitors complete the system with clear, smooth mids and highs.

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Niagara Falls, N.Y. 14305

IN CANADA
Yorkville Sound Ltd.,
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Pickering, Ont. L1W 3Y8

CIRCLE 68 ON FREE INFO CARD

IN-EAR FOR THE MASSES: Nady

World Radio History

can be difficult to control, and if the mix from a speaker cabinet is reaching the wrong person, then that person may be hearing the wrong mix. This scenario defeats the purpose of having multiple monitor mixes in the first place.

...AND THE CONS

Before you run out to buy a set of in-ear monitors, there are several things you need to know. The concept works best when the entire band wears in-ear monitors, thus eliminating traditional on-stage monitors. If only one person wears them, the band (and their monitor engineer) must take care to ensure that feedback doesn't happen, else the person wearing the monitors might experience hearing damage. In practice, the volume level in the earpieces is usually lower than that at which one might listen (for instance) to a Walkman in a train. To protect the user from excessive volume levels, some in-ear monitor systems have built-in limiting. When using a system that does not, an outboard compressor/limiter should be patched into the signal chain between the (console) send output and the input to the in-ear system. The limiter will set a ceiling on the volume level, keeping both the user's hearing and the ear monitors safe from damage.

In some systems the earpieces will have to be custom-molded and a trip to a manufacturer-recommended audiologist will be in order. Certain manufacturers will get intimately involved in the process of outfitting a band with in-ear monitors — and some won't.

Until this year, prices have ranged from several thousand to around the $10,000 mark *for one system*. Now we are starting to see in-ear systems for under $1000, and while this might sound like a lot of money for a club musician to spend on monitors, it is comparable to the cost of a pair of high-quality wedges, an equalizer, and a power amp. (See the sidebar for a listing of companies that are manufacturing in-ear monitor systems priced at under $3000.)

SUMMARY

An in-ear monitor system cannot be viewed as "just another piece of gear," because proper operation of the system is crucial to the health of the user's hearing. But in-ear systems (used properly) can help avoid the two leading causes of hearing damage among musicians: excessive SPL from monitors, and monitor feedback. In addition to the long-term hearing benefits, the sound quality of the monitor mix is greatly improved. Maybe best of all, in-ear monitors can fit into your pocket — try *that* with a monitor wedge.

For applications of in-ear monitors, see the next issue of *EQ*. EQ

CIRCLE 15 ON FREE INFO CARD

World Radio History

EQ LIVE

New Gear For Your Next Gig

Ribbiting Speakers

Bullfrog Speaker Systems is offering their line of DT (Deep Tuned) speakers. These cabinets have been 100-percent computer designed and optimally tuned and produced on CNC point-to-point precision routers and NC panel saws accurate to .005. Bullfrog also provides T-bar handles, 16-gauge metal grille and corners, and black nylon-weave covering. The components include large proprietary fiberglass radial or constant directivity horns, Titanium compression drivers, CompGard HF protection circuit, and custom heavy-duty 250-watt woofers fully tuned for deep bass response. For complete details, contact Bullfrog, 1503 Prairie Ave., South Bend,IN 46613. Tel: 219-233-4151. Circle EQ free lit. #124.

Bullfrog's DT Series Loudspeakers.

Wild Board

Soundcraft introduced its new SR monitor console, the SM12. Specifically designed for stage monitor mixing, the SM12 is available in 32-, 40-, and 48-channel frame sizes. Included are 12 mono sends and 1 stereo send, giving 12 discrete mono mixes plus a stereo side fill. All sends are switchable in pairs to be either pre-fade or post-fade. The SM12 can also be used as a FOH console with 12 subgroups. 100mm long throw faders, LED input metering, four sweepable bands of EQ, and four mute groups are included as standard. For complete details, contact Soundcraft USA, 8500 Balboa Blvd., Northridge, CA 91329. Tel: 818-893-4351. Circle EQ free lit. #125.

Soundcraft SM12

The 1995 Sound-Reinforcement Equipment Preview

All REVved

Following in the footsteps of its predecessors the REV7 and the REV5, the REV100 digital reverb unit has been unveiled by Yamaha. The user can choose from 99 reverb programs — all of which can be edited in the decay, delay time, and wet/dry balance signal parameters. The REV100 offers full stereo in/out capabilities and has two inputs and two outputs. Its A/D and D/A converters are 16-bit, its sampling frequency is at 44.1 kHz, and it has a frequency response of 20 Hz–20 kHz. The REV100 is designed to be user-friendly with its rotary controls on the front panel, making for quick operation. Retail price is $299. To get the inside scoop, contact Yamaha Corporation of America, Audio, Guitar and Synthesizer Division, P.O. Box 6600, Buena Park, CA 90622-6600. Tel: 714-522-9011. Circle EQ free lit. #126.

The Yamaha REV100.

Ear Today...

Garwood Communications unveiled the new PRSII in-ear monitoring system. The PRSII is comprised of a belt-pack receiver and a 1/2-rack width transmitter. The unit

World Radio History

offers full stereo transmission on a single transmission frequency; it will operate on UHF frequencies allocated for this usage and is configured as standard on one of six compatible operating frequencies. The beltpack receiver comes with dedicated molded ear pieces. An on-board noise-reduction system offers a wide dynamic range and there is a soft muting system to avoid the possibility of pops and clicks in poor transmission areas. The range of the PRSII is 150 feet in adverse conditions. To hear all about it, contact Garwood, 136 Cricklewood Lane, London NW2 2SP. Tel: 0181-452-4635. In the U.S., contact Firehouse Productions, Inc., 176 Norman Ave., Brooklyn, NY 11222. Tel: 718-383-5606. Circle EQ free lit. #127.

Array of Sunshine

EAW has introduced the KF853 virtual array system, a long-throw, two-way loudspeaker that covers a frequency range from 200 Hz to 17 kHz and is designed to address the problem of maintaining vocal articulation at large stadium and arena events. The large midrange horn allows for pattern control down to the lowest frequencies of operation. Dual 10-inch midrange drivers offer peak output levels of up to 147 dB at 1 meter. EAW's proprietary, ferrofluid-cooled CD5003 high-frequency compression driver provides high output with low distortion. The KF853 is designed to complement the KF850 three-way system, KF852 midhigh system, BH852 horn-loaded midbass system, and SB850 direct-radiating subwoofer. It has a one-hour sine wave power-handling capability @ 300 watts (MF) and @ 70 watts (HF). Maximum output is 147 dB MF Peak SPL, 140 HF Peak SPL, 142 dB MF Long Term, and 135 dB HF Long Term. For more details, contact EAW, One Main Street, Whitinsville, MA 01588. Tel: 508-234-6158. Circle EQ free lit. #128.

EAW KF853 Loudspeaker.

Crest Century Vx

Board of the Century

Crest Audio introduced the latest addition in its Century Series console line, the Century Vx console. This newest console features eight VCA groups, eight audio groups, four mute groups, a meter bridge with up to 21 VU meters, eight matrix outputs as standard, and LCR panning. All channels have eight discrete aux sends with individual on/off controls. For the inside word, contact Crest Audio Inc., 100 Eisenhower Drive, Paramus, NJ 07652. Tel: 201-909-8700. Circle EQ free lit. #129. EQ

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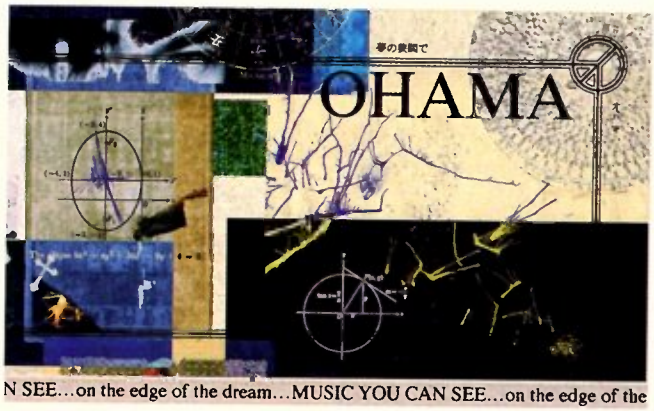
EQ LIVE

MULTIMEDIA IN THE REAL WORLD, PT 1



N SEE...on the edge of the dream...MUSIC YOU CAN SEE...on the edge of the

DESIGN IT: The opening to the audio/video presentation.

CD-ROM, multimedia, virtual reality — I set out to create a music project for both CD and live performance that would take advantage of these new technologies. But how much is hype and how much is real? My experience with Apple QuickTime, 3D rendering, and 32-bit color had previously been limited to watching Mac demos, but they looked intriguing enough for me to become curious as to how far you could stretch this technology.

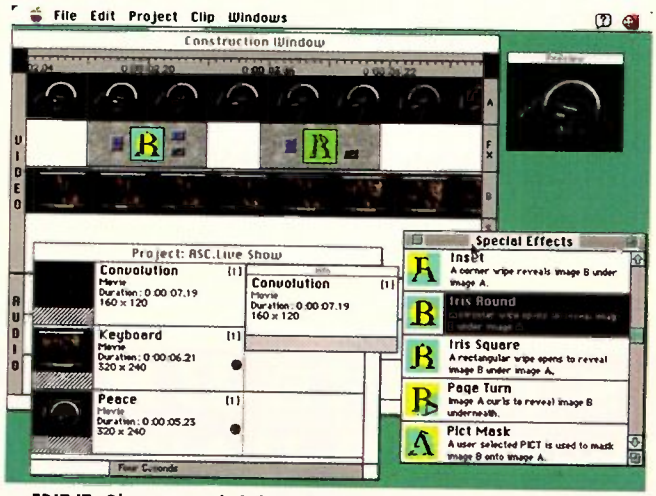
Multimedia doesn't have to be an abstract concept. In fact, the principles used in multimedia CD-ROM productions such as Peter Gabriel's *XPlora* are also a perfect fit for live performance. During 1994, I performed ten solo shows at the Alberta Science Centre (ASC) Planetarium that incorporated QuickTime movies, 3D animations, Macromedia Director movies, MOTU Digital Performer sequences, Digidesign Sample Cell (to play backing vocals and other sounds), and a rack of MIDI modules. The result was a concert, created entirely on the Macintosh, that enveloped the audience with images and sound — somewhere between the CD-ROM game *Myst* and a virtual reality machine.

Is it difficult to do a production like this? Well, yes and no. I'm not a graphics artist, interactive multimedia programmer, or anything like that; I'm mostly a singer/songwriter who has used a Mac-based MIDI studio since 1986. So it is doable, even if you're not an "expert," but like any emerging technology, you'll run into your share of glitches, compromises, and gray-hair generators before getting things to work.

THE A/V CONNECTION

Digital Performer played the backing tracks, including 800 MB of audio; I played one part on my keyboard and sang live. Regarding visuals, a planetarium is ideal for using video projectors because of the low ambient light level (which is often essential to creating the proper mood). The ASC has three video projectors: one points up to the dome's center and two point horizontally north and south. There are several banks of slide projectors. One bank projects a 12-slide panorama around the dome's base, while another bank projects "all skies" that cover the entire dome. There are several solo projectors, some lighting effects, lasers, and, of course, the star projector.

The Planetarium's Omni-Q system (basically a visual sequencer that syncs to SMPTE timecode) controlled still images transferred to the banks of slide projectors, as well as moving images transferred to an S-VHS player and three laserdiscs. Fred Boehli, the Omni-Q programmer, provided a 1/2-inch analog 8-track tape with SMPTE on track 8. I planned to put music on tracks 1 and 2 and a guide vocal on track 3 so Fred could program the



EDIT IT: Ohama compiled the video images using Adobe's Premiere.

PLAY IT: Ohama played the movies using Apple's QuickTime.

HOW I, A DIE-HARD AUDIO GUY, MADE A LIVE INTERACTIVE AUDIO/VIDEO PRESENTATION USING MY MACINTOSH

BY TONA OHAMA

World Radio History

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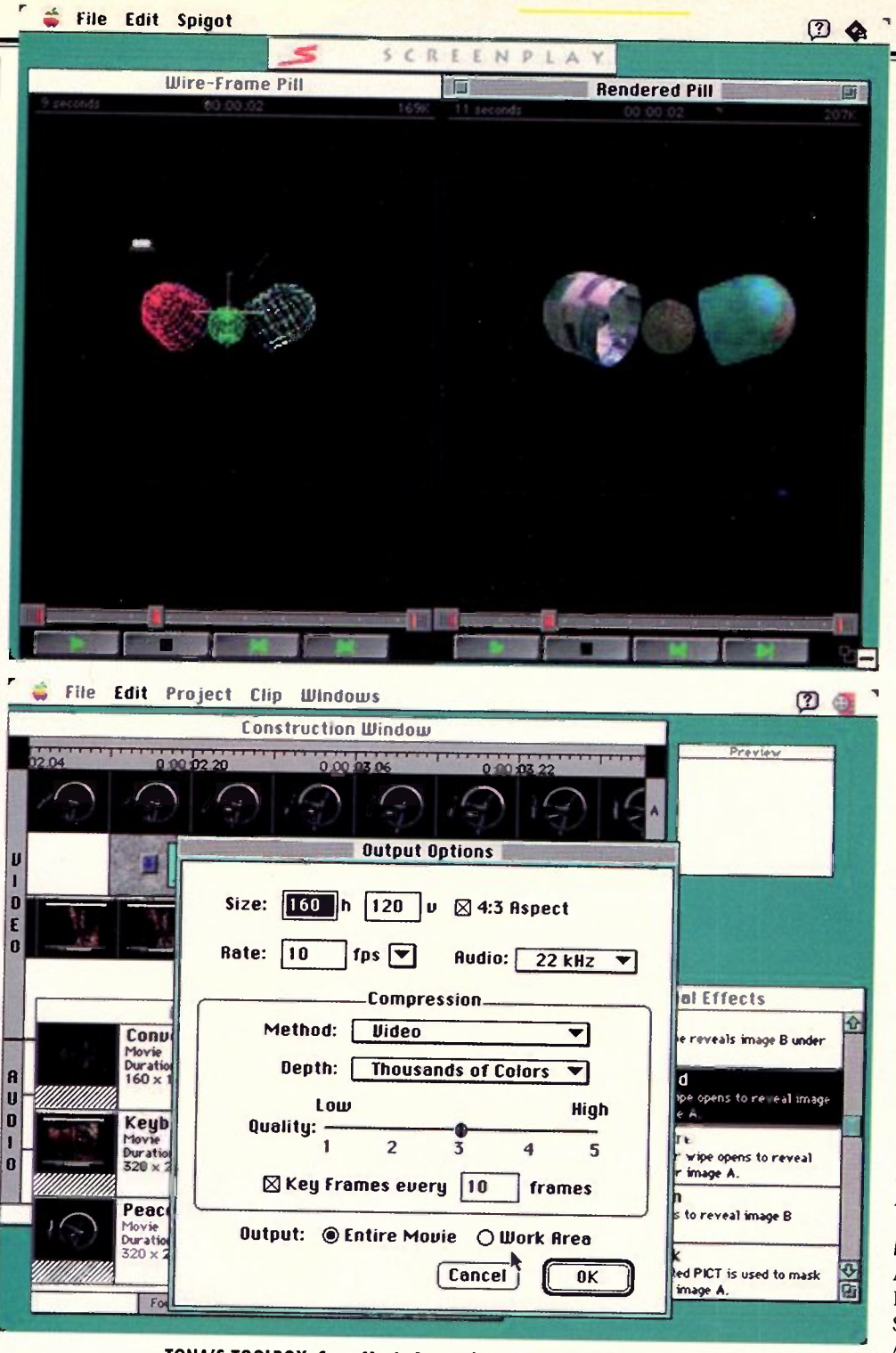

TONA'S TOOLBOX: SuperMac's Screenplay (top) and Adobe Premiere

projectors without needing my equipment to play the music. Tracks 1 and 2 could also provide backup just in case the sequencer malfunctioned during the show (which did happen).

I slaved Digital Performer to SMPTE and started recording the audio tracks — but after 42 minutes, the audio quit (though the MIDI data continued). MOTU verified that Digital Performer will not play audio after 42 minutes when slaved to SMPTE, but I solved this by recording my own timecode on track 7, going from 00:00:00:00 to 00:30:00:00 and then again from 00:00:00:00 to 00:30:00.00, with no pause between the two chunks of code. Instead of making one long sequence, I created two sequences and during the show went from one to the other manually — a little hairy, but it worked.

Early on I decided to record my visuals in real time from the Mac because I didn't own a frame-accurate video recorder or a controller card like a Diaquest DQ-Animaq, but I did have an Apple Quadra 700, 20 MB of RAM, and a 1.2 GB drive. My budget allowed me to get a Radius VideoVision card, and I already owned an S-VHS recorder. Going real time offered two important benefits: it was less expensive because it used equipment I already had, and I could also see what my work looked like on a regular television as I created it.

STILL LIFE

The black in a regular slide is not black enough and will show a rectangular border when projected on the dome. Therefore the slides used at ASC either mask the object with some sort of tape or have two layers of film (an overexposure of the slide laid over the original slide). Since the slides are projected onto a curved surface, they're "keystoned" by being bent in a jig, then reshot to compensate for the dome's curvature.

Because of the matting and keystoning required, I did not have the budget to create all the slides, and ended up using some material from previous ASC shows. All original images were done in Adobe Photoshop at 72 dpi screen resolution, then recorded to an AGFA PCR II film recorder.

MAKING MOVIES

A SuperMac Video Spigot NuBus card (bundled with Supermac Screenplay and Adobe Premiere) was the Mac's video input device. Recording live QuickTime movies worked flawlessly: you just plug an 8mm camera directly into the back of the card and go. It wasn't broadcast quality, but the thrill of recording and playing back images from a video camera on the Mac for the first time rivaled the first time I saw audio on the Mac in Sound Designer!

Adobe Premiere is an intuitive program; editing

World Radio History

Two Amazing Things Happened in 1994

1 The King of Pop Married the Princess of Rock

2 Bruce Swedien Switched from JBL 4310's to Westlake Audio BBSM-8's

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Bruce Swedien on Location at the Hit Factory New York

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– Bruce Swedien on BBSM-8 monitors.

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MULTIMEDIA SOURCES

Adobe Systems Inc.,
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Mountain View, CA 94039-7900
1-800-833-6687
Adobe Premiere, Photoshop

Alberta Science Center Planetarium
Box 2100 Stn. M #73
Calgary, Alberta, Canada T2P 2M5
403-221-3717

Aldus Corporation
411 First Avenue South
Seattle, WA 98104-2871
206-628-2320
Aldus Gallery Effects

Apple Computer, Inc.
20525 Mariani Ave.
Cupertino, CA 95014
1-800-776-2333
Quadra 700, QuickTime

Diaquest
1440 San Pablo Avenue
Berkeley, CA 94702
415-526-7167
DQ-Animaq

Macromedia, Inc.
600 Townsend Street, Suite 310W
San Francisco, CA 94103
415-252-2000/1-800-288-4797
Director, Three-D, Macro-Model, Accelerator

Mark of the Unicorn, Inc.
1280 Massachusetts Avenue
Cambridge, MA 02138
617-576-2760
Digital Performer

Miles Canada, Inc
77 Belfield Road
Etobicoke, Ontario, Canada M9W 1G6
416-240-7312 Att: Paul Marshall
AGFA II film recorder

Ray Dream, Inc.
1804 N. Shoreline Blvd.
Mountain View, CA 94043
415-960-0765/1-800-646-0111
Ray Dream Designer and JAG II

Radius, Inc.
1710 Fortune Drive
San Jose, CA 95131
408-424-1010
VideoVision

SuperMacTechnology
215 Moffet Park Drive
Sunnyvale, CA 94089-1374
408-541-6100
Video Spigot Nubus and ScreenPlay

the clips and adding effects was painless. However, I wanted the movies to have a computer "look" (it was pointless to go through all this work just to have things end up looking ordinary), and this was time-consuming. After editing the clips, I opened the QT movie in Ray Dream's JAG II and ran it through Aldus Gallery Effects filters like Craqulequre and Graphic Pen; I wasn't able to run QT movies through Photoshop filters. This process requires a large hard drive and patience — it took four hours to run a 30-second clip through the filters.

I had no idea how to sync live music to a QuickTime movie, so I did it in real time. I set up a video camera and recorded my hand playing a piano sequence. After using JAG II to add some special effects, I opened the clip in Screenplay and played it back while recording the Mac screen to S-VHS using the VideoVision card.

Although this was generally the most painless part of the process, JAG would crash while filtering some movies (always on the final frame), and I never figured out the cause.

Next issue, I'll discuss how I created my animations and prepared the whole presentation for the concert. **EQ**

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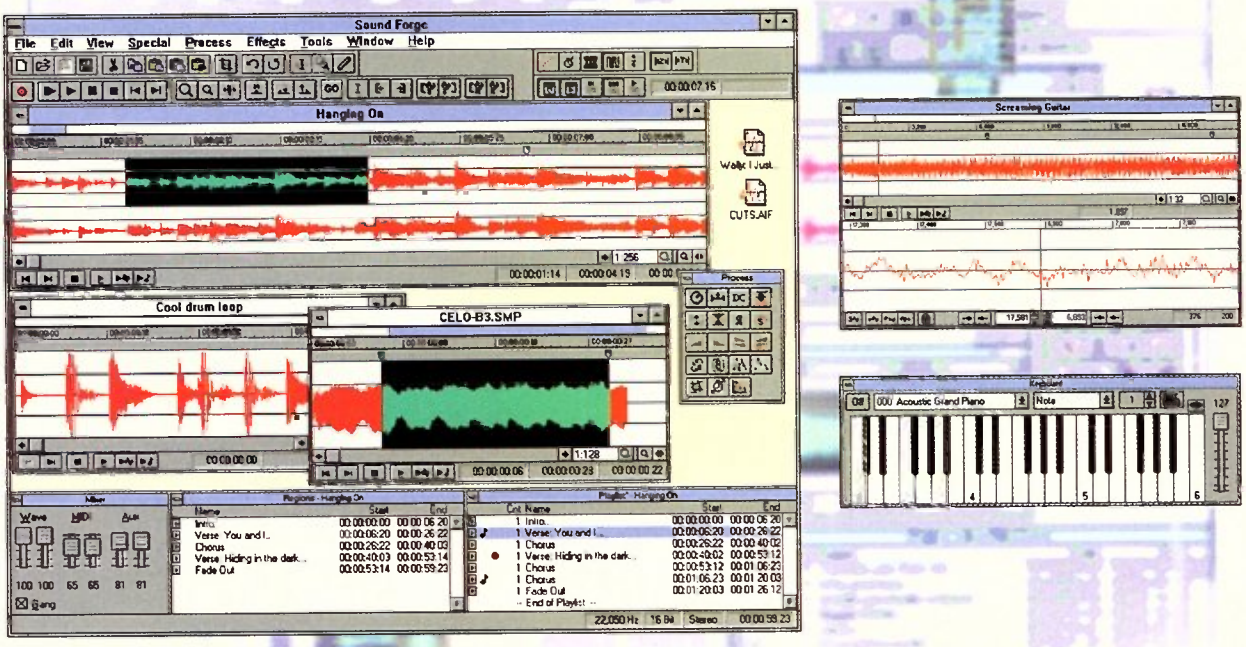

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CIRCLE 192 ON FREE INFO CARD

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DEMETER VTCL-2 TUBE COMP/LIMITER

TURN ON the VTCL-2 and you enter a time warp — there's an all-tube signal path from the '50s, analog opto-isolators from the '60s, LED indicators from the '70s, and the improved performance we've come to expect in the post-CD era of the '80s and '90s.

If this sounds like the recipe for a golden ear kinda device (with a price to match), you'd be right. At just over $2K, this product is clearly intended for those in more upscale studios who are willing to pay for the sound that only a well-designed tube device can deliver. Is it worth the financial stretch compared to budget devices?

ROAD TEST

MANUFACTURER: Demeter Amplification, 2912 Colorado Ave. #204, Santa Monica, CA 90404. Tel: 818-986-7103.

APPLICATIONS: Dynamic range processor/tube "warmer" for voice, tape tracks, musical instruments, and other 2-channel program material.

SUMMARY: This is a natural-sounding, non-intrusive compressor/limiter that will delight well-heeled tube fans.

STRENGTHS: Pure tube sound; good metering options; well-built; multiple input and output connectors.

WEAKNESSES: Costly compared to nontube compressors; minimalist manual; captive, two-conductor line cord instead of three-conductor type.

PRICE: $2095 **EQ FREE LIT. #:** 130

BY CRAIG ANDERTON

SPECS AND BASICS

The VTCL-2 is a two-rack-space, 2-channel compressor/limiter (C/L) with switch-selectable stereo or dual-mono operation. Each channel has controls for input gain, threshold, attack, release, output gain, and analog VU meter monitoring mode (input, output, or amount of attenuation; an associated switch selects two different meter ranges to accommodate –10 and +4 signals). There are also dual-bypass switches and overload LEDs. There's no ratio control; the ratio is a function of how much compression you're adding, which gives an extreme "soft knee" response. This is at least partly responsible for the VTCL-2's non-intrusive processing.

The tubes used are two 12AX7A, two 12BH7A, and one 12AT7A. They're hit with 250 V of B+ voltage (enough to make the tube's plates snap to attention), and both the B+ and filament voltage are regulated. Speaking of voltage, the VTCL-2 runs on either 117 or 240 volts.

The input impedance is 27k, so guitars and such will need a preamp. Tape tracks, synths, drum machines, and other line-level signal sources work just fine.

Incidentally, Demeter obviously subscribes to the theory that you get better sound if the high-frequency response extends well above the normally accepted range of human hearing; response is quoted at –3 dB at 65 kHz.

FACING THE INTERFACE

There are three unbalanced connectors for each input and output (12 total): 3-pin XLR, 1/4-inch phone, and TT. An optional upgrade using Jensen transformers can balance the XLR connectors for $150 per input pair or output pair. A switch chooses pin 2 (IEC standard) or pin 3 hot.

USING IT

The manual is one page and has no graphics; it doesn't even come close to explaining how to use a C/L. However, Demeter

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HEAR THE FUTURE

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says a revised version is on the way with presets contributed by users.

Getting back to the unit, I like the sound of tubes and also the way the opto-isolators work in the context of a compressor — they seem to give a more "natural" sound (possibly because of small amounts of distortion inherent in opto-isolators). Demeter has managed to merge the two technologies, along with modern-day construction practices, to give the equivalent of a '50s compressor brought up to the state-of-the-art. If you're careful when setting levels, it can be extremely quiet (EIN is quoted at –110 dB with 40 dB of gain), and the controls cover enough range to be very useful (attack: 0.5 ms–100 ms; decay: 200 ms–10 secs).

OPINIONS

There are many compressors, each with a characteristic sound quality. In fact, people sometimes choose a particular C/L because of the coloration. I'd say that the VTCL-2 has a somewhat warm, "sedate" sound as opposed to the occasionally brighter timbre of solid-state gear. This coloration is subtle, even with relatively extreme compression settings, and is very "supportive" to an instrument. It sounds more like it's pulling sound out of the signal rather than adding an overlay.

This is not a compressor for everyone — nor is it meant to be. However, one factor that makes the VTCL-2 a bit more cost-effective is that it can also be a tube preamp capable of warming up just about any sound (try this with drum machines, synths, and digital tape track outputs; you'll be delighted). Just hit the bypass or set the threshold for minimal compression (the meter's attenuation range clues you in) and you're set.

On a more subjective level, this is a C/L with a light touch — it's kind to your signal and does not give an obviously "compressed" sound. Part of this may be due to the inherent decay time present in an opto-isolator; the compression action is very gentle and natural. The downside is that you can't set fast enough release times to give those outrageous "sucking drum" sounds (as used on several Beatles tunes) that compressors often did back in the '60s. I assume, however, that most people would consider that a relatively small tradeoff.

Overall, if you do have $2000 to spend on a compressor — and the rest of your system is clean enough to appreciate the Demeter's sound quality — you'll like what you hear.

Note: Starting in January, you can hear two recorded samples of compression using the Demeter on America On-Line. Go to "Craig Anderton's Sound, Studio, and Stage" area, then key into "EQ On Line." **EQ**

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An open letter from Morris Ballen, Disc Makers Chairman

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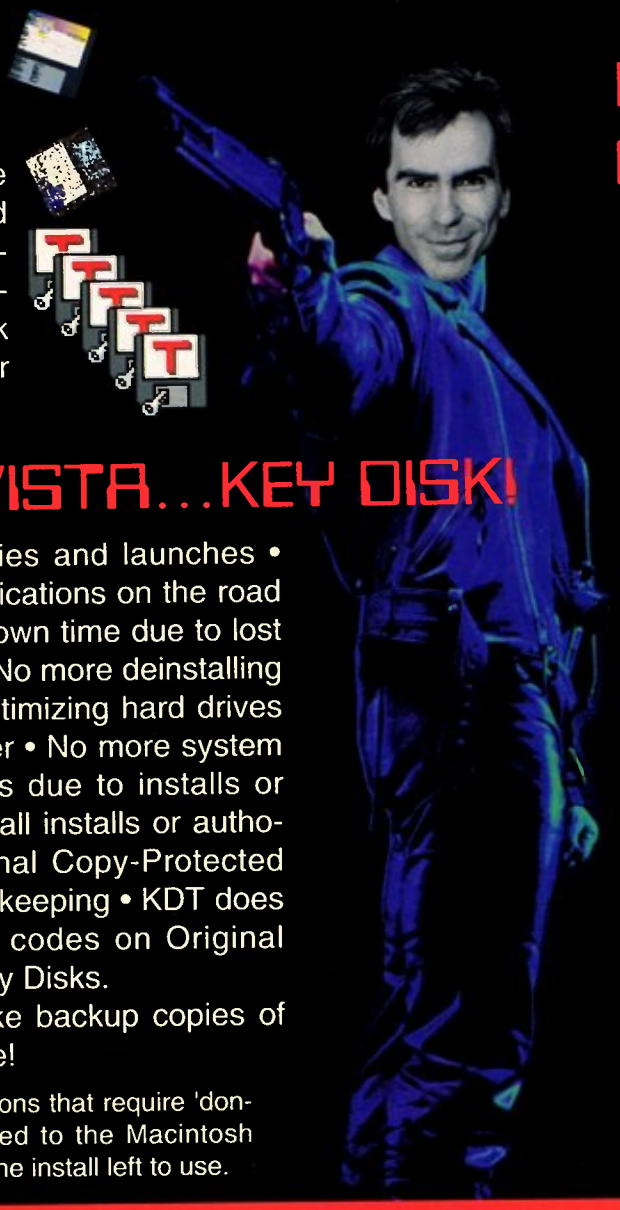

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SoundCzech!: EQ Live in Europe

KEEP ON ROCKIN' IN A FREE WORLD: Dagger rocks the house in the newly named Czech Republic.

EQ'S TIPS ON MAKING SURE YOUR EUROPEAN EXTRAVAGANZA GOES AS SMOOTHLY AS POSSIBLE

BY STEVE LA CERRA

WHEN YOU think of rock 'n' roll on tour, many images can come to mind: tour busses, planes, trains, and faraway cities like Paris, Amsterdam, Frankfurt, and Karlovy Vary. Wait a minute — *Karlovy Vary*? That's right Karlovy Vary — known to some Americans as Carlsbad. Karlovy Vary was one of the stops on the 1994 Dagger tour of the Czech Republic. The Czech Republic was formerly known as Czechoslovakia until late 1989 when the country experienced its "velvet revolution." It has since split into two republics known as the Czech Republic (the western part) and Slovakia (the eastern part).

The recent free-market economy in the Czech Republic means that people living there now have access to Western imports for the first time. Two of the "imports" that appeal to the Czechs are McDonalds and American rock 'n' roll, so it wasn't that much of a surprise when I got the call to go there to do FOH for the rock band Dagger. The New York-based group has been building a following in European countries like Denmark, Belgium, and Germany, as well as in the Czech Republic. This would be Dagger's second tour of Europe, and most of the venues would be clubs, with a few festival-type, outdoor shows sprinkled in. Although the band's CD has yet to be released in the United States, Czech audiences eagerly awaited the performances and ate up Dagger paraphernalia faster than you could shake a drumstick.

PRETOUR PREP

When the pretour prep started, we knew we would have to be ready for several factors. Budget constraints dictated that we could not fly all of the gear overseas, so there would be a rented backline and PA. In the U.S., dealing with a rented backline is no big deal — especially since people working here speak English. All requests to the Czech rental companies had to go through a translator whose command of both languages was good, but whose technical knowledge was limited. Matters were made more difficult by the fact that some equipment is simply not available in certain areas of the Czech Republic. For example, although we requested a Pearl drum kit, the one supplied could turn out to be a local imitation of the real thing. Due to the strength of the dollar against Czech currency (roughly 29 Czech "crowns" to $1 U.S.), some items are very expensive measured against the average Czech wage. For example, a Lexicon LXP-1 effects unit costs roughly two months' salary for a Czech worker.

World Radio History

TAKING THE LEAD

The band and I decided to take only the equipment that was key to the Dagger sound. The first sonic consideration was lead vocalist Rob Rage's wireless microphone. The microphone element was a Shure Beta 58 and the receiver was Shure's True Diversity system. We packed two dozen 9 V batteries, and with 15 shows scheduled, we had juice to spare. Rob has been using the Shure system for about three years now and we both love the tone of the mic. I also love the fact that the system never goes down.

Next in line was the rack for guitarist Stephen Anthony. Stephen's ace technician, Mike Hornstein, usually sets up a Marshall JMP-1 preamp, a Mesa/Boogie model Fifty/Fifty power amplifier, two Marshall 4 x 12 cabinets, and an ART DRX effect unit. Taking the cabinets with us was unpractical and unnecessary — we knew that we could easily get real Marshall 4 x 12's via rental. The output of the JMP-1 could be used to drive any Marshall head (either via input, effect return, or power amp input jack) so we felt we could leave the power amp home and still get the killer tone for which Stephen is known. Mike and I built a "miniguitar rig" into a four-space rack bag and mounted the JMP-1, the ART effect unit, and a Furman PL-8 power controller. You might recall that the alternating current in Europe is 220 volts, 50 Hz, and while Mike could have converted the units to operate from this power supply, we felt that a power transformer would be a less permanent solution. With some help from the folks at Sam Ash Music in New York we found a unit rated to deliver about 10 amps — plenty for our purposes.

We could have added the Boogie amp into a six-space rack, but the depth of the amp would have called for the rack bag to be much bigger. With the extra size and weight, the rack would not have made the requirements for carry-on baggage and we did want to carry the gear onto the plane for maximum safety.

Bassist Tony Redd chose to carry his Peavey Rudy Sarzo-model bass and left his electronics home. Tony has always been able to get his aggressive tone simply from the way he pummels his instrument. For his rental rig we spec'd a Marshall head with a 4 x 12 cabinet. The 4 x 12 cabinet gives us plenty of bottom end while still retaining a lot of the upper-midrange lost when using 15-inch speakers. I spec'd an Electro-Voice RE-20 to mic the cabinet, but more often I got a Shure SM-57 or -58. I also took a direct feed via a Countryman Type 85 direct box that I carried with me.

The drummer, Woody Stevens, took along a cymbal case with his Zildjian cymbals, plus the one thing we could not expect to find in the Czech Republic: a Pearl twin pedal, left-footed. Using a double pedal instead of two kick drums makes my life easier. I only need one mic (an AKG D-112) and input channel for the kick and I don't have to worry about matching a second kick setup to the first. Packed in Woody's suitcase was an assortment of snare and tom heads; on last year's tour of the Czech Republic we had a rough time finding a music store that carried our preferences in drum heads.

MEET MY RACK: Soundman and fashion plate Steve La Cerra.

SHOWTIME

Most of the PA systems we used had the typical assortment of microphones: the AKG D-112, Shure SM-57's and SM-58's (for the guitar cabinets, snare drum, and toms), and AKG C460 (or C451) condenser mics for the high hat and cymbal/overhead mics. Although I faxed ahead with equipment, input, and mic lists, I knew my choices would not always be available. The mixing consoles varied from Soundtracs to Soundcraft to Studiomaster, and on one occasion the console was from an East European manufacturer called Tesla. Soundczech — er, soundcheck — was always an adventure because communicating the system setup was difficult. Just about everyone understood "kick" and "snare," but I wish someone would tell me how

EUROPEAN ESCAPE

There is one touring tip that you won't find in any tech manuals and it concerns your passport. Make sure that you have a couple of photocopies of the passport, stored *in a place other than where the original is located.* Keep your passport with you at all times. Do not leave it in a hotel room and do not allow anyone else to hold it. A brief anecdote may serve well. One of the hotels in Karlovy Vary asked us for our passports. We firmly declined but told the hotel manager that she could make photocopies (while we stood by) and then immediately return the originals to us. She photocopied the documents and then returned them to us. At the end of our stay in this particular hotel there was a miscommunication between the promoter (who was responsible for paying the bill) and the hotel management. If the management had had our passports in its possession, the passports would have been "held for ransom" until either the band paid the bill or the police arrived to make a decision. If you should lose you passport, the US Embassy (in the country in which you are staying) can help you obtain a new one. If you have a photocopy of the original, the process is greatly expedited. Remember: *you cannot get back into the United States without a valid passport.*

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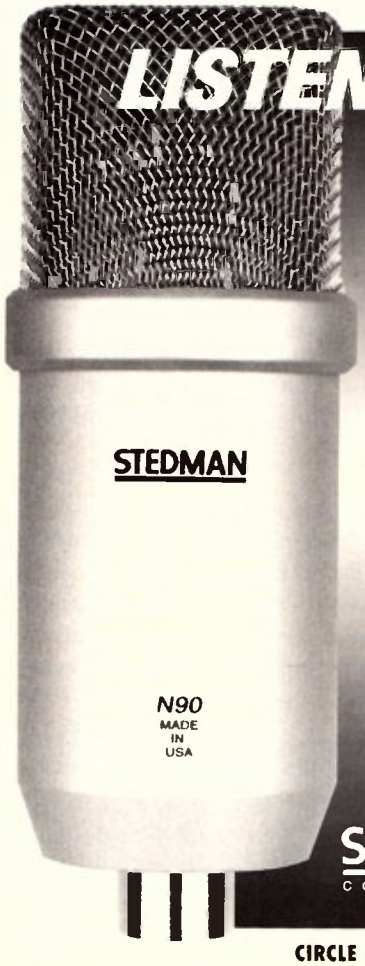

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EQ LIVE

to say "tom 1" in Czech. Prior to every show I changed the battery in the wireless microphone so that we wouldn't have to worry about the battery failing during the show. The Shure system performed exactly as I expected: flawlessly.

Since I wanted to use specific effects, I carried a three-space rack bag with a Furman PL-8 power controller, Lexicon LXP-1 and LXP-5 units, and a Symetrix 501 compressor/limiter. I had an AC transformer for my rack and I also brought along a Lexicon MRC so that I could instantly access and tweak the effect units during the show (I consider the MRC a must for using the LXP units). My MRC already had some of the reverbs and delays from the mix sessions of Dagger's CD (*Fate Of A Violent World*/North America Music), so I was able to use some of the exact same effects used on the disc. The Symetrix unit was usually patched into the insert on the lead vocal channel and set to a ratio of about 7:1.

POSTSHOW WRAP-UP

The key to having successful shows was the preparation during soundcheck. In addition to the usual assortment of tools, I brought along a cable tester and checked each cable as it was connected. It was paramount that the system be carefully evaluated every night, because trying to communicate a problem in another language while the band was playing would have been a horror show. The thing I found most interesting was that although Dagger's lyrics are in English, the Czech kids had no problem singing along! They certainly were appreciative of Dagger's music and enthusiastically responded to the performances. EQ

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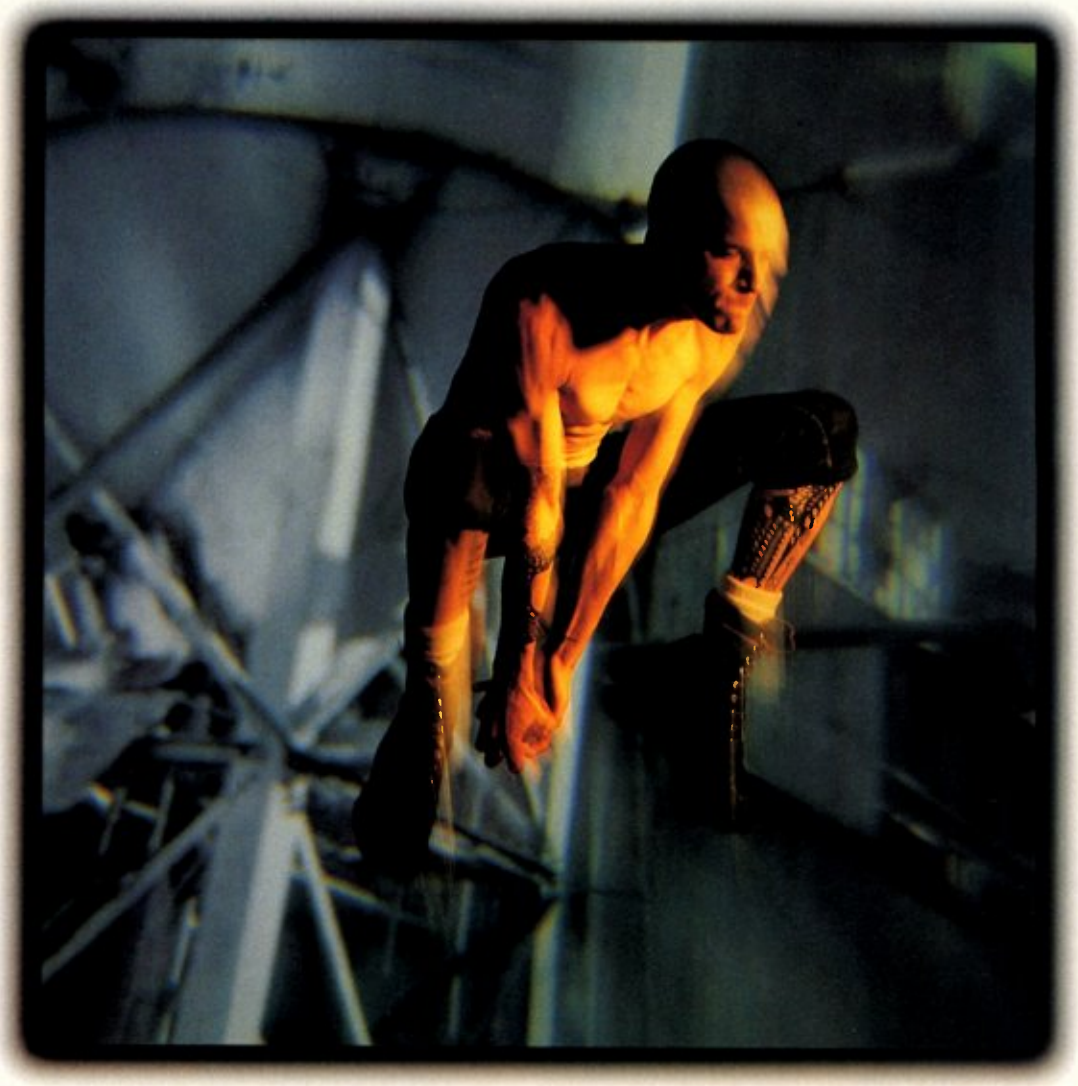
The product manager said we could graphically represent the Tri-Power sound anyway we wanted provided we told you it provides "more gain before feedback without requiring EQ or displaying funky off-axis honk."



[Perhaps he was expecting a chart.]

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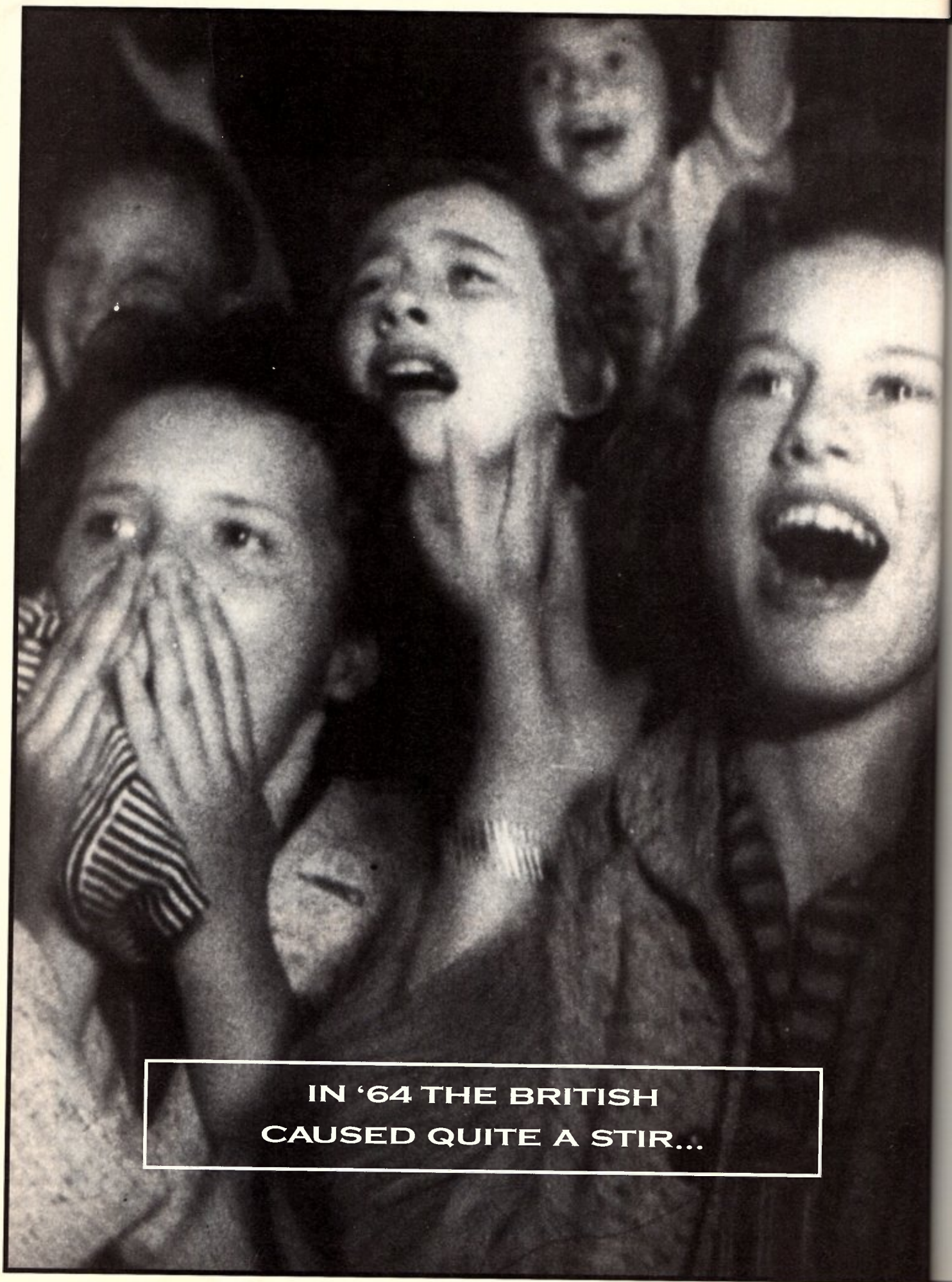

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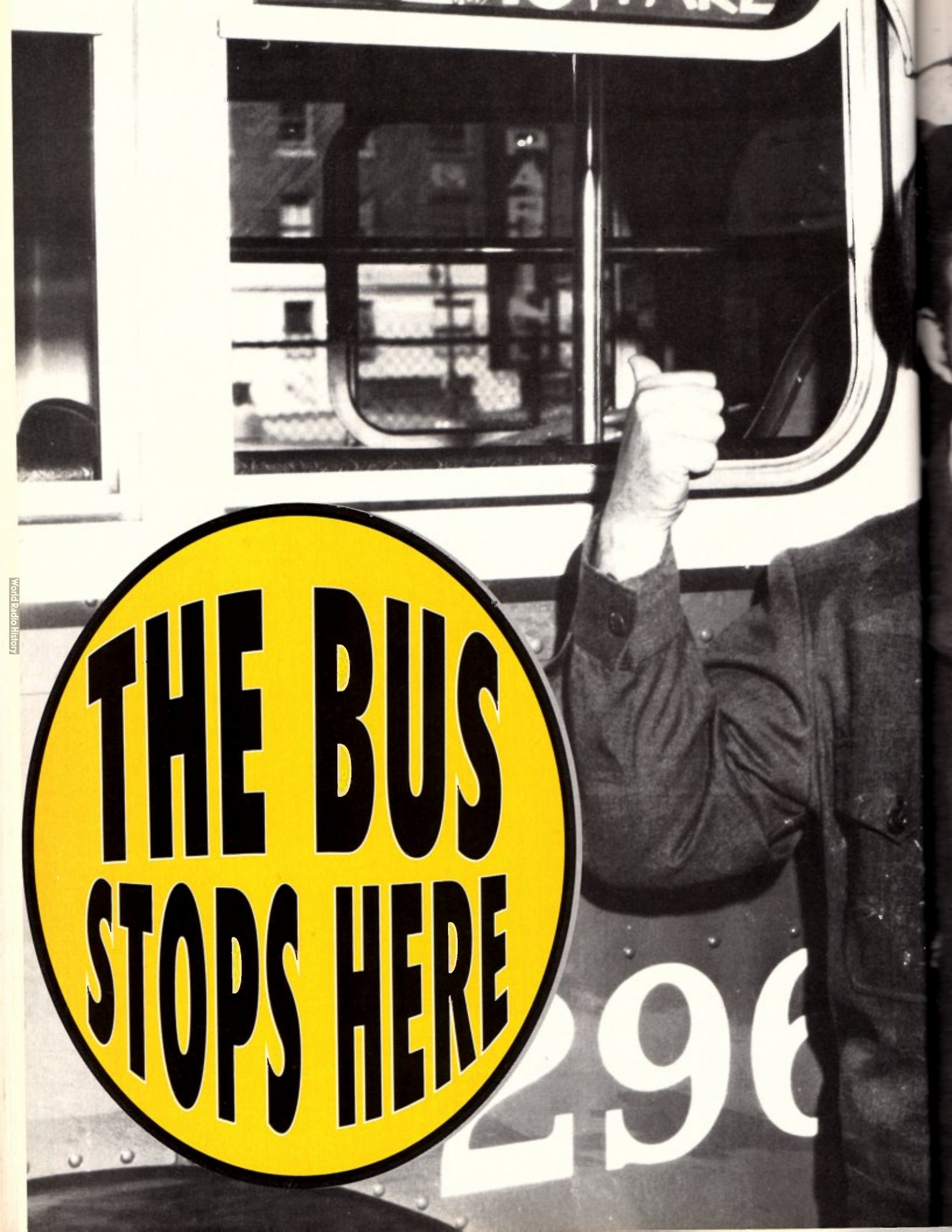


World Radio History

With 8-bus consoles, the honeymoon is just beginning. Here's a buying guide for finding the model that's right for your project studio.

By Steve La Cerra

World Radio History

THE BUS STOPS HERE

In the not too distant past, the audio limitation of a project studio was the analog tape machine. The sound quality of analog machines did not demand the utmost in fidelity from the recording consoles that were feeding audio into them. But over the past several years the development of affordable modular digital multitrack machines (MDMs) has led to an increased demand for high-quality recording consoles at a modest price.

As a result, the recording equipment market has seen an influx of 8-bus recording consoles designed to complement these tape machines. This is good news for studio owners because the new breed of equipment has far better performance and features than consoles of even just five years ago.

Although some studios may have 16, 24, or even more tape tracks, this does not mean that the console must have the same number of busses (see sidebar "Is Eight Really Enough?"). This is an important consideration since 16- and 24-bus consoles tend to sell at price points well above most of those in our survey. In fact, most of the consoles listed here are priced below $10,000. And there are few, if any, practical limitations involved in using an 8-bus console in a 24- or even 32-track studio

OPERATING LEVEL

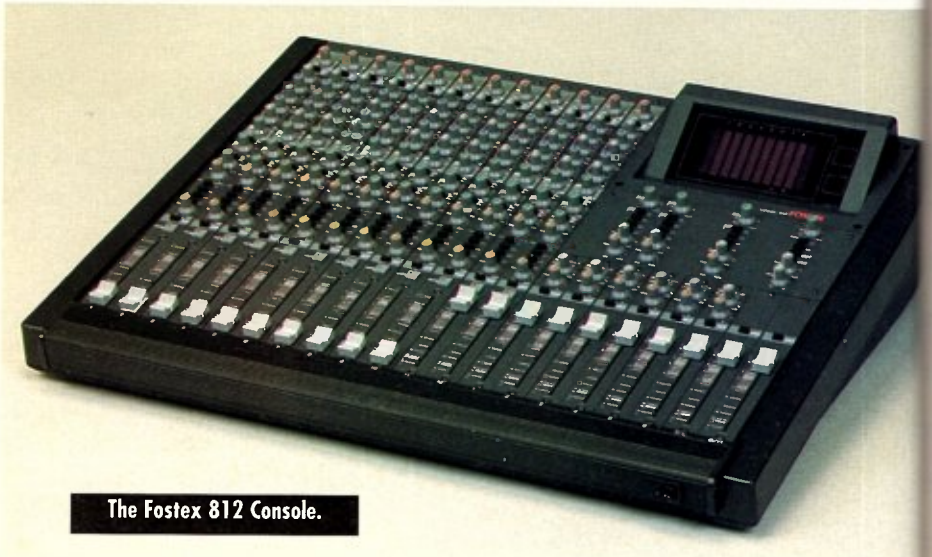
Console operating level will be a major concern when deciding what to buy. If your tape machine can operate at +4 dBm ("pro" level), then it makes sense to purchase a console that operates at that same level. Many of these consoles have bus outputs and tape returns that can be switched to operate either at +4 dBm or –10 dBV ("semi-pro" level). This can be a good thing if you plan to upgrade your tape machine(s) at a later date. Generally, the consoles that operate at +4 also offer balanced inputs and outputs. Most consoles operating at –10 have unbalanced inputs and outputs. The difference is that a +4 balanced input or output will be more quiet and less subject to RF interference ("RFI"). Although a +4 dBm tape machine *can* be successfully interfaced with a –10 dBV console, be certain that the tape return inputs can handle the "elevated" level that the tape machine is sending to the input. If your future plans include a Fostex RD-8, ADAT, or DA-88 machine, keep in mind that these machines can operate at *either* +4 (balanced) or –10 (unbalanced) levels. Also be aware that while using balanced gear can yield a lower noise floor, the connectors and patchbays needed to wire a balanced system will cost considerably more (for more about patchbays see sidebar).

On some consoles, there will be a mixture of +4 and –10 interfaces. Typically, the L/R master outputs will be +4 balanced even in a board that operates at –10. This arrangement can be useful for minimizing noise added during mixdown to the 2-track machine. Our chart refers to the operating levels of the channel and tape inputs and the group outputs, so you may need to contact the manufacturer for the complete story.

THE INPUT CHANNEL

Most of these consoles are configured as "in-line" consoles, meaning that the tape monitor controls are physically arranged in-line with the channel input (the exceptions are the DDA Forum Composer and FMR, Carvin MX2488, Peavey Production Series 800, Soundcraft Delta 8, and the D & R Vision, which are split designs). This makes the in-line desk more compact, taking up less control-room real estate and putting most of the controls within easy reach. The in-line design also allows for double the number of inputs on remix. Each channel has a "Mic/Line" and "Tape" input, and both can be used during mixdown for additional flexibility.

Since a microphone puts out a delicate signal, balanced mic inputs are a must for any serious recording, and all



The Fostex 812 Console.

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Yep...ESI-32s can be a powerful introduction into digital sampling or ultimately support all of your power-user needs in full-blown studio and performance situations.

Naturally, you're going to want to see how ESI-32 stacks up against the competition. We invite the comparison. We're confident that when you see what you'll have to pay to match ESI-32's features, you'll make the next logical move...through the door of your local E-mu dealer to check it out in the flesh.

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World Radio History

these consoles offer balanced microphone inputs with phantom power for condenser-type microphones. The mic preamp is a critical portion of the signal flow and can make or break the sound coming into the recording chain. There are *real* differences in the mic preamps in these consoles, so use your ears intently when comparing. Listen to the mic pre with a variety of different microphones — the preamp should *not* make all your mics sound the same. Anyone who frequently mics acoustic drums should look for a phase reverse switch ("ø"). This often mislabeled switch reverses the *polarity* of the mic signal. It can be helpful in comparing the phase of overhead mics and is an absolute *must* for simultaneously miking any drum from the top and bottom.

Much less of an issue is whether or

Manufacturer	Operating Level	# of Channels	Inputs/ Remix	# of Sends	# of Returns	Inserts	Channel Equalization	Monitor Equlization	C/R Spkr Outs	Studio Spkr Outs	Meter Bridge	Talkback	Oscillator
Alesis X2	+4 dBu or –10 dBv	24	64	8	8 stereo	channel, group, mix	2 band para, HF&LF shelf	HF&LF from ch.	1 pair	1 pair	standard	To slate & studio	100 Hz, 1 kHz, 10 kHz
Allen & Heath GS3-16/24	+4 or –10 dBV	16/24/ 32	40/56/72	6	4 stereo	channel, group, mix	2 band swp, HF shelf	HF&LF shelf	2 pairs	1 pair	no	To groups & cue	1 kHz, 10 kHz
Allen & Heath GS3V-16/24	+4 or –10 dBV	16/24/ 32	40/56/72	6	4 stereo	channel, group, mix	2 band swp, HF shelf	HF&LF shelf	2 pairs	1 pair	no	To groups & cue	1 kHz, 10 kHz
Carvin MX2488	+4 dBv or –10 dBv	24	34	4	2	channel, group, mix	3 band swp	none	1 pair	1 pair	standard	To auxiliaries and mix	no
DDA Forum Composer	+4 dBu or –10 dBv	24/32/ 40	24/32/40	6	-	channel, group, mix	2 band swp, HF&LF shelf	HF&LF shelf	1 pair	1 pair	standard	To auxiliaries	1 kHz
DDA FMR	+4 dBu or –10 dBv	24/32/ 48	32/40/48	6	-	channel, group, mix	2 band swp, HF&LF shelf	same as input	1 pair	1 pair	standard	To auxiliaries	1 kHz
D&R Vision M/MT Series 8/16/24/32	+4 dBu or –10 dBv	8/16/24 /32	34/56/72/ 88	8	2 st./8 mono (4 st.)	channel, mon., group, mix	4-band sweep/ 3 band sweep	2 band	2 pairs	none	VU opt.:$1940	To aux 1/2, groups or mix	1 kHz
D&R Orion 16/24/32/40/48	+4 dBu or –10 dBv	16/24/3 2/40/48	36/64/88/ 104/120	8	12 stereo	channel, monitor, mix	4 band sweep	2 band swp from ch.	2 pairs	1 pair	standard	To studio, phones, groups	100 Hz, 1 kHz, 10 kHz
Euphonix CS2000/CSII	+4 dBu	8–104	16–208	8–52	use faders	channel, group, mix	4 band parametric	4 band parametric	3 pairs	1 pair	standard	To mix, auxes or multitrack	100 Hz, 1 kHz, 10 kHz
Fostex 812	–10 dBV	12	30	4	3 stereo	channel	2 band swp, HF shelf	none	1 pair	none	standard	no	no
Mackie 16-8/24-8/32-8	+4 dBu or –10 dBV	16/24/ 32	44/60/76	6	6 stereo	channel, group, mix	1 swp, 1 par, HF&LF shelf, Lo Cut	HF&LF from ch.	1 pair	1 pair	optional	To aux 1 &2, tape, phones	no
Peavey Production Series 800	+4 dBm	24/32	48/56	8	8	channel,group, mix	4 band sweep	HF & LF shelf	2 pairs	1 pair	standard	To auxes, groups, mix	40 &100 Hz, 1& 10 kHz
Peavey Production Series 2482	+4 dBm or –10 dBV	24	48	8	8	channel, group, mix	2 band sweep, HF&LF shelf	HF&LF shelf	2 pairs	1 pair	optional	N/A	N/A
Soundcraft Spirit Studio 16/24/32	+4 dBu or –10 dBV	16/24/ 32	40/56/72	6	4 stereo	channel, group, mix	2 band swp, HF&LF shelf	HF&LF from ch.	1 pair	none	no	To mix, cue, groups	1 kHz, 10 kHz
Soundcraft Spirit Auto 16/24/32	+4 dBu or –10 dBV	16/24/ 32	40/56/72	6	4 stereo	channel, group, mix	2 band swp, HF&LF shelf	HF&LF from ch.	1 pair	none	no	To mix, cue, groups	1 kHz, 10 kHz
Soundcraft Spirit Studio LC 16/24/32	+4 dBu or –10 dBV	16/24/ 32	48/64/80	8	3 stereo	channel, group, mix	2 swp, HF shelf	none	1 pair	1 pair	no	To studio, groups, mix	1 kHz, 10 kHz
Soundcraft Delta 8	+4 dBu or –10 dBV	20/28/ 36	36/44/52	6	6 mono	channel, group, mix	2 band swp, HF&LF shelf	HF&LF on group	2 pair	none	standard	To mix, bus, aux 1 & 2, groups	1 kHz, variable gain
Soundcrfat Saphyre	+4 dBu or –10 dBV	20/28/3 6/44/52	46/63/78/ 94/110	6	6 stereo	chan. groups, tape, mix	2 band swp, HF&LF shelf	HF, LF, swp from chan	2 pair	1 pair	standard	To mix, aux 1 & 2, groups, feedback	40, 100, 400 1k, 64k, 16k
Soundcraft DC2000	+4 dBu or –10 dBV	24/32	56/72	6	4 stereo	channel, groups, mix	2 band swp, HF&LF shelf	HF, LF, swp from chan	2 pair	1 pair	standard	To studio, groups, phones	1 kHz, 10 kHz variable gain
Sound Tech Panoramic S824/S832	+4 dBu or –10 dBv	24/32	48/64	5	5 mono, panable	channel, group	1 swp, HF&LF shelf, swp HPF, LPF	1 swp, HF&LF shelf, swp HPF, LPF	1 pair	1 pair	no	To studio, groups, auxs, mix	no
Soundtracs Topaz 24/32	+4 dBu or –10 dBV	24/32	56/72	6	4 stereo	channel, group, mix	2 band swp, HF&LF shelf	HF&LF shelf	2 pairs	1 pair	opt./S850, S950	To studio, groups, aux 1 & 2	no
Soundtracs Solo MIDI 16/24/32	+4 dBu or –10 dBV	16/24/ 32	40/56/72	6	4 stereo	channel, group, mix	2 band swp, HF&LF shelf	HF&LF from ch.	1 pair	1 pair	no	To studio, groups	1 kHz
Soundtracs Solo Logic 24/32	+4 dBu or –10 dBV	24/32	56/72	6	4 stereo	channel, group, mix	2 band swp, HF&LF shelf	HF&LF from ch.	1 pair	1 pair	standard	To studio, groups	1 kHz
Studiomaster P7	+4 dBu or –10 dBV	16	40	6	4 stereo	channel, group, mix	2 band swp, HF&LF shelf	HF&LF from ch.	2 pairs	none	optional	To slate, groups and aux	1 kHz and 10 kHz
Tascam M-2600-16, -24, -32	–10 dBV	16/24/ 32	44/60/76	8	6 stereo	channel, group, mix	2 band sweep, HF& LF shelf	2 band sweep, HF& LF shelf	1 pair	1 pair	no	To slate, aux and studio	no
Tascam M-3500-24, -32	–10 dBV	24/32	52/68	6	4 mono	channel, group, mix	2 band swp, HF&LF shelf	none	2 pairs	1 pair	optional	To slate, aux, studio	40,100 Hz; 1,10,16 kHz
Tascam M-3700-24, -32	–10 dBV	24/32	52/68	6	4 mono	channel, group, mix	2 band swp, HF&LF shelf	none	2 pairs	1 pair	optional	To slate, aux, studio	40,100 Hz; 1,10,16 kHz

World Radio History

not there is a pad available on the input. Most mic preamps can handle high signal level without a pad; thus removing another bit of circuitry from the path to the tape machine.

GETTING MODULAR

Very few of these mixing desks are modular. We define a modular console as one where a channel can be removed from the top panel of the desk without disconnection or disassembly of the entire chassis. The main factor here is cost: modular boards are the most expensive. For some studios, however, the ability to pull a bad channel and

Oscillator	Automation	2 Tk Returns	MSRP	Notes
00 Hz, 1 kHz, 0 kHz	MIDI mute	2	S7999	
kHz, 10 kHz	MIDI mute	2	GS3-16: S4495; GS3-24: S6495	8-channel expander available...S1995; optional balanced tape I/O
kHz, 10 kHz	VCA fader/ MIDI mute	2	GS3V-16: S6995; GS3V-24: S8995	8-channel expander available...S2595; optional balanced tape I/O
o	no	1	S2999	
kHz	no	1	24: S15,000; 32: S18,000; 40: S20,000	Optional Stereo Input and Digital Stereo Input modules available. *24 tape/effect returns are available.
kHz	MIDI mute	1	24: S14,900; 32: S19,400; 40: 24,400	Optional Stereo Input and Digital Stereo Input modules available. *24 tape/effect returns are available.
kHz	see note	2	S8375 through S19,100	The Vision M Series may be fitted with six different types of input modules. Automation packages start at S1350
00 Hz, 1 kHz, 0 kHz	see note	3	S14,215 through S31,215	Completely modular with custom configurations available at no extra charge. Automation: S1350 and up.
00 Hz, 1 kHz, 0 kHz	see note	6	Call manufacturer for pricing.	The CS2000 and CSII offer SnapShot Recall and Total Automation and automation of faders, equalizers, mutes, pans and sends.
o	optional/MIDI mute	N/A	N/A	
o	see note	2	16-S3195, 24-S3995, 32-S4995	VCA fader automation available in Spring 1995. 24 channel expander for 24-8 and 32-8: S2995
0 &100 Hz, & 10 kHz	see note	2	24x8x16: S10,500; 32x8x16: S10,500	Upgradable to moving fader automation.
N/A	see note	N/A	24x2: S5000	Upgradable to moving fader automation.
kHz, 10 kHz	no	1	16- S4275, 24-S6195, 32-S7995	
kHz, 10 kHz	VCA fader and mute	1	16-S6195, 24-S8995, 32-S10,995	
kHz, 10 kHz	no	1	16-S2995, 24-S3995, 32-S5995	
kHz, variable ain	no	2	20-S11,395; 28-S14,795; 36-S17,995	Full 16 ch. meter bridge for tape returns included.
0, 100, 400, k, 64k, 16k	automation ready (VCA)	2	20-S24,950; 28-S30,950; 36-S37,950; 44-S44,950; 52-S52,950	Includes VCA automation ready package for optional system.
kHz, 10 kHz ariable gain	moving fader, mute, MIDI	2	24-S27,950; 32-S33,250	Includes stand, hard disk, moving fader automation system.
o	no	1 Bal, 1 Un	24-S4000, 32-S4700	
o	VCA fader and mute	2	24/S3995; 32/S4995	
kHz	MIDI mute	2	16/S4299; 24/S5999; 32/S8699	
kHz	VCA fader and mute	2	24/S12,499; 32/S14,999	
kHz and 0 kHz	MIDI mute	2	S4195	8 channel expander: S1695. Operation requires use of a security code when the unit is powered up.
o	no	1	16/S2999; 24/S3799, 32/S4699	
0,100 Hz; ,10,16 kHz	no	1	S3500/24: S8999; 3500/32: S9999	Also available with stereo inputs as the 3500/24/ST: S10,999
0,100 Hz; ,10,16 kHz	VCA fader & mute, EQ on/off	1	S3724: S14,999; 3732: S16999	

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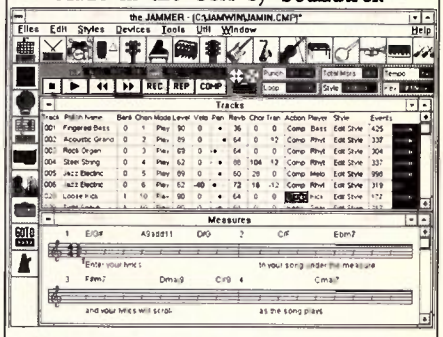

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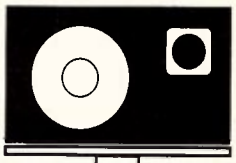

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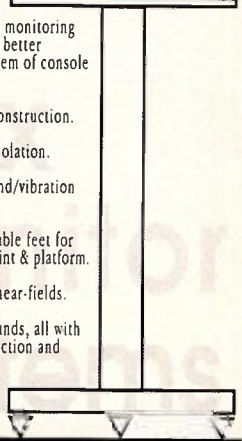

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THE BUS STOPS HERE

IS EIGHT ENOUGH?

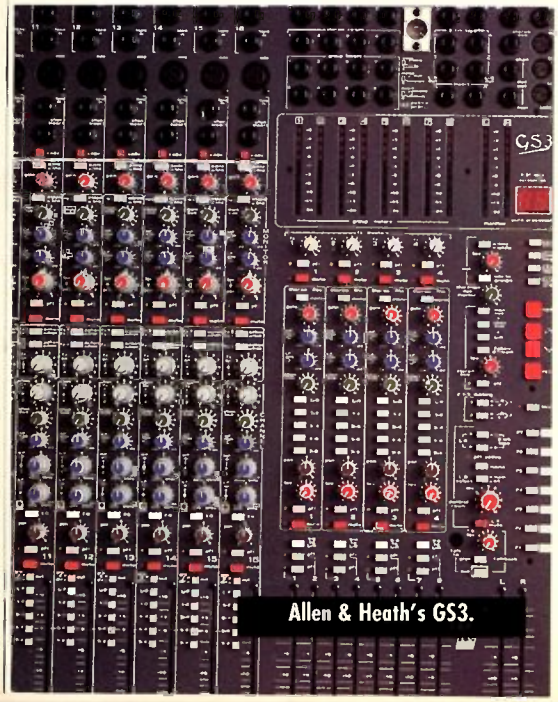
All studio owners contemplating the purchase of a new recording console are faced with the question of whether or not an 8-bus console will be able to accommodate their needs. But depending upon how a console is designed, eight busses may be more than enough.

The DDA FMR Console.

The answer to this question lies in knowing when you need to use a bus as opposed to a direct output. All of these recording consoles have a number of direct outputs (sometimes called "tape outputs") in addition to the bus outputs. So getting a single channel to a tape track is a breeze via the direct output. In fact, the signal flow from a channel to a tape track via direct output is usually shorter (and possibly more quiet) than via bus output. A bus really becomes necessary when you plan to mix different channels together and send them to the same tape track. This normally cannot be done with a direct output since the direct out allows only the signal from that particular channel's input to pass to the tape track. The bus becomes crucial when, for example, you want to layer four different synths (on different input channels) and record the resulting mix onto one or two tracks.

If you need to be able to mix many signals together and get them to any of 24 different tracks, there is always the patchbay to help you route, say, bus 2 to tape track 17. But repatching may not be necessary for some console designs. For example, Soundtracs has its "floating bus" concept that allows a bus to feed a corresponding tape output. Pressing Bus switch on channel 17 will source channel 17's tape out from bus 1, *not* the input to channel 17. Pressing the Bus switch on channel 18 will source channel 18's tape out from bus 2, and so on. This is a great convenience for use with 8-track MDM's, and companies such as Allen and Heath, Alesis, and TASCAM are implementing similar features on their consoles.

pop in a spare without major downtime can be invaluable. For a desk with a fixed top panel, an internal problem could mean that the board must be removed from the studio and sent to a repair shop for diagnosis of the problem. There are some designs that are "internally modular," meaning that you can remove a bad channel and still operate the board, but you will have to disconnect and disassemble the chassis to get that channel out. Definitely a pain in the bus, but still less of a disaster than shutting the studio down while you wait for a repair. You might also consider purchasing a spare channel for the console for just such situations.



Allen & Heath's GS3.

THE EQUALIZER

Equalizers come in all shapes and forms in 8-bus consoles. The EQ circuits implemented on these boards fall into three basic categories: shelf, sweep, and parametric. Although the parametric offers the most control, it is also scarce in this price range — the Mackie, Euphonix, and Alesis consoles are the only ones offering true parametric equalization. Be certain that the console provides EQ for both the input channel and the tape return (most do). Many offer a 4-band EQ with the ability to switch part or all of the equalizer into either the channel or the tape monitor return (we have indicated this arrangement by labeling the monitor EQ spec as "from channel"). Some consoles offer 2-band EQ dedicated to the tape monitor, giving you the ability to leave the 4-band EQ in the channel.

Look for some kind of a switch that routes the EQ in and out of the signal flow (it could be a "bypass" or an "on/off"). When testing out any equalizer, listen for the amount of noise that is added when the EQ is switched in. With it in and all controls flat, there should not be any noticeable difference in noise from when the EQ was switched out. If you have never heard a high-quality outboard equalizer (such as a Focusrite or Summit), make it your business to try one and use it as a benchmark by which to judge the onboard EQ. These external units give onboard equalization something to aspire to.

SENDS...

The more sends and returns that are available to you, the more flexible your studio can be. Look for at least one (prefader) stereo send (or two mono sends) that can be accessed by both the channel and tape monitor signals simultaneously for use as the headphone cue. Some of these boards have one or two dedicated "cue" sends that fit the bill and still allow use of the other sends for effects devices. The optimum situation is that these sends are switchable from the top panel for pre- or postfader *and* equalizer, but in reality this switching is often done via internal jumpers. If the configuration of the sends is carefully thought out before installation, then dealing with internal jumpers won't be too much of a problem.

Some designs use a send knob with a Shift button that lets you select between two different sends (e.g., send 3 *or* send 5) but does not allow the signal to simultaneously access both sends. The bottom line with this arrangement is that you cannot access all the sends on a channel at once. The best case scenario (and most expensive) is an equal number of knobs and sends, each having a switch that lets you assign any send to either channel *or* monitor, pre or post. If automation is important to you, check to see if the send master can be muted — this could be really handy during a mixdown if you need an effect to turn on automatically in one or two spots of a song.

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...AND RETURNS

The number of returns you will need is dependent upon how many effect units you own. True Gear Sluts will look for at least four stereo returns. If more returns are available, that just means more effect units must be purchased to make those returns happy. Seriously, though, keep in mind that if a console has everything else you want but is short by a return or two, you can always patch an effect into an open channel. The returns should have controls for (at least) level, pan, and shelf-type EQ. It would be nice if there were bus-assignment buttons so that you could route the effect return to the tape machine via a bus without too much of a hassle. Some returns may have a send knob that busses the effect into the headphone cue — a really helpful feature when vocalists like to hear reverb in his or her cans. Don't forget to find out if the returns can be automated.

THE FADER STORY

The one thing all these consoles have in common is faders. The "main" fader usually controls the signal input and then a round fader or smaller straight fader controls the monitor level. It really doesn't matter whether the secondary fader is round or straight, but a straight secondary fader looks really cool (important for impressing prospective clients). More important is whether or not those two faders can be swapped (or "flipped") one for the other. For mixdown, the large fader is far more convenient and it usually comes with the more extensive EQ section. Also, the secondary faders may be more difficult to reach and see for mixing purposes. At these price levels, you will not find Penny & Giles faders on every channel — at $75 to $150 per fader

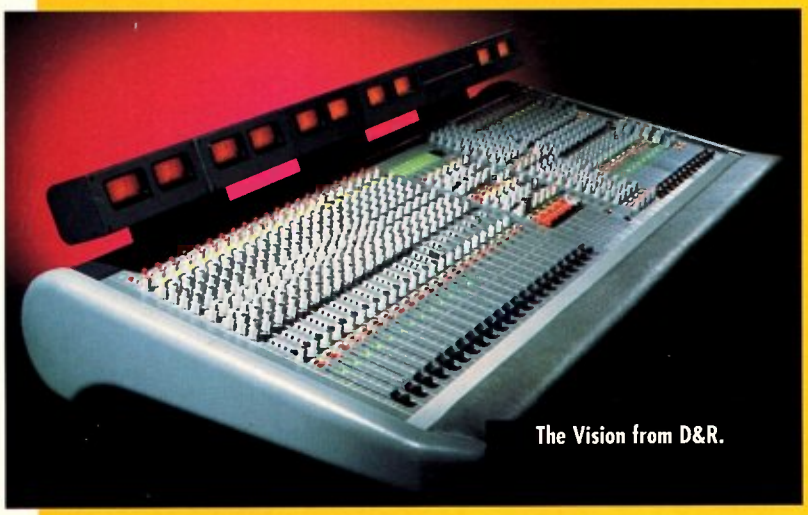
PATCH IT UP

If you are planning to purchase a new recording console, don't forget to budget for the patchbay. Although it might be possible for a studio to function without a patchbay, the mess of wires, confusion, and grounding problems will make any simple recording task a source of aggravation. In spite of the fact that most 8-bus consoles are not sold with integral patchbays, the console and bay should be considered a system.

Keeping the system approach in mind, the number of bays you need will be dependent upon how many channels the console offers and how thorough you want to be about bringing all the patch points to the bay. Laying out a patchbay is like building a house: you want to start with a strong foundation so that you can add to it at any time without problems. Therefore, you should bring every connection to and from the console over to the patchbay (mic inputs being the exception). Since the bus outputs will most certainly be connected to the bay, you might be able to squeeze by without bringing the bus inserts over to the bay. You can always route the signal via the bus output in a manner that closely approximates that of the bus insert, but consider this: On a console where the bus has an insert and can be assigned to the L-R mix bus, the return part of the insert can actually be used as an additional input during mixdown. This would give you eight more inputs during mixdown, and we all know how important it is to have just one more input.

For a typical 24-track studio you will need about 220 patch points to interface the console, the tape machine(s), and maybe four reverb units that can be normalled to the console. The rest of the outboard equipment might require another bay, depending upon how much of a Gear Slut you are. If you decide to go with TT-type (a.k.a. bantam-type) patchbays, there are some available that have three rows of 48 points (instead of two), giving a total of 144 points. Check to see how that third row relates to the top two — it may or may not be normalled to one of the top rows, depending upon the design. If your wiring harnesses have to be soldered to the bay, you might as well solder cable leads to every patch point, including those in immediate use, because soldering open points later on is a real pain. When you finally get the cash to buy that new compressor, all you will need to do is terminate the wire with an appropriate connector, and the device will come up on the bay.

Speaking of cash, be sure to budget for the wire, connectors, and patch cords as well as the bays. Although TT bays cost more, they usually have more points-per-bay than 1/4-inch bays, thus reducing the number of bays required to do the job. Wiring a 24-track system with TT bays [yourself] will cost around $2300, including an assortment of connectors for your equipment, patch cords for the bays, and 3000 feet of wire (which, by the way, is not a lot of wire when you are making harnesses in groups of 24). The same system wired with 1/4-inch bays will cost between $1400 and $1700, depending on whether the bays are unbalanced or balanced. Using a premium-quality cable like Mogami or Canare will add around 20 cents per foot of wire and may well be worth the extra money in the long run.


The Vision from D&R.

Finally, don't take the patchbay as an afterthought. If you are not 100 percent confident that you can design the patchbay layout for proper operation and no ground loops, leave it to a studio tech who can handle the task.

World Radio History

it just cannot be offered — but the available faders should be quiet, smooth, and well sealed from the external environment. Input and channel faders should have an automated mute switch (or on/off button), and a solo switch as well. On older boards, pressing Solo meant that the signal appeared in mono sans effects. But over the past several years, "solo-in-place" has become the norm. This feature will let you hear the effects when you solo a channel and will also preserve the stereo placement of that channel.

THE COMMUNICATION BREAKDOWN

Once you are convinced that the input channels can make you happy, you can address the master section. A talk-back mic is a must and it should be easy to route to the stereo mix bus (for slating mixdowns), the busses (for slating the multitrack), and to the headphone cue send (for speaking to the talent). If there is no "talk-back to cue" routing you might get by with routing the talk-back to the studio monitors.

The two track returns should accommodate no less than two machines: a serious mixdown deck (i.e., DAT or analog stereo 2-track) and a cassette deck. An auxiliary return is great for routing a CD player to the speakers without using two input channels. The returns should be switchable between –10 and +4 operation, and balanced circuits are always preferred. The control room and studio speakers should be capable of monitoring any of these sources, as well as the sends, with no more than a push of a button. Look for separate volume controls and outputs for the studio and control room speakers. An "alternate speaker" switch for the control room will let you select between A and B speakers without having to build or buy an external speaker switcher. A Solo Trim

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knob is an excellent way to keep your ears from getting hurt whenever you hit a Solo button, and a light indicating when solo is on can save a lot of time if the entire console seems inexplicably muted. A single stereo fader will make fadeouts much more easy to execute than two mono units, although sound quality is not necessarily dependent upon one or the other.

THE SPEC STORY

You may have noticed by now that the emphasis of our survey has *not* been on the audio specifications of the consoles. The reason for this is twofold: first, specs really don't tell you how the console sounds (your ears must do that); and second, with reference levels and testing standards varying among manufacturers, it is not always valid to compare numbers from one company with those of another.

DECISIONS, DECISIONS

Purchasing a new recording console is like buying a new car. It has to fit your needs, be reliable, and offer the performance and features that you feel are important. Make sure you "test drive" a console before you buy it and, if possible, do a session on it. The real test for a console, however, is the day-after-day use that it will be called upon to receive. When you have chosen the right desk, it will allow you to perform all the tasks you need to for successful recording. EQ

THE AGE OF AUTOMATION

Many of the consoles examined in our report have some sort of automation available either standard or as an option. The automation options available at this price range fall into three basic categories: MIDI muting, MIDI control of VCA faders, and moving fader. Here is the lowdown on all three:

MIDI Mute Automation: MIDI mute automation can turn a channel on or off with no modification in fader levels. Consoles with MIDI muting usually offer two modes of automating mute settings. The first is "snapshot" automation, where the console "looks" at the status of the mute settings on the board and stores a picture of those settings. The snapshots can be stored and recalled via onboard patch registers or by sending a MIDI program change from an external device (like a sequencer). Snapshots can be written and recalled for various sections of a song, thus providing different mute setups for the respective sections.

The second mode of MIDI mute automation allows each channel to write a mute as a MIDI note on command. When playing through a mix, you turn channels on or off as needed, producing MIDI note on/off data. The mute switching data is usually stored in an external sequencer (though some desks have built in microprocessors to handle the task). Upon playback, the sequencer will play this data back, telling the console which channels to turn on or off. While it sounds limiting, there really is a lot you can do with this type of automation. First, your mixes can be made less noisy by writing mutes into channels whenever audio is not playing during a song (sort of like a noise gate on each channel). And even though you cannot ride faders, there are ways of executing simple level and EQ changes. You could send a sound to more than one channel, set each channel for a different level, panning, EQ, and reverb and then switch between channels as needed. This type of automation generally requires an external SMPTE-to-MIDI interface for the sequencer to follow a tape machine.

VCA Fader Automation: The next step in flexibility would be VCA automation of the faders. For those unfamiliar with the VCA, it is a voltage-controlled amplifier whose gain is set by moving the fader. The fader is actually not in the audio path. While this does offer a lot of flexibility for making fader moves, there can be two possible disadvantages. The first is the resolution of the faders: if the number of bits used to represent fader settings is too small, there could be a "zipper" effect when a volume change is made. Twelve-bit resolution will yield 4096 different volume steps, and this will avoid problems with zippering. The other concern is whether or not you want your audio signal passing through another amplifier. Some people claim to hear a difference in the sound quality between an audio fader and a VCA fader.

VCA automation will be executed most quickly when the recording console has an onboard computer for controlling the automation. Some desks will require an external computer to run the automation via MIDI. This will make the automation package more costly and slower, but may provide a fader status screen so that you can see where faders are set to at any given point in time. A board that does not require an external computer can usually store fader changes as snapshots recallable from either the front panel or via MIDI program change.

When evaluating a MIDI mute or VCA fader automation system, find out which faders can be automated. While MIDI mute systems usually offer control over channel, group, and monitor faders, some VCA systems automate the channel only (owing to the expense of VCA faders). This could be a limitation if you typically run a lot of virtual tracks into your mixes along with all of the tape tracks. Muting on group faders is handy when you need to mute an entire drum kit with one or two MIDI commands, and VCA control of the master fader could be really helpful for automating a fade-out.

Moving Faders: Lastly, there are the consoles that offer moving fader automation. Moving faders are reserved for the upper echelons of 8-bus console hierarchy. This most costly of automation systems is favored by engineers who don't want their audio signal passing through a VCA and want to be able to see the status of a fader at any point in a mix. Automation of channel, group, and master faders is possible, and some console manufacturers offer moving faders as a retrofit to desks originally purchased without automation. While moving fader automation looks really cool, it is not for the weak of wallet: systems start in the thousands of dollars.

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8-BUS REVIEWS

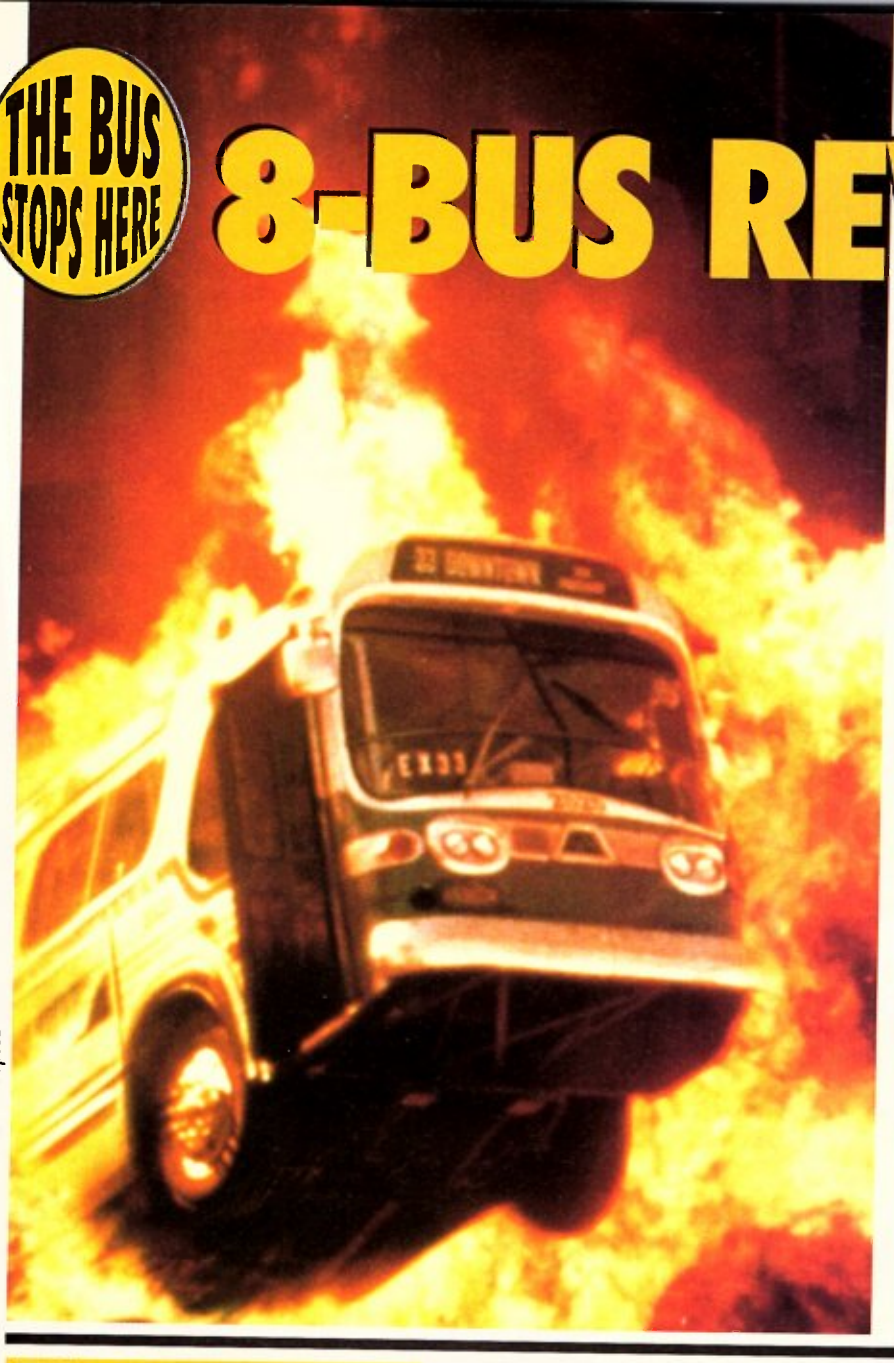

Photo from the film *Speed*

Eight-bus consoles are popping up in many product lines (see the comparison chart on page 100 to see the full selection). *EQ* takes a look at five under-$7600 8-bus boards so that when it comes time to buy, you can fly high — as opposed to crashing and burning (see left).

EQ LAB REPORT

MANUFACTURER: Spirit By Soundcraft, 8760 So. Sandy Parkway, Sandy, UT 84070. Tel: 801-566-8800.

APPLICATION: Eight-bus console.

SUMMARY: A clear 8-bus in-line, with 3-band EQ, 8 auxs, and seven effects returns.

STRENGTHS: Plenty of auxs; thoughtfully flexible; clean; balanced connectors; compact.

WEAKNESSES: Only 3-band EQ; no EQ in monitor path; no mic/line switching; no solo level; features are channel heavy.

PRICE: $4795 for 32-channel model.

EQ FREE LIT. #: 131

Soundcraft Spirit Studio LC

SOUNDCRAFT'S SPIRIT range will need no introduction to those scanning for an affordable 8-bus desk, and the Studio LC extends the lineage that includes the price-busting VCA automated Auto board.

Available in 16-, 24-, and 32-channel versions, the 64 remix inputs of the largest version can be boosted to 82 by the seven stereo effects returns, a stereo submix input, and a 2-track return if needed. This density of inputs is achieved in considerably less real estate than that taken up by many competing products.

Connectors are positioned on a raked rear panel with balanced mic, line, and tape returns; ground-compensated switchable –10/+4 tape sends; and inserts on each channel. All other inputs are balanced, and mix, aux, and monitor outputs are all ground-compensated. Inserts are also available on the two main stereo outputs.

MASTER SECTION

Matters are dominated by the main stereo output fader with a fine-balance pot for correcting stereo image and a

World Radio History

Mix B fader that sources from the monitor sections but can be routed to the main stereo. The control room can listen with Dim and Mono to the main mix, Mix B, and a 2-track return with its own level pot and routing to the main stereo. The control room output can be fed into a studio phones section, which additionally sources from auxs 1 and 2 and has an output level pot and AFL. You get PFL/AFL and switchable solo-in-place but curiously no solo level control — which makes for loud surprises if you're not careful.

The picture is completed by a two-tone oscillator, talk-back via a built-in mic to the groups, studio phones, and the main mix, plus aux masters each with AFL and cut. Auxs 3 and 4 can be blended together for combining channel and monitor sends.

Group output faders have PFL and can be routed in pairs to the main mix for subgrouping. Each stereo effects return has its own short-throw fader and balance pot, and can be cut, PFL'd, and routed to the main mix and the pair of groups directly beneath it. Additionally it can be fed to the studio phones bus, Mix B, and auxs 3 and 4. There are also three more basic stereo effects returns pots that are just hard-wired directly to the main stereo. Most interesting is the now-quaint inclusion of a submix input for bringing in a feed from an external keyboard or bolt-on submixer that can be PFL'd and fed on pots to the studio phones, Mix B, and the main stereo.

IMPRESSIONS

There is no mic/line-switching on channels, which means you have to unplug to make your intentions clear. And the EQ is fixed in the channel path and cannot be split to the monitor. This might be problem in certain applications and serves to underline the feature-heavy channel path nature of this desk, which is also apparent in the aux allocation. During mixdown, if you want to use all the EQ, there is a Flip switch that allows the tape return to feed the "CHAN" path and line/mic to feed the "MON" path without repatching.

The EQ is good, with a spacious HF, a capable though wide-range mid, and a superb LF that is solid and very controllable. It amounts to a better EQ than you'd expect from a 3-band, but there will undoubtedly be times when you'll miss that extra band.

Sonically the LC is clean and comfortably spec'd, with able mic preamps and a general impression of quality to its sound.

CONCLUSION

This is a remarkable desk that is surprisingly flexible. It offers some well-thought-out advanced features and good performance, yet has some peculiar omissions. However, what is offered is so well rounded that it is difficult not to be won over by the LC.

—Zenon Schoepe

Mackie 32•8 8-Bus Mixer

THE 32•8 has a lot to answer for. It almost single-handedly attached credibility and desirability to a desk sector that had earlier enjoyed little of either. Consequently, it's become the desk to beat.

Its outlook is decidedly American compared with the more British feel of its rivals, yet it's fairly conventional — in-line, 8 group faders, six auxs, 4-band EQ that can be split between the channel and monitor (or, as Mackie insists, "The Mix-B/Monitor" section), and six stereo effects returns. It comes in 16-, 24-, and 32-channel versions. There's an optional meter bridge for channel outputs or tape returns, plus a 24-channel expander (for the 24- and 32-channel versions) and an 11u rack sidecar.

Access to the commonly needed rear-panel connectors is excellent, with a horizontal surface housing mic XLRs, balanced jack line inputs, unbalanced jack direct outs, and unbalanced TRS jack channel inserts. You'll also find channel mic/line switching and 8-channel phantom powering switching here. The master section is capped by jack sockets for the group inserts; main stereo insert; aux sends (auxs 1 and 2 are balanced); unbalanced aux returns; and unbalanced connectors for the control room, main stereo, Mix-B output, headphones 1 and 2, studio, 2-track input, and external input.

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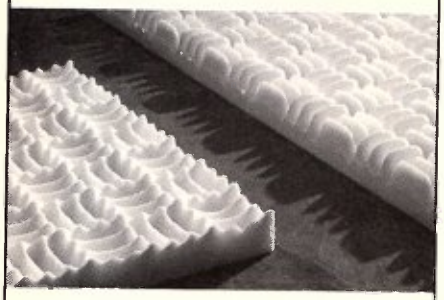

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The rear panel has 24 group outputs (parallels of the 8 groups) switchable for balanced/unbalanced +4/–10 operation and similarly switchable tape returns. It means you're bound to have to repatch if you've more than 24 tracks (or use eight "Y" cords to total 32 outputs). Matters are rounded off with main stereo balanced XLR outputs and a multipin expander port.

MASTER SECTION

Group faders have solos and can be routed to the main stereo mix for subgrouping. The Mix-B bus has its own level control and output, but can be routed into the main stereo output to double mixdown inputs or to provide a separate monitor mix.

You get two stereo headphone outputs driven by independent sections, each of which can source from the control room monitor mix, Mix-B, aux 3/4, aux 5/6, and an external source. Control room and studio outputs have level pots that can source from the main stereo mix, Mix-B, 2-track input, and an external source.

There's a solo level pot and the built-in talk-back mic can be directed on nonlatching buttons to the 'phones and studio, the 8 groups and main L/R, and auxs 1 and 2.

Of the six stereo returns, only 1 and 2 have balance pots, but all have solos. Returns 1 and 2 can be routed to the groups and the main stereo. Returns 3 and 4 can be routed to the main stereo and the two 'phone sections, while 5 and 6 are plumbed permanently into the main stereo.

IN USE

There's a wide range of cut and boost available in all EQ bands — more than ±15 dB would suggest — with satisfying results achieved for the majority of cases within the top semicircle of gain pot range.

The HF is very easy sounding. The LF is almost overpowering at extreme boost, but its thinning characteristics are effective.

The fully variable bandwidth facility on the HM is versatile, although achieving precision on the tightest bandwidth is difficult over 500 Hz to 18 kHz on one pot. However, if you leave it wide-ish and sweep the frequency delicately, it sounds good. Variable bandwidth might have been better employed in the narrower range LM, which has lots of action where you want it.

The EQ is splittable between the channel and monitor, but you are restricted to inserting only the HF and LF into the Mix-B path. If you want to try the mids, then you will have to flip, and that is likely to involve changing other pot settings.

The aux section is fine, although the arrangement gives four channel sends or two channel and two monitor sends. However, the direct out sockets mean that you've got additional outputs for aux sends or other applications.

The mic input circuitry is very quiet, and what noise there is on extreme crank-up is inoffensive and sounds almost weighted. The rest of the desk is also quiet and clean.

CONCLUSION

The 32•8 is a darned good desk and stands its ground ably in all departments in providing a flexible combination of features.

One of the strongest points is its expandability, which means you can stick with it a while longer as the rest of your rig swells.

Solid performance and features leave a lasting impression. The Mackie 32•8 remains something of a yardstick.

—Zenon Schoepe

EQ LAB REPORT

MANUFACTURER: Mackie Designs, 16620 Wood-Red Rd., Woodinville, WA 98072. Tel: 1-800-898-3211.

APPLICATION: Eight-bus console for project studios.

SUMMARY: A solidly featured 8-bus in-line, with 4-band EQ splittable between the channel and monitor paths, six auxs, and six stereo effects returns.

STRENGTHS: Clean; mic amps; balanced tape inputs and outputs; expandability; direct output sockets; flexible.

WEAKNESSES: Twenty-four tape outputs; no phase reverse; HF and LF EQ can only be split into the monitor path; phantom power switchable in blocks of 8 channels.

PRICE: $4995 for 32-channel model. **EQ FREE LIT. #:** 132

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This concludes the written portion of the exam.

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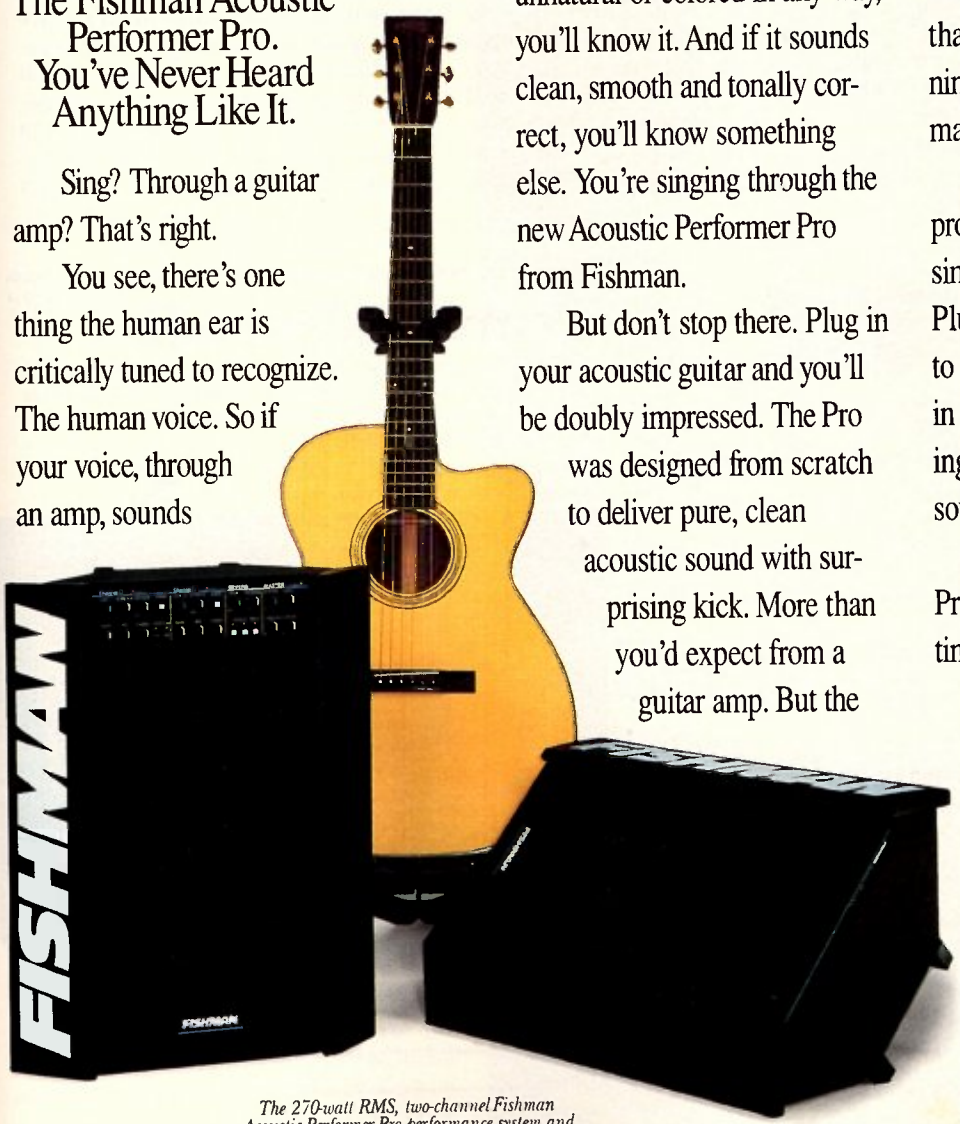

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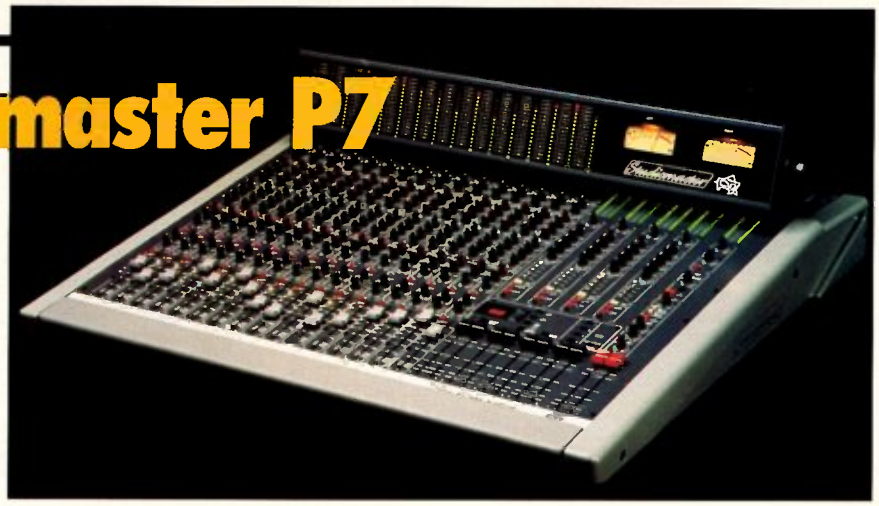
THE BUS STOPS HERE

Studiomaster P7



THE P7 satisfies all the 8-bus desk entry requirements while also including intelligently implemented MIDI muting as standard. Available in sizes from a base 16-channel version, the desk is expandable by 8-channel blocks to a maximum of 40 channels — giving double the number at remix plus four stereo effects returns. There are six auxs, 4-band swept mid EQ splittable between the channel and monitor paths, and eight group faders.

Access to the top panel connectors is excellent and each channel can be switched individually for phantom power via a recessed button. Line, tape, sends, and outputs are all on unbalanced jacks, but the desk can be modified internally to run at +4 for multitrack. However, you do get a balanced XLR output for the main stereo and some RCAs for plumbing in 2-tracks. Inserts are available on the channels, the group outputs, and the main stereo. The MIDI in, out, and thru handle communication to and from the P7's muting system.

MASTER SECTION

Aside from the main stereo faders, the group faders (each with PFL and paired switching to the main stereo for subgrouping), and the MIDI mute control panel, this section is taken up with the four fully routable stereo effects returns. Each has level, balance, the LF/HF EQ of the channel strip and access to aux 6. A single strip provides a two-frequency oscillator and talk-back through a built-in mic to the groups and aux 6, which is intended to act as a cue mix source.

Aux 6 is limited, however, because it's mono and accessible only from the channel path and effects returns. And while you can sum aux 5 to aux 6, the former is accessible only from the monitor path and is postfader. Although mono aux sends are common in this price range, performers do like stereo placement when tracking, and cueing pre- and postfader signals can be tricky if the engineer's monitoring requirements is not to impinge on the requirements of the player. Alternatively, the monitor output can

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be mixed into the aux 6 bus on a pot, but the arrangement is still unsatisfactory.

Two 2-tracks can be selected and dubbed between, and two pairs of speakers are supported.

MIDI MUTING

Channel, monitor, and aux 1 to 4 mutes can be automated via MIDI either by 99 snapshots, which can be activated from the control panel or by external patch-change command, or by recording individual mute selection (each mute corresponds to a note number) from the desk buttons into a sequencer synced to tape. You also get four single-button Mute groups and a solo-in-place function with solo safe that transforms the channel and monitor mutes into solo-in-place switches that effectively mute everything apart from those buttons pressed. mute groups and solo-in-place are not transmitted via MIDI.

The muting system is superb and works best when driven into a sequencer where the data can be fine-edited. It simplifies mixing because once you get your cuts right you can forget about them and concentrate on levels and balancing.

Sonically the P7 is fine. There is little warning on the channel overload LED — by the time it's flashing, the signal is already suffering audibly, so you end up being overcautious. The EQ is comfortable to work with and encourages generous use, but, annoyingly, there are no center detents on the boosts. Studiomaster instead opted for better pots and EQ to Feed.

The HF gives excellent sizzle, but the LF is a tad dull and low. The high mid is wide-range and consequently a little too broad or a little too narrow depending on where you are in its travel. The low mid, though, does sterling work and actually pulls the whole section together and makes it work.

The inclusion of VU meter ballistics on the eight group output bargraphs in this digital age is surprising — especially since the main stereo gets peak ballistics.

I found the fader panel switches too small for comfort. Also, the legending is unclear and unnecessarily cluttered for a desk that is absolute child's play to use and get an immediate result with.

CONCLUSION

The P7 is a good board that scores well in all departments but excels in ease of use. It really comes into its own as a well-balanced package that can also be expanded for input capacity where MIDI muting is a consideration. *—Zenon Schoepe*

EQ LAB REPORT

MANUFACTURER: Studiomaster, 3941 Miraloma Ave., Anaheim, CA 92807. Tel: 1-800-878-7883.

APPLICATION: Eight-bus console for use in project studios.

SUMMARY: A no-nonsense 8-bus in-line desk with 4-band EQ splittable between channel and monitor paths; 6 auxs; four fully routable stereo effects returns; and MIDI muting of channels, monitors, and four aux send masters.

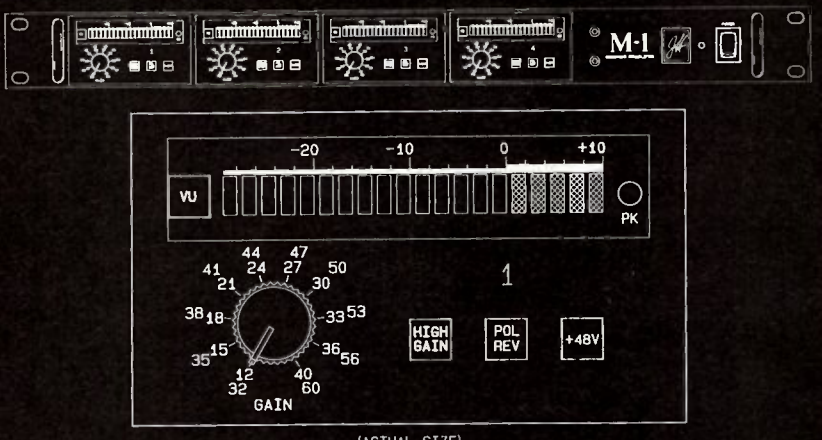
STRENGTHS: MIDI muting; ridiculously simple to use; fully routable effects returns; expandability.

WEAKNESSES: Cluttered legending; group VU meter ballistics; unbalanced tape connections; mono cue mix; no EQ boost-pot center detents.

PRICE: $7595 for 32-channel model. **EQ FREE LIT. #:** 133

M-1

MICROPHONE PREAMPLIFIER



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THE BUS STOPS HERE

TASCAM M-2600 8-Bus Console

YOU'VE GOT to hand it to TASCAM; for a Japanese company it surely knows how to stack up a console against the products of the British and Americans. Part of this is due to the company's willingness to listen and absorb influence — and the result is obvious in the M-2600, which has been bred to match its competitors on a feature-for-feature basis as much as possible.

You get eight group faders and a channel strip with 8 auxs (four of which are arranged as stereo cues/aux sends), and a 4-band swept mid EQ that can be split in the usual way between channel and monitor. It comes in 16-, 24-, and 32-channel sizes, with double the number at remix, plus six fully routable stereo effects returns.

The eight group outputs are repeated in blocks of eight channels along the length of the desk, and each channel also has a switchable direct out. Tape inputs and outputs are on phonos, and thus unbalanced, but you get balanced jack line inputs, balanced mic XLRs, and unbalanced stereo jack inserts. Unbalanced jacks are also used for aux sends, effects returns, and control room and studio outputs, with balanced XLRs and paralleled RCA main stereo outputs plus a balanced XLR 2-track return. There's also an external stereo input on RCAs, and inserts are available on the group and main stereo outputs.

MASTER SECTION

Each group fader has solo and mute, and pairs of faders can be switched into the main stereo bus for subgrouping. Each stereo effect return has solo, level, and balance pots, plus routing to the four group pairs, the cue bus, and the main stereo mix.

Selectable control-room monitoring sources are the main stereo mix, auxs 1 and 2 (the channel stereo cue), auxs 3 and 4 (the monitor stereo cue), the 2-track return, and the additional external source. Aux masters 5 to 8 have solos, and 5 and 7 and 6 and 8 can be summed. The stereo cue/aux masters 1/2 and 3/4 are normally also summed but can be split, and a button marked L-R to Cue sends the main stereo mix into the Cue bus, permitting musician monitor mixes to be created quickly. Matters are further helped by two sets of headphone jacks and level pots: one for the control room and one for the cue mix.

Talk-back via a panel-top mic with level pot can be assigned to the slate, all auxs, or the studio output. The studio feed has its own level pot and On switch. There's no oscillator, and only one set of monitors is supported.

IMPRESSIONS

The channel strip is well featured, has excellent aux flexibility, and a useful EQ. Bass and treble are handled by fixed HF and LF shelves with swept and overlapping ranges on the mids. The whole section is particularly good at dealing with drums and is quite smooth. Plus, you can split the HF/LF and mids in part or total between the channel and monitors.

There's no phase reverse or high-pass filter, and some would argue that a padless input stage is the thing these days. Phantom power is switched on in 8-channel blocks, which could be a problem if you don't plan out phan-

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EQ LAB REPORT

MANUFACTURER: TASCAM, 7733 Telegraph Road, Montebello, CA 90640. Tel: 213-726-0303.

APPLICATION: Eight-bus console for project studios.

SUMMARY: A well-featured and well-built 8-bus in-line desk with a 4-band EQ that is splittable between the channel and monitor paths, 8 auxs, and six fully routable stereo effects returns.

STRENGTHS: Clean; easy to use; excellent cue mix/aux send flexibility; loads of stereo effects returns; flexible.

WEAKNESSES: Unbalanced tape inputs and outputs on RCAs; no phase-reverse or high-pass filter; phantom power switched in blocks of 8 channels.

PRICE: $4699 for 32-channel model. **EQ FREE LIT. #:** 134

tom-friendly and -unfriendly inputs.

Sonically, it's as clean as a whistle, with very able performance from every type of input — but it is, after all, intended to be TASCAM's entry-level DA-88 companion.

Four stereo effects returns routed to the main stereo would have been appreciated, but six fully routable returns is generous in the extreme, allowing multitimbral units and samplers, as well as effects units, to be patched in. The lack of mutes can be overcome by canceling routing.

Bargraph metering similar to that on the DA-88 covers the eight groups and the main stereo, with in-place solos being displayed on the latter.

CONCLUSION

TASCAM's sensitivity to user needs is one of the M-2600's strongest points. The console is designed to allow you to make the most of what you buy. The quality is blatant.

This is a straight-up-the-middle, honest-to-goodness, workhorse, project studio recording and mixing desk that almost defines what it is that its target user wants.

—Zenon Schoepe

Soundtracs Topaz 8-Bus Console

TOPAZ HAS all the on-paper features that are now expected of an affordable serious starter desk. Access to the slanted rear-panel connectors is good, with the optional bar-graph meter bridge clipping onto the rear top of the board and connecting via an XLR, giving channel input displays plus two mechanical VUs for the main stereo.

The desk is available in 24- and 32-channel versions that accumulate to 56 and 72 inputs at remix, respectively, given the desk's in-line monitoring and four stereo effects returns. A channel input passes through a strip and can either be output as a direct from its associated tape output or sent through the eight group output faders to other bus/tape output sockets. Multitrack tape returns are routed to a monitor mix output that can be merged into the main mix, and you can also audio subgroup into the main stereo output. The clarity of operation makes it an ideal desk on which to learn.

Each strip has an individually switchable phantom power mic input, balanced line and tape inputs on standard jacks, unbalanced ground-compensated low-impedance inputs, unbalanced tape output on mono (TRS) jack, and an unbalanced insert on the stereo jack. Group outputs, left/right outputs, auxs, effects returns, and monitoring outputs are on the unbalanced ground-compensated low-impedance jacks along with the main mix and group output inserts. All tape inputs and outputs can be individually internally solder-linked for –10 or +4 operation.

MASTER SECTION

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THE BUS STOPS HERE

itor mix level derives from the monitor inputs, while a studio-output section sources from the main mix, monitor mix, control room, and auxs 1 and 2. The control room section supports two sets of speakers from two balanced 2-track inputs, the main mix, or monitor mix. Talk-back can be directed to the studio, groups, and auxs 1 and 2 on a nonlatching button. There's no oscillator.

Group outputs have individual left and right switching into the main stereo mix, plus AFL, while the stereo returns (located above the group output faders) have level and balance pots, PFL, routing to the main mix, and routing to the pair of group outputs directly beneath them.

EQ LAB REPORT

MANUFACTURER: Distributed in the U.S. by Samson Technologies, P.O. Box 9068, Hicksville, NY 11802-9068. Tel: 516-932-3810.

APPLICATION: Project studios.

SUMMARY: A straightforward 8-bus in-line console with separate groups faders, four stereo effects returns, and separate channel and monitor path EQ.

STRENGTHS: Clean; clarity of layout and ease of operation; class-leading EQ; dedicated EQ on monitors; flexible.

WEAKNESSES: Auxs are slightly inflexible; no channel mic/line switching.

PRICE: $3995 for 24-channel model; $850 for optional meter bridge.

EQ FREE LIT. #: 135

IMPRESSIONS

The Topaz sounds clean and expensive. It's quiet and there's an obvious comfort margin on the mic inputs. However, there is no channel mic/line switch, which means you have to unplug the line input if you want to use the mic, and vice versa, otherwise you're faced with the prospect of introducing noise.

The best aspect of Topaz is its channel EQ. Offering 15 dB each way, its effect is immediately apparent and very pleasing, with only the slightest of turns on the gain pot. At extremes it verges on the hard-as-nails, but you'll rarely have to push it that hard as the musical and effects stuff is achieved in the 9 o'clock to 3 o'clock section of the boost pot's travel.

It's the best EQ I've heard on a desk in this price range — not because it's particularly warm or clinical, but because it achieves a bit of both and is so usable. The two midbands have a high degree of overlap yet manage to hold their own ground rather than requiring adjacent band interaction to create a cumulative effect. The two channel shelves take care of general bass and treble and are identical to that in the monitor path. If you want to add mids to the monitor, you have to flip inputs.

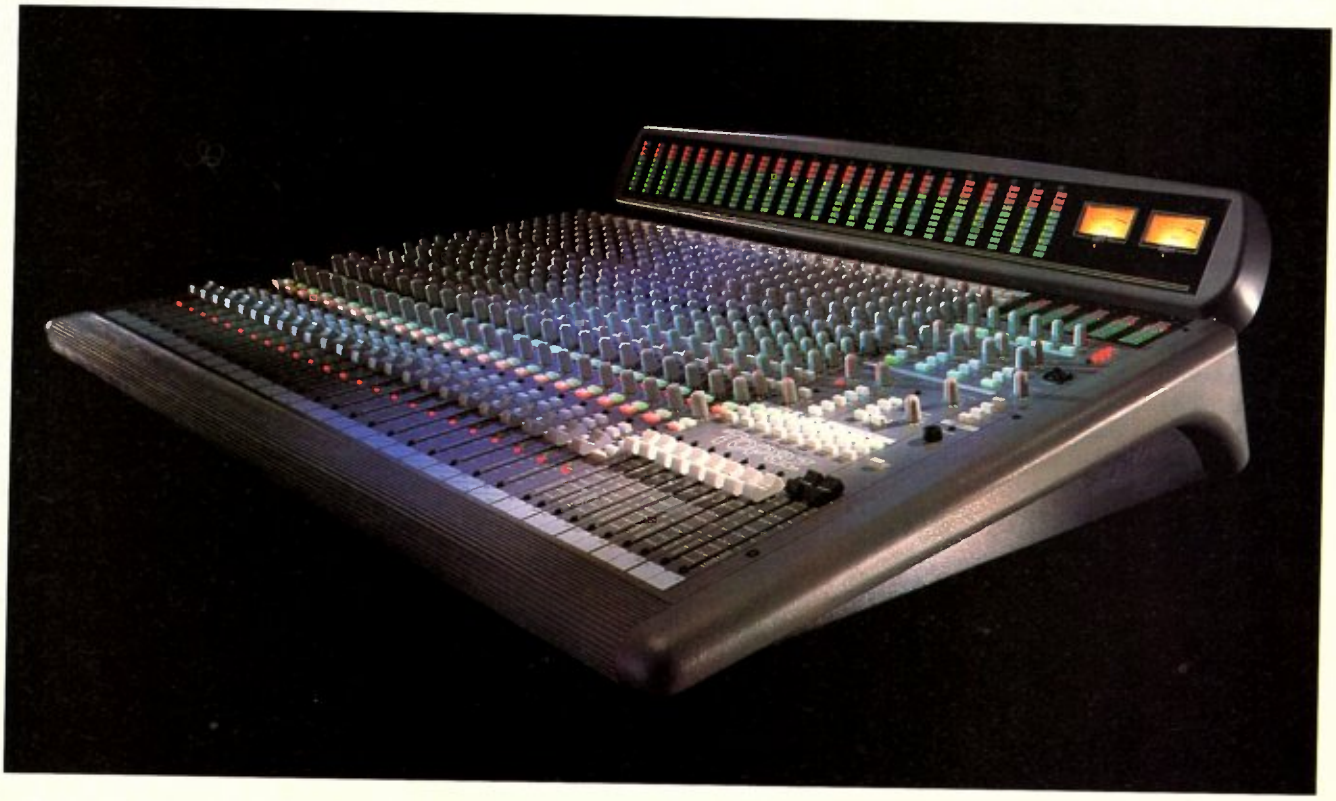
The auxs are more disappointing because they're fairly fixed with no pre/post switching and the desk is effectively restricted to only four post auxs across the board for monitor and channel at mixdown. The prefader status of auxs 1 and 2 are intended as artist monitor sends.

CONCLUSION

Effects returns routing to some of the group busses means you can keep things hard-wired without repatching in-line with the way you like to organize and lay down tracks. The fact that there is some dedicated EQ on the monitors, rather than the sharing arrangement of channel EQ found on other desks, weighs heavily in this console's favor. The EQ is exceptional.

Topaz shouts "value for money" and compares extremely favorably on a dollar-per-bang basis with just about everything else in this area.

—Zenon Schoepe



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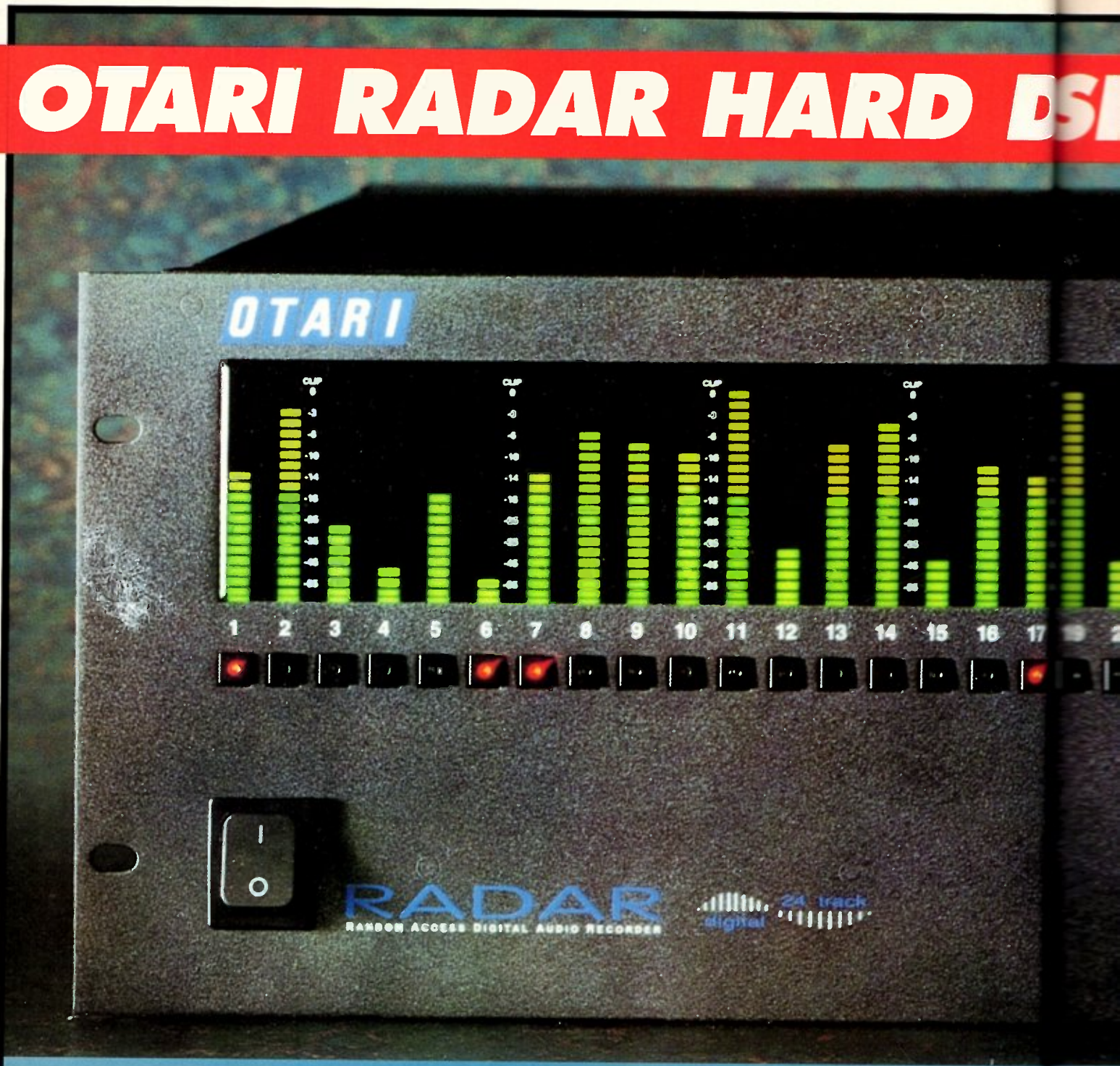

EQ LAB REPORT

MANUFACTURER: Otari, 378 Vintage Park Drive, Foster City, CA 94404. Tel: 415-341-5900.

APPLICATIONS: Digital multitrack recording with editing capabilities that far exceed those for analog tape.

SUMMARY: RADAR successfully simulates a 24-track analog deck, but adds digital sound quality and precision editing.

STRENGTHS: Extreme ease of use; convenience; "systems" approach that simplifies setup; upgradeability; superb jog wheel implementation.

WEAKNESSES: Lack of graphical editing; inability to hear audio during fast forward or rewind.

PRICE: $21,300 for 24 tracks; $10,164 for 8 tracks; $15,725 for 16 tracks; RE-8 Remote, $1100; Exabyte backup storage unit, $3500 ($25,900 for 24-track system).

EQ FREE LIT. #: 136

It's been a lo ou recording sys h

AN EQ SP

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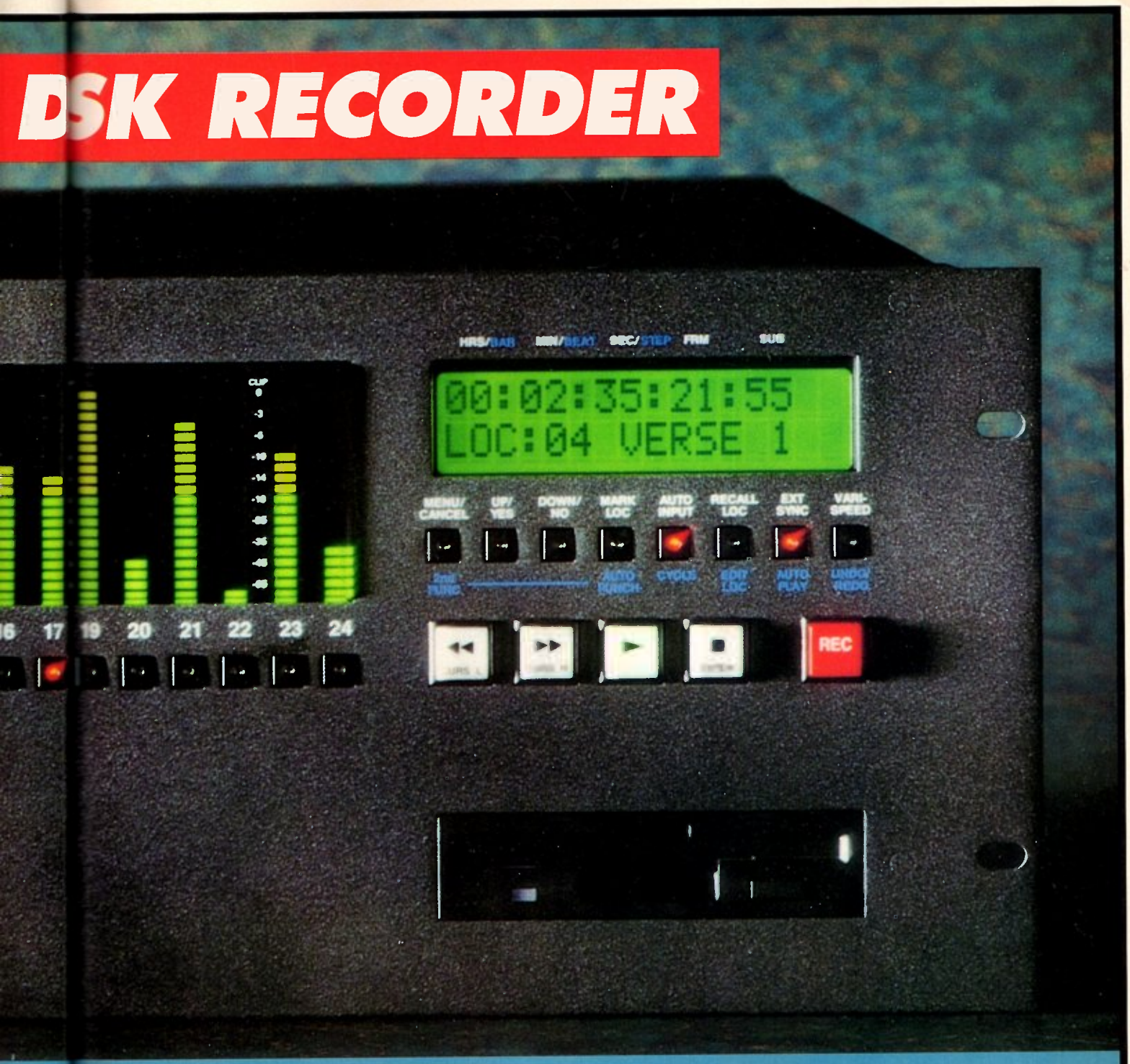
DSK RECORDER



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Project studio hard-disk recording (HDR) got started by riding on the back of the personal computer, which cut expenses and development time. The tradeoff was a need to wrestle not just with the HDR, but with the computer as well — installing cards, defragmenting disks, and resolving operating system conflicts.

RADAR (Random Access Digital Audio Recorder) is a stand-alone, 4U rack-mount multitrack HDR system that's easy to set up and use. It's available in 8-, 16-, and 24-track configurations; 8- and 16-track versions can be upgraded to the full 24 tracks. There's nothing obtuse about RADAR: its transport controls resemble those on a tape recorder and it's about as easy to operate as a standard multitrack deck unless you want to delve into the more sophisticated features.

BASICS

Each input and output has a 1/4-inch phone jack (balanced and unbalanced compatible); you can record on all tracks simultaneously. Both inputs and outputs can be set as a group for +4/–10 dB operation.

RADAR can chase SMPTE as well as handle AES/EBU, S/PDIF, external remote, and video reference/word clock/PAL sync signals. MIDI, mouse, and keyboard ports are included for future applications. (RADAR does not yet generate SMPTE or send/receive MIDI, but see the sidebar on coming attractions.)

A SCSI port allows adding up to three more hard drives to increase recording time beyond the standard 22 minutes (at 48 kHz), with room left over for an additional SCSI backup device. Otari offers a companion Exabyte 8mm tape backup unit. A built-in 3.5-inch floppy drive accepts software updates.

FACING THE INTERFACE

The front panel is instantly familiar: there are twenty-four 21-segment LED VU meters with track "record ready" buttons, tapelike transport controls, several function buttons (cursor control, menu selection, variable speed during playback and record, punch, mark location point, and so on). The clip LEDs have a peak-hold function where, if clipping occurs, they contin-

ALL-IN-ONE: Hard-disk recording for those who want to avoid computer hassles.

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World Radio History

OTARI OPTION: The RE-8 remote control.

ue to glow dimly and need to be reset.

Unlike personal computer-based systems, there's no graphical editing display other than an alphanumeric LCD (thankfully, it's bright and easy to read). RADAR pretty much emulates tape — right down to using the remote control's jog wheel the way you'd "rock" standard analog reels to find splice and marker points (it's also great for scratching!). Although fans of graphic editing might balk, relying exclusively on your ears isn't necessarily a bad thing — computer complications can force you into "left brain" mode that's inimical to creativity.

USING IT

Using RADAR on a session is just like running a tape deck, except that everything is instant. Stop, and it stops. Locate, and you're there in a flash. Almost all the techniques learned dur-

OPTIONS AND COMING ATTRACTIONS

An optional 37-pin parallel interface card ($199) lets RADAR be controlled by automation systems (SSL, NEVE, GML, etc.) and Otari remote controls; ADATlink ($995), a dealer-installable card that fits in the RADAR "motherboard," provides six channels of ADAT digital I/O for transferring up to 24 tracks between multiple ADATs and RADAR.

Also available: the Backup Station, a $2995 card that plugs into an IBM PC to allow for backup while recording. This would typically be used with a unit that includes tape backup and multiple removable drives (Exabyte makes a suitable box for around $4100). As one example of its use, you could record to the removable drives, then back them up to the tape drive while you continue to work using RADAR's internal drives.

Otari plans to implement several features in early '95: SMPTE sync out (meanwhile, stripe one of the tracks), Sony 9-pin control, RADARlink for 48-track operation, MIDI Machine Control, and MIDI timecode.

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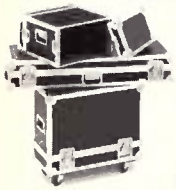

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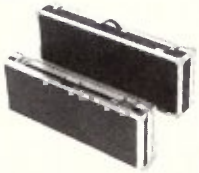

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GET WITH THE PROGRAM: RADAR supports up to 99 different projects.

ing the process of working with analog decks apply to RADAR; if you've ever worked with a high-end analog multitrack, RADAR is uncannily familiar.

But of course, there are differences that owe to hard-disk technology. Rewind and fast forward can occur at two different speeds, and banishing tape handling from your life is a definite plus for autolocation. In fact, once you get into autolocation, you'll seldom use rewind/fast forward.

RADAR supports up to 99 different "projects" (playlists of different recorded material), which can have their own locate points (up to 99), start times, and names. Projects are completely independent of each other, but can share data or be copied to unused projects. (To create a "backup" file, just copy something before editing it.)

Location points can be named, edited, deleted, or added, as can mark in/out points. The latter are used for automated punching, block repeats, location chasing, etc. Pre- and postroll work in conjunction with markers, although preroll is available only with the RE-8 remote.

Like most hard-disk systems, RADAR accumulates bits of audio until you tell it to reclaim disk space. RADAR can scan all projects, and erase unused audio.

System-related functions include backup/restore; sample rate select; SMPTE time sync offset; renumber locate points according to chronological order; undo/redo (recovers most editing functions except drastic things like Erase Disks); crossfade time for edits and punches (0 to 100 ms); preferences; diagnostics; and my personal favorite, meter display diagnostics — which turn the meters into a decent approximation of Tetris and Pong where you use the buttons to move the "blocks" or "paddles," respectively. (I am not making this up. Besides, I told you engineers have a sense of humor!)

By the way, the variable speed function changes depending on the sample rate. At 48 kHz, you can go +2.81 percent to –50 percent; at 32 kHz, the range is +54.21 percent to –25 percent.

AUDIO EDITING

You can mark what Otari calls an "audio clip" and cut, copy, paste, move, erase, slide, audition, or loop it. Cutting causes the audio around the cut area to close up; erase creates silence, which retains the original length. Move does the equivalent of erase + paste. Paste can either overwrite or insert, or write to a different track if desired. One useful feature is that if you paste at the mark out point, the end of the clip matches the mark-out point, and the preceding audio is moved backward to make room for the new audio.

The clip can consist of multiple tracks, which are assignable to any other tracks. The only limitation is that the lowest numbered source track must paste to the lowest-numbered destination track, and the next higher numbered source tracks must paste to the next higher numbered destination tracks.

Slide moves a clip forward or backward one millisecond (or frame) at a time. This is great for "feel factor" and "groove" techniques. Loop causes successive pasting of a piece of audio, up to the number of times you specify.

A handy utility, Modify Edit, groups together all pertinent parameters of an edit for "one-stop" editing. Other functions include reverse playback, jog wheel nudge, various solo modes, programmable peak and clip hold times, cue to next/previous audio segment, reverse clipboard, and .WAV file import.

GOING REMOTE

The RE-8 remote controller is sold as an option but is essential; in particular, because the jog/shuttle wheel does not have a front-panel equivalent, the remote is required for any serious editing. The remote is far more complete

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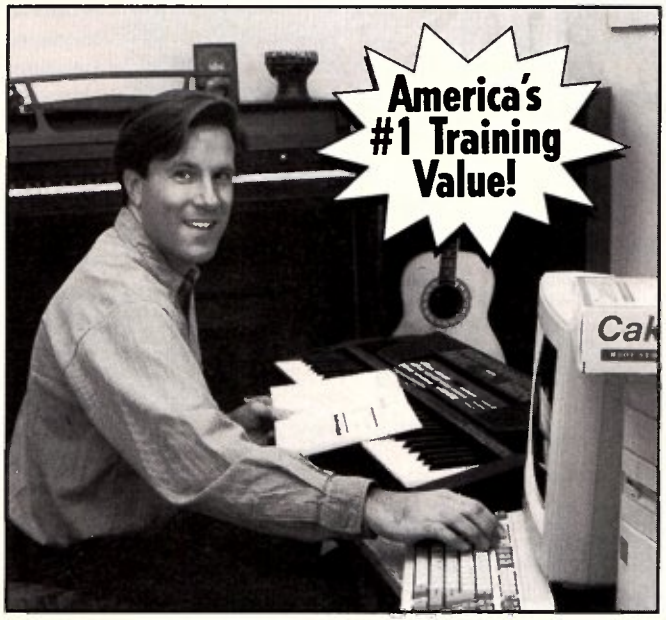

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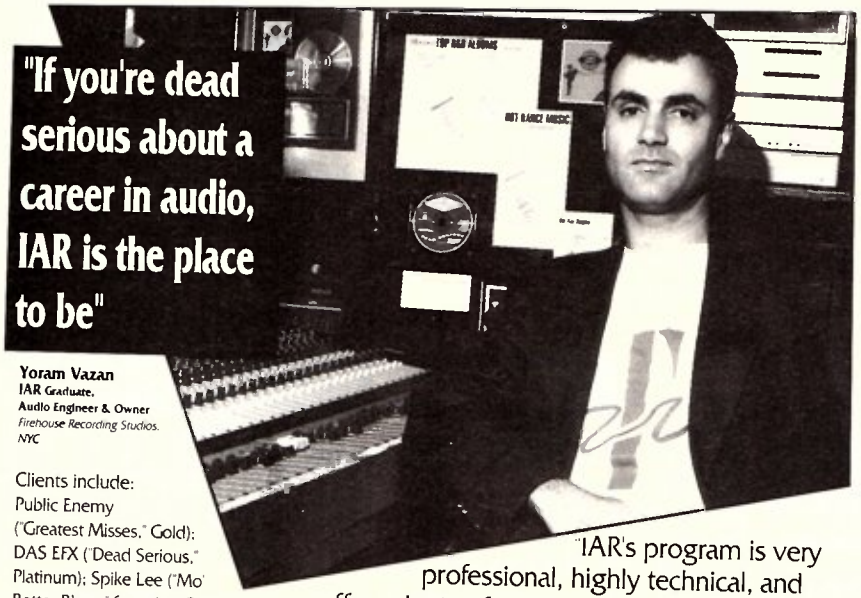

CIRCLE 91 ON FREE INFO CARD

than the front panel — with a keyboard for text entry, a numeric keypad, record disable to "write-protect" a track, track solo, and three footswitch jacks (normally open only) for locate, record, and play. If you're tired of using computer alt, function, and command keys, you'll love this — a dedicated controller really makes the system work smoothly.

OPINIONS

RADAR more than accomplishes its assigned task, which is to painlessly replace a reel-to-reel multitrack with the hard disk equivalent — all at a cost close to that of a reconditioned MTR-90 24-track analog deck. RADAR is fast and intuitive, and offers distinctly high-quality sound — it doesn't have a "digital-sounding" edge, and is far cleaner than analog tape. It feels rugged, too; there's none of the prima donna quality that personal computers sometimes have, and RADAR seems a logical choice for live recording (but isolate the hard disk and fan noise from the sound source).

Overall, perhaps the best part about RADAR is that it's a "plug and play" hard-disk multitrack you can unpack in the late afternoon and use on a session in the early evening — a quality that is extremely rare, yet most welcome, in high-tech gear. *—Craig Anderton*

JUST THE FACTS

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Fishman Acoustic Performer Pro

EQ LAB REPORT

MANUFACTURER: Fishman Audio Division, 340-D Fordham Road, Wilmington, MA 01887. Tel: 508-988-9199.

APPLICATIONS: Portable amplification for acoustic instruments (particularly guitar and voice) that's at home in the studio as well as in live performance.

SUMMARY. Fishman hits a home run on their first big foray into amplification. However, it may be over-engineered for those on a budget who need something simpler and cheaper.

STRENGTHS: Punchy sound with lots of presence; flexible interfacing; compact and easily transported; useful bells and whistles.

WEAKNESSES: Performance like this doesn't come cheap; loud thump on turn-on.

PRICE: Acoustic Performer Pro $1995; Acoustic Monitor Pro $1395; Narrow Format Acoustic Matrix transducer $139.95; Crown GLM200E instrument mic $139.95.

EQ FREE LIT #: 137

A DECADE AGO DX7 synthesizers were flying off the shelves. Now it's acoustic guitars, and the unplugged movement has yet to peak. Fishman's Acoustic Performer Pro (APP) and Acoustic Monitor Pro (AMP) satellite speaker/monitor are part of a complete, portable sound system targeted at the back-to-basics acoustic player who doesn't want to forego the conveniences of modern amplification.

Don't be shocked when you first see the amp or monitor. They're very compact (19.3 inches H x 15.2 inches W x 7.2 inches D) and don't look like they could fill a small club. But hearing is believing. One of the nice things about the guitar from an engineer's standpoint is that it does not have much bass energy, so you don't need huge speakers that move a lot of air. What you do need is clean power driving a speaker with lots of power-handling capacity and punch. That's what the APP and AMP do, which is why you get so much sound out of such little boxes (the extremely long-throw, custom-made woofer is what's responsible for the excellent low-frequency performance).

Both the APP and AMP run off 115 V or 230 V and use a biamp, MOSFET-based design, with a pair of bridged amps feeding 230 W RMS into the 8-inch polypropylene driver and a separate 40 W RMS amp for the 1-inch fabric dome tweeter. There are also compressors for both channels that, in the event of a sustained signal that could overstress the system, come into play but are otherwise not a factor.

APP JACKS ON THE BACK

The APP is a 2-channel amp with multiple inputs and outputs. A stereo input feeds into both channels and is optimized for Fishman's dual-transducer system (see sidebar). Channel 2 (10 Meg input impedance) works with piezo and magnetic transducers, while Channel 1's 1 Meg input impedance with a switchable 15-volt phantom supply slants toward vocal and

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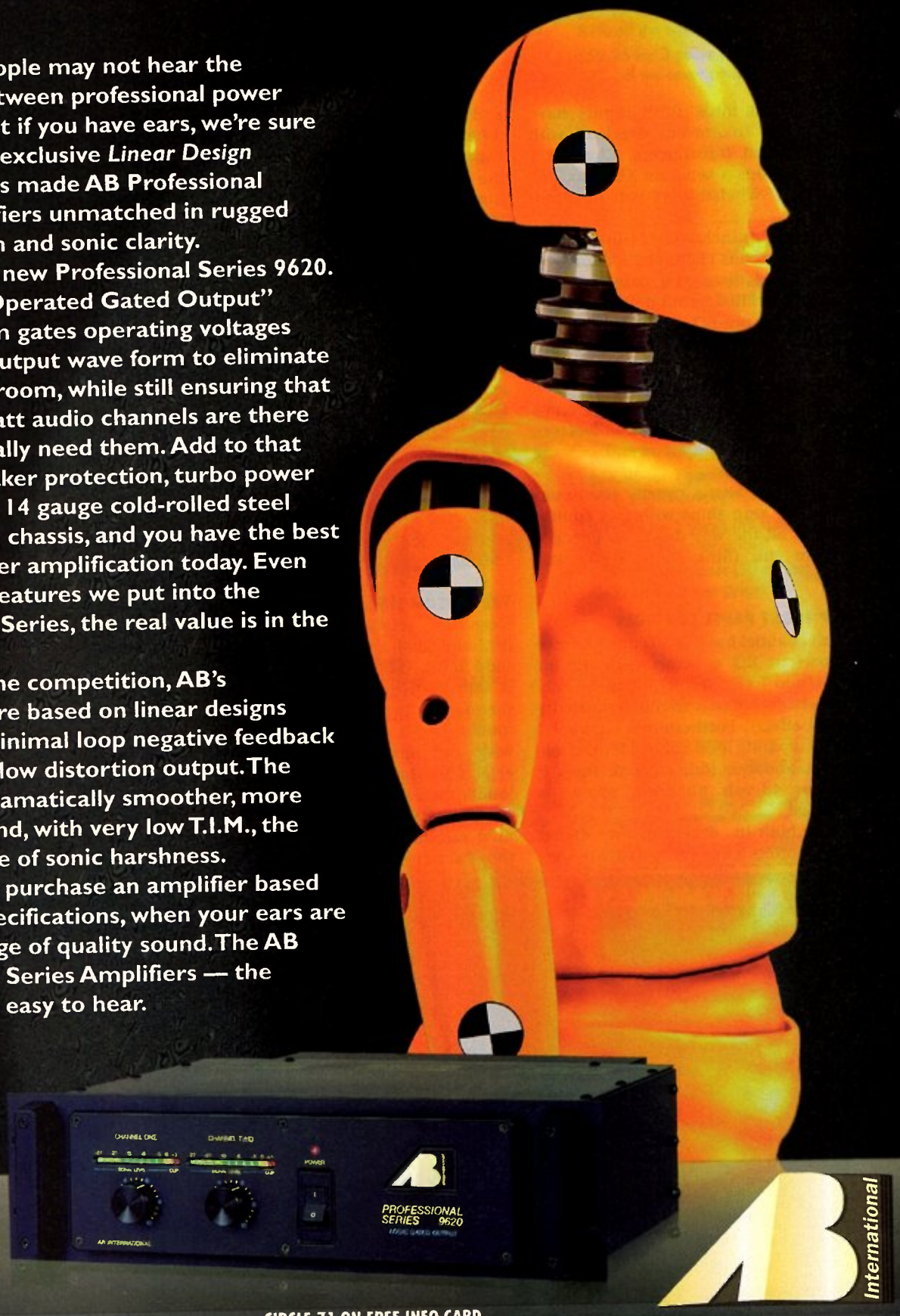
Unlike the competition, AB's Amplifiers are based on linear designs which use minimal loop negative feedback in achieving low distortion output. The result is a dramatically smoother, more genuine sound, with very low T.I.M., the major source of sonic harshness.

But why purchase an amplifier based on paper specifications, when your ears are the final judge of quality sound. The AB Professional Series Amplifiers — the difference is easy to hear.



CIRCLE 71 ON FREE INFO CARD

AB International 1830-6 Vernon St. Roseville, CA 95678 (916) 783-7800

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instrument mics. Both inputs have trim pots to prevent overload with high-output transducers. Channel 1 also features a separate XLR aux/mic in, with switchable 48-volt phantom power.

Outputs include a 1/4-inch phone jack that sends channel 2's signal to a tuner, and three XLR balanced outs with individual ground lift switches (channel 1 pre-EQ, channel 2 pre-EQ, and a post-EQ/post master fader mix of both channels — the latter is what you'd probably use to drive the AMP). Three mono, send/return effects loops (for channel 1, channel 2, and master), and a tape/CD input round out the rear-panel jacks.

There's also a tweeter level control. The amp ships with this control turned all the way down, so check it before you think there aren't any highs.

APP FRONT PANEL CONTROLS

Each channel has a level control, three boost/cut EQ controls (±10 dB for bass/mid 1 kHz/treble), phase switch, and effects blend (variable from all dry to all effect). Furthermore, channel 1 has a separate level control for the mic input, and two indicators to show if 15- or 48-volt phantom power is enabled.

A built-in, decent-quality digital reverb offers a mix control (dry to wet) and six-position switch to select five different reverb types or off. A master control section sports a mix control for the master effects loop, master level, notch filter with variable depth and frequency (from 50 to 500 Hz), and mute switch that mutes everything except the tuner input (good thinking).

SATELLITE OF LOUD

The AMP is a stripped-down version of the APP with balanced XLR and unbalanced 1/4-inch inputs and outputs, tape/CD in jack, tweeter level control, bass boost, and a switch to compensate for different bass responses depending on whether the speaker is mounted on a stand or sitting on the floor. The front panel has a volume control, clipping indicator, and power indicator.

THE BOTTOM LINE

Despite its relatively light weight (29 lbs.) and small size, the APP can shout (add in the AMP, and they scream). As it says in the beginning of the APP manual, "Caution: This amplifier is louder than it looks. Do not operate it with your ears in front of the speakers." This isn't marketing hype; it is louder than it looks.

There was one mystery: a very mild mechanical buzz caused by the toroidal transformer. I called Fishman about this, who said that they have had some reports of this in some electrical environments. Yet the next day, the buzz was gone, and never returned. Maybe the components just needed to settle in.

Granted, this system is not exactly inexpensive. But you get a lot in return, particularly if you use Fishman's transducer system, which — unlike other, general purpose acoustic guitar amps — fits the APP/AMP like a glove. Add in the zillions of interfacing features, portability, and enough raw power to faithfully reproduce an acoustic guitar's hefty transients, and there's plenty to justify the price if you're a professional acoustic guitarist.

In the studio, the AMP makes it easy to get a good acoustic guitar sound quickly thanks to the excellent transducer fidelity. Just grab the direct outs, and mic the speaker if you want to play with the ambiance and timbre.

Overall, the APP and AMP passed the most important test: they made me want to forget about writing the review, and just play. If you're doing a coffeehouse or small club gig and want a great acoustic guitar sound (and a mic input), Fishman's latest represents a serious combination of sound, size, and sizzle.

—Craig Anderton

THE FISHMAN TRANSDUCERS

Part of the reason that I was so impressed with the amp has to do with the Fishman transducers and Martin guitar (an OM28 Perry Bechtel model, courtesy of Chris Martin) used in the test. The transducer system consists of a Crown GLM200E condenser mic that clips on to bracing near the sound hole, and Fishman's "Narrow Format Acoustic Matrix" transducer (also marketed by Martin as the "Thin Line Gold Plus" transducer). This mounts in the saddle and includes a preamp that requires a 9V battery.

Installing all this isn't too difficult; if you're accomplished you could do it yourself, but you're probably better off having things done professionally. Fishman estimates the installation cost at $40–$100.

If I had to choose only one transducer, it would be the acoustic matrix — it's full, loud, and relatively feedback-resistant. The response is very even, and the vibration-sensitive copolymer element (developed by Pennwalt and licensed exclusively to Fishman for use in guitar transducers) offers better audio quality than most piezo devices, and certainly beats sticking a mic toward your guitar and hoping for the best. Adding in the mic, though, does layer an extra dimension, and thanks to the complement of APP controls, you can dial in just about any sound you want. Of course, the APP is tailored to using the two transducers, right down to the phantom power and phase switches.

Fishman has a reputation for making excellent acoustic guitar transducers; play with one and you'll see why.

—Craig Anderton

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Jupiter Systems MDT v.1

EQ LAB REPORT

MANUFACTURER: Jupiter Systems, P.O. Box 697, Applegate, CA 95703-0697. Tel: 800-446-2356.

APPLICATIONS: Macintosh-based dynamics processor, configured as a software DSP "plug-in" for Digidesign-based hardware/software systems (e.g., Sound Designer II).

SUMMARY: Software alternative to traditionally hardware-based DSP functions such as compression, limiting, expansion, parametric and graphic equalization, spectral enhancement, and so on.

STRENGTHS: Excellent sound; wide variety of usable features; intuitive user interface; great learning tool; good documentation.

WEAKNESSES: Occasional slight "digital" sound quality on extreme parameter settings; no zoom feature on editing displays; cannot monitor filter parameters in real time while adjustments are being made.

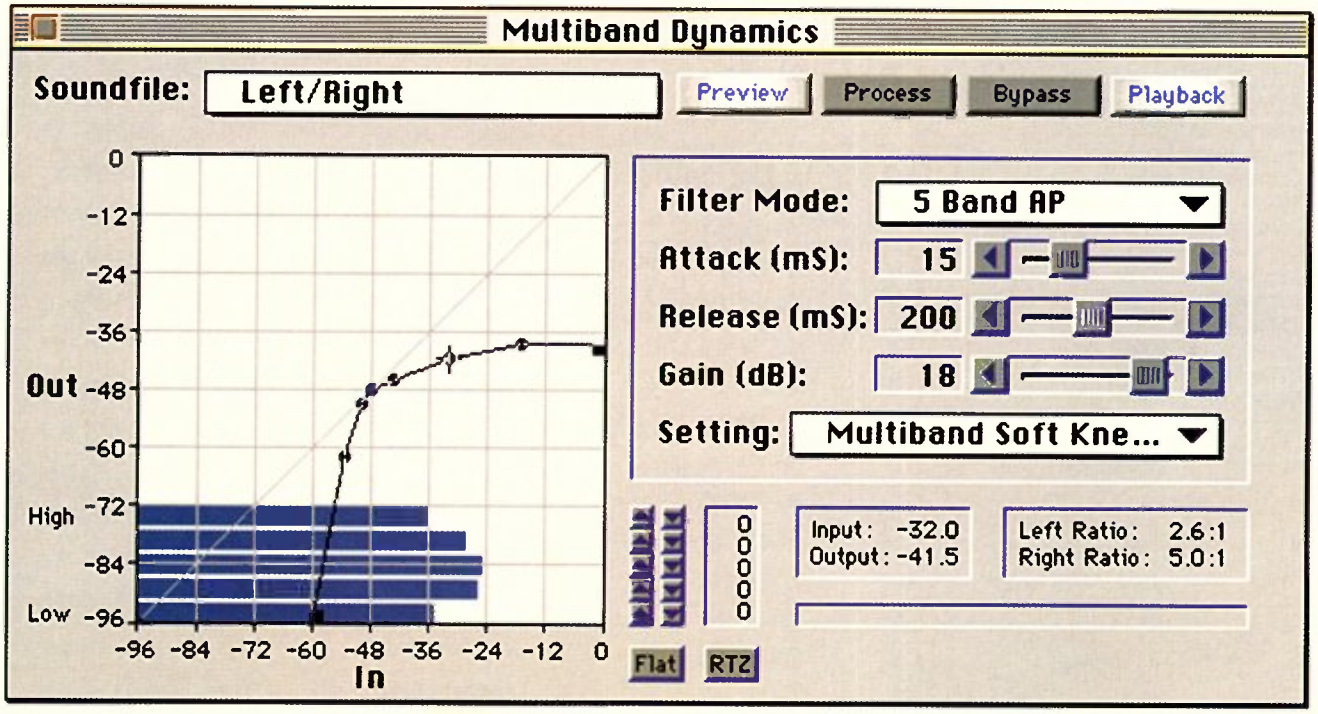
PRICE: $399 **EQ FREE LIT. #:** 138

DIGIDESIGN has been nurturing relationships with third-party hardware and software developers for its Pro Tools and Sound Designer digital recording/editing platforms. The result is a list of "development partners" that now number in the dozens and collectively supply the audio industry with a wide variety of tools for desktop audio production. One addition, Jupiter Systems' MDT Multiband Dynamics Tool, offers a truly stunning list of features with sound quality to match. If you use turnkey desktop audio production systems, this could be the program you've been waiting for.

SYSTEM OVERVIEW

MDT is a DSP plug-in software extension that runs inside of, and adds functionality to, Digidesign's Sound Designer II audio-editing program. MDT will work only with Sound Designer II (version 2.5 or higher) or OSC's Deck audio-editing software (version 2.1 or higher). MDT also requires QuickTime (version 1.6 or higher) in your extension folder, and is copy-protected through a key-disk protection system.

Installing MDT should be straightforward to anyone experienced with Macintosh computers.



TRUE COLORS: The MDT AP filter provides the minimum amount of signal coloration.

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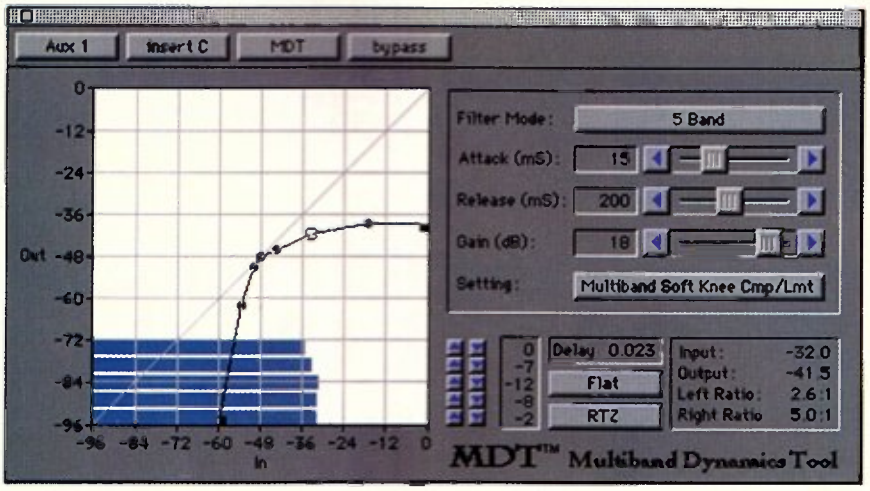

MOD SQUAD: MDT emulates many dynamic processors including compressors and de-essers.

Only two installations are allowed for copyright reasons, but MDT can be deinstalled from your hard drive and reinstalled on another machine. MDT cannot be installed on removable media disk drives.

MDT emulates a full complement of dynamics processing functions usually found only in dedicated hardware devices (see sidebar). There are two general functions: *single band* applications (including compressor, expander/gate, and a "tube" compander), and *multiband* applications (such as filters, multiband compressor, spectral enhancer, and de-esser). MDT is a true stereo processor package that processes each discrete incoming signal separately, although both channels share the same signal level computation to avoid amplitude anomalies in the compression/expansion algorithms.

The graphically oriented user interface provides a set of visually uncluttered screens that are uniformly consistent and functionally complete. Numbers show the individual parameter settings, while sets of soft sliders and buttons control parametric changes within each of the MDT's function modules. An X/Y grid also allows for the display and redrawing of certain settings such as velocity curves, input vs. output curves, and other transfer functions.

INSIDE THE MODULES

The compressor module is one of the MDT's most dramatic-sounding applications. It performs exactly like its hardware equivalents by providing control over compression ratios, attack and release envelopes, threshold levels, and overall gain structures.

MDT includes two disks of sample sound files that, in conjunction with the demonstration tutorials, effectively showcase the various effects the program can generate. For example, the Debussy selection supplied on the disk demonstrates the dramatic effect compression can have on a musical passage's overall dynamics.

The various filter modes are also extremely well implemented. MDT offers several variations of digital, dynamic filters that emulate both graphic and parametric filter types. These include three-band (three octaves wide) and five-band (two octaves wide) filters, as well as filter enhancement features such as LN (which optimizes filter scaling for minimum filter noise with signals that have sustained quiet passages) and AP (a filter set optimization that allows for the flattest pass band near unity gain and provides the minimum amount of signal coloration).

Other useful effects include a de-esser that compresses only the upper-frequency range to eliminate unwanted high-end sibilance, a spectral enhancer that adds brightness to the upper frequency spectra, and a "soft knee" compressor/gate that is ideal for vocals because of its less obvious compression effect.

THE VERDICT ON VIRTUAL PROCESSING

The variety of applications, cost effectiveness, and excellent sonic quality of MDT makes this an indispensable addition to anyone's desktop audio production system. The program is easy to use, flexible, and can provide both subtle and dramatic changes in your sound. As with its previous program (Infinity, a dedicated sample looping tool reviewed in the August

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...And More!

'93 issue), Jupiter Systems has developed a powerful audio application that provides the type of DSP tools that were previously unavailable in lower-cost, virtual audio environments. —*Ed Tywoniak*

DYNAMICS PROCESSING PRIMER

Dynamic signal processing has been around for decades, yet it remains one of the more subjective aspects of the audio engineering arts. When should you use compression on a snare, and how much? What about gating guitar effects pedals? Are there unwanted sonic side effects from putting a limiter on a vocal mic? Does a spectral enhancer introduce noise? While there is usually no definitive answer to these questions (just a range of subjective likes and dislikes), most engineers agree that dynamics signal processing is a powerful audio tool that can subtly or dramatically alter your overall sound.

Among other algorithms, MDT offers the three most familiar dynamics functions:

- Compression restricts an incoming signal's overall dynamic range by bringing down the amplitude of loud passages and increasing the volume of softer passages.
- Limiting prevents extremely loud transient peaks from exceeding a predetermined amplitude threshold, thus preventing the signal from being driven into distortion that could result from limited headroom.
- Equalization is essentially frequency-selective filtering that adjusts the volume of a specific set of frequencies or frequency ranges. Hi-Fi tone controls are one example of equalization, although there are many different types of equalizers with varying degrees of signal processing control.

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continued from page 42

their programs "horizontally" instead of in a vertical list and use right/left arrow buttons to move from one program to another. In all these cases, the basic principle is still the same.

PARAMETER SELECTION AND EDITING

Now that we have a program, it's time to select and edit parameters. Each unit has a slightly different way of doing things (argh), but here's a typical real-world example based on a generic multieffects:

Suppose a multieffects has two displays (left display for program number, right for other parameter values), two sets of up/down buttons, and one set of left/right buttons. You would begin by selecting a program, as shown on the left display, with the left set of up/down buttons (fig. 3). Up selects the next higher numbered program, and down selects the next lower numbered.

Upon calling up the program, the right display might then show the number of the algorithm used in the selected program. To choose a different algorithm, you would use the right set of up/down buttons.

Each algorithm has an associated "list" of parameters (fig. 4), which we'll assume are accessed by the left/right buttons.

The display identifies the parameter you've chosen. To change the parameter value, use the right set of up/down buttons; the display will then show the parameter's value. After selecting the value, press the left or right button again to get to the next parameter on the list (fig. 5).

This process illustrates two important points:

• There is a definite order for parameter editing. You must first choose the program and, if applicable, the desired algorithm before you can edit parameter values.

• Note how the display anticipates your needs. If you press a left/right button with an algorithm number showing, the display knows that you want to see parameters. If you have a parameter selected and you press an up/down button, the display knows you want to see values; but if an algorithm is showing, then the up/down buttons select a new algorithm.

This demonstrates the good news/bad news of digital effects: if you know what you're doing, editing flows in a logical fashion. If you don't know what you're doing and you press the wrong button at the wrong time, you may get lost in the program and not be sure what you're adjusting (or of how to return to a familiar reference point).

Different units use variations on a theme. Some boxes have dedicated buttons for turning individual effects in an algorithm on and off ("effects select" buttons). If you wanted to edit a particular effect, you might press an "edit" button to select a parameter editing mode, which would then change the effects select buttons into effect edit buttons. For example, pressing the compressor on/off button while in edit mode would select the compressor for editing. Each successive press of the compressor button would access another compressor parameter, and up/down arrow buttons would set the value.

Although the specifics are different from the example given above, you are still: selecting a program; selecting an algorithm or effect; specifying a parameter; and changing the parameter's value. *No multieffects unit (or synthesizer) strays too far from this basic concept.*

CUSTOM ALGORITHMS

Although many multieffects string certain effects together in algorithms, some devices let you create your own algorithms out of an available palette of effects. This gives considerably more flexibility, but requires more of an effort to learn and is beyond the scope of this article.

SHORTCUTS

Since button-pushing is tedious, manufacturers include different shortcuts. For example, scrolling through 99 programs with up/down arrows can take some time. So, one unit might increase the scrolling rate while the button is held down, while another doubles the scrolling rate if you press the down arrow while holding the up arrow. And since even little buttons cost money, a manufacturer might use a "shift" button (like the shift key on a computer keyboard or typewriter) that changes the function of a set of buttons so that five buttons and a shift button can do the work of ten buttons.

Parameter-controlled effects may be confusing at first, but don't give up. You have a lot more power at your fingertips, and greater repeatability. Sure, it takes more time to program or tweak a sound initially, but once you find a great sound and store it in memory, you'll never have to find it again. EQ

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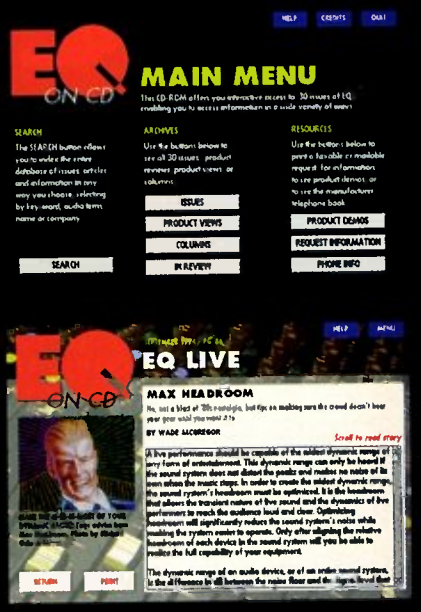

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Howling Wolff

Producer Jonathan Wolff makes many of your favorite TV tunes in his project studio

BY DAVID JACOBS

Photo by Harrison Funk

PRIME TIME: Jonathan Wolff relies on state-of-the-art technology to get the job done.

Turn on your TV any night of the week and you're bound to hear a theme, a song, or a piece of incidental music written by Jonathan Wolff — one of TV's most prolific composers. Whether you're talking about the distinctive bass and pops in *Seinfeld*'s well-known theme or the background music to *Dave's World*, it's no wonder that many television execs are crying "Wolff."

Seinfeld, *Dave's World*, *Married With Children*, *The Boys Are Back*, and *Blue Skies* are but a few of the current hit shows Wolff composes for. A complete list of the well-known TV shows he has worked on would practically take up an article in itself. Suffice it to say, you've heard his work — a lot.

Wolff's Music Consultants Group in Burbank, CA houses a unique studio complex, wherein he composes and records the music through the creative use of a remarkable array of state-of-the-art automated techniques and equipment.

"We work together as sort of an in-house music department for my clients," relates Wolff. "My staff takes care of details, such as research, music editing, computer programming, bookkeeping, logging, deliveries, library chores, maintenance, supplies — all that kind of stuff that has to be done — freeing me up to concentrate solely on the music and the musical needs of our clients. I do all the music composing and producing myself."

Wolff says he and his company are "fanatics" about new technology. "Since we're constantly installing new gear," he says, "I have two people who's primary responsibility is to keep up to date on the latest gear and software releases. Our aim is to let the technology assist us in being as efficient as possible in every conceivable way. Again, this allows my energies to focus on being musically creative and devoting all my attention to my clients."

When the facility was built in 1987, it was designed for live recording with five isolation rooms. "We had one room dedicated to a grand piano, another room dedicated to drums and percussion. I found myself using those less and less as electronic access to those two things became more and more appropriate," says Wolff. "What were originally the piano and drum rooms are now studios B and C, leaving us still with three iso rooms. I found that I needed the real estate more for separate studios than for recording live musicians."

When the need arises, however, Wolff does record live. "I do mostly hybrid scores," he explains. "Much of it will be done on the samplers and the synth rack and I'll embellish it with real singers and players." Wolff prefers to record certain instruments live when possible — "There are just some things that jangling strings do that you just can't emulate. Matters of the heart such as sax solos or guitar solos; it's just not worth the effort to try and emulate that, so you call in a real player and do it right. Also, if I'm scoring for a scene that features a violinist, I'll do it with a real violin. If it's to be in the background of a restaurant or something of that nature, I'll do it myself. I have a fiduciary responsibility to my clients to get the job done in the most efficient and cost-effective way and sometimes that means me playing it. On the other hand, part of the duty to my clients is also to make sure that it's the best quality and sometimes that means spending the $200 on a player."

Wolff's experience as a musician has been, as he puts it, "pretty schizophrenic. I played jazz as a kid, did a lot of rock and roll tours, and I've conducted for a lot of different artists and played on a lot of different records. I think that helps me when I approach a show."

Wolff composes exclusively for TV today. "Many of my shows are quite different. *Seinfeld* has its own little genre of music. I'm not sure what one would call it. *Dave's World* has a totally different attitude. Every week we hear Dave Barry's commentary in voiceover. Part of my job is to underscore these voiceovers. I treat the scores as if they were the music inside Dave Barry's head as he writes his columns and I play it all on solo piano. Sometimes it's bluesy or rock and roll, sometimes if he's talking about his family, it'll be gentle Americana, it could be jazz, whatever, but it's always solo piano because that ties in with the theme that was written by Billy Joel."

Wolff, who was a competition pianist in his youth, composes in every imaginable musical style, and some that stretch the imagination as you can gather from his previous statement. He manages to allot his time in such a way that he makes his deadlines with quality product. It's a grueling job. "We work in two shifts and I work both of them. But, hey, I get the summers off!" EQ

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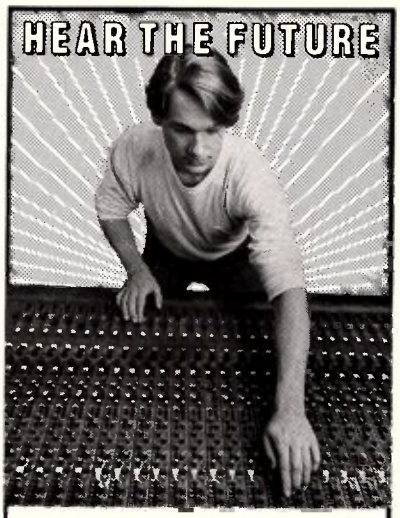

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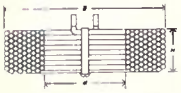

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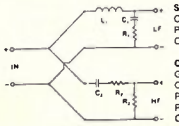

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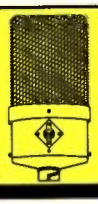

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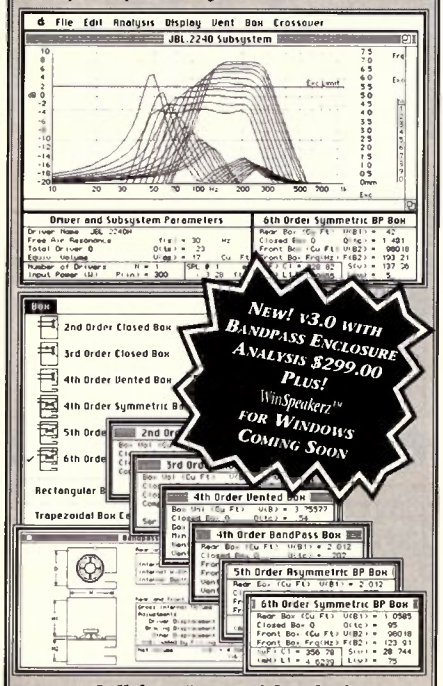

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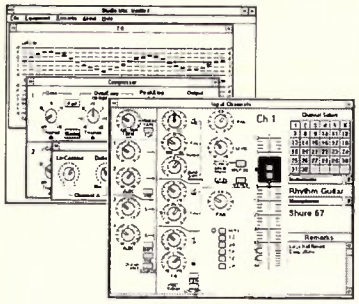

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Storage Wars

Computers are requiring more RAM and more storage space — putting the squeeze on your sounds

BY MARTIN POLON

If there is one vital element to the nonlinear studio-quality recording, editing, and postproduction of audio on personal computing platforms, it is the use of memory to store and manipulate the audio waveform. Yet the use of computer memory for mass storage has never been more ambiguous, owing to the computer platform and computer software upheaval that is transforming the business of personal computing in 1995.

Methods of accessing mass memory are changing. Traditionally, there have been IDE (Integrated Drive Electronics) drives in PCs based on the Intel, IBM, and Microsoft standards, with SCSI (Small Computer Systems Interface) drives in Macintosh computers. Audio-based computer manipulation has always found a niche in Macintosh systems, as much for their SCSI transfer system that allows up to seven external storage devices to be connected as for their ease of memory configuration and user interface. The existing IDE system can only accommodate two devices at a time.

The computing architecture standards of the past have given way to new standards and to an acceptance of both storage access standards on existing platforms. New Macintosh computers are using IDE drives for internal storage while retaining SCSI for external storage. PCs are adding plug-in boards to accept SCSI-based memory devices. In addition, faster drives of the IDE variety are destined for both Macs and PCs.

Beginning with some 1995 computer models, new memory drive/device communications via SCSI-2 and SCSI-3, fast IDE, and the impending adoption of "Plug and Play" — with new PCI (Peripheral Component Interconnect) slots and Firewire communications and transfer technology ports — all promise to revolutionize mass storage hookup and access.

The announcement of a new "PREP" specification (Power PC Reference Platform) to be embedded in the silicon of the latest Power PC chips available at the end of 1995 from the Apple, IBM, and Motorola PPC (Power PC) collective will further change the way we do audio business on computers. Since the new machines to be based on the PREP chips, not to be available until first quarter of 1996, will offer Apple System 8/System 8.5, IBM OS-2/OS-3 Warp, Windows NT, Windows 95, A/UX Unix, etc., the concurrent memory storage demands will increase correspondingly.

The coming of new operating systems in 1995, such as Apple's 7.5 for the Macintosh platform and Microsoft's long awaited Windows 95, promises to further confuse storage needs for audio and other users since they inflate both the basic memory overhead in RAM and the concomitant hard-drive storage space. Most Apple owners, even those with machines devoted solely to audio post, editing, or signal processing will sooner or later load System 7.5 to access Apple Power Talk and Quick Draw GX, or some of the other 50 some-odd features added to the revised operating system. This will be especially true as features of the new operating systems are utilized by audio editing and other software makers. This will increase memory space demands for Macintosh users. Nevertheless, Mac operators will still be able to customize a "lean and mean" load of new operating systems as desired.

Microsoft users who are PC owners will find themselves up against a wall facing a firing squad since Microsoft has made Windows 95 a huge operating system that finally offers most Mac features, but at a terrible penalty in increased RAM and hard-drive space. And since Microsoft requires all licensees of the Windows logo to upgrade their software to Windows 95 compatibility, that will force virtually all users and third-party software vendors to eventually comply.

So, the point of the exercise is that changing computer platforms with higher speed and more advanced operating systems promise to demand more space for operating overhead than was previously thought possible. Remember that the original IBM PC had only 64k of memory available — total — for all uses, and that was RAM. Ten years ago, hard drives were the province of the military and of large-scale main-frame computers the size of a small room. The price-to-bytes ratio was so extravagant that no one could easily afford to use hard drives with their personal computers.

Add to all of this the ever-growing requirement for the storage of digital audio and you have a demand for additional storage space that has virtually doubled every year since the advent of personal computing. The old rule of thumb on digital audio track storage has been 10 MB of storage space per minute for two tracks of stereo information. Thus, to record eight tracks for 30 minutes would require 1.2 GB of storage — no mean feat even five years ago. Today, such space demands are almost inconsequential with the improvement of storage media.

In a succeeding issue, we shall look at the various storage mediums being used today and also consider the necessity of compressing the audio waveform to more precisely fit the available storage space. EQ

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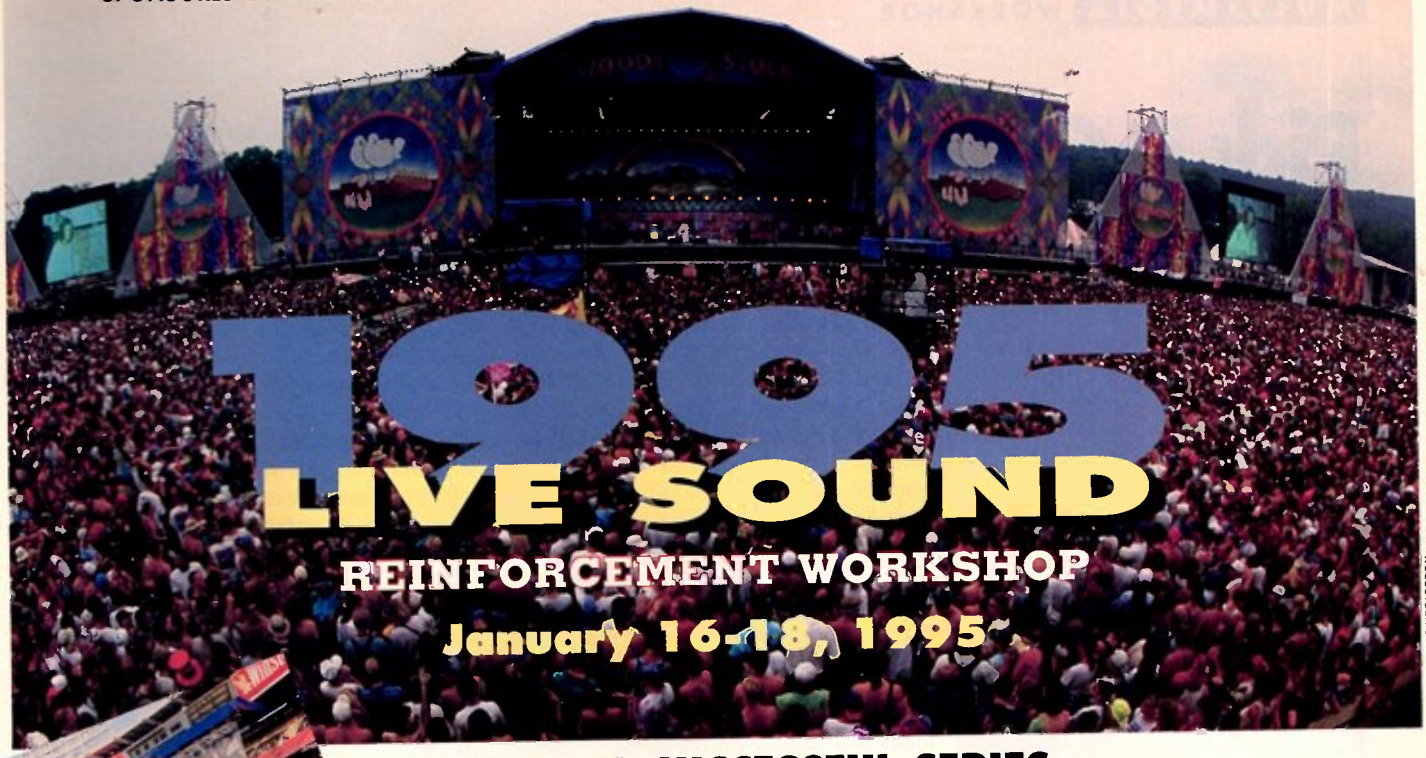

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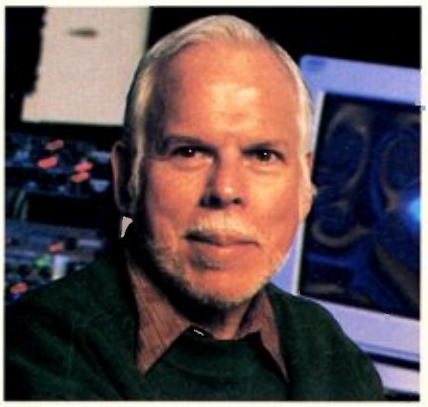
Pick a Card, Any Card

Video game soundman Martin Galway gives his take on computer sound cards

BY MURRAY ALLEN



When the publishers asked me to write a column on sound cards, I thought I should go to an expert in this field. Martin Galway is just such a person. I had the pleasure of working with him on *Wing Commander III*, for which he was the audio director. As I expected, he was a gold mine of information.

EQ: What are some really "cool" games you have worked on?

Martin Galway: During my four years at Origin, I have worked on such big-name titles as *Wing Commander II*, *Ultima 7*, and *Strike Commander*. I have done everything: audio software programming; music composition; arrangement and adaptation for other platforms; the synthesizing and digitizing of sound effects; rudimentary studio construction and operation; vocal direction; recording; game audio design; team direction; and even some performances. Since March '94 I have been directing audio development on *Wing Commander III*, which will perhaps make the biggest splash yet in computer game sound — as well as a bunch of other measurements, like size!

Tell me about some of the sound cards you have used.

For playback in PC games, I've used Roland LA-PC1, SCC-1, and RAP-10; the entire Sound Blaster range; D Lib MSC and Gold; Ensoniq Soundscape; Gravis Ultrasound; and Sierra's ARIA design. For development work, I love Digital Audio Labs' CardD for its excellent sound quality and low cost. We got our first one in 1991 and now have over a dozen throughout the company. Also, we are making a transition to a development environment with both Macs *and* PCs, with not just PCs. As a result we are buying Audiomedia II's and Sound Accelerator cards.

What is new in sound cards?

Sample playback (sometimes referred to as wavetable synthesis) is now maturing as a technology. The first one was the SCC-1 in late 1991. Strangely enough, this is still the benchmark. Some manufacturers are continuing to include synthesis parameters in their cards, for example, the AWE32, which is good. However, the newest "craze" is audio effects beyond the conventional reverb, chorus, and delay, etc. I'm talking about QSound and other forms of 2- or 3-dimensional sound.

What are the positive features of the new "digital" sound cards as against those of the older FM cards?

They're all digital of course, but if you're talking about sample playback or other forms of sound generation, FM has really had its day, and the OPL3 chip is really just popular with manufacturers because of its compatibility with the bottom rung of the ladder, (i.e., with the two-operator Ad Lib MSC) and its low cost. Professional FM synthesizers used up to eight operators and played a lot more than six voices, but no one has released any FM chips for game audio with more than 4 operators or (4-op) voices. Yamaha showed its agreement last year by releasing the OPL4 chip, which, while having an OPL3 tucked away in the corner for compatibility, is really quite a nice 32-voice sample playback device. I am being gentle about FM of course; I have never liked its sound.

Are there any negative features created by these digital sound cards?

The lower-spec ones with small voice sets (in terms of memory size) don't sound too good — for example, the Wave Blaster. The ones with onboard RAM do not share a common hardware standard, so it's costly to support them all. Such complexity requires a standard DOS interface, either software (API & driver) or hardware register set, and the manufacturers have not been cooperative in making life simple for us! The lack of a DOS standard has been exacerbated by the new complexity and variation of today's cards. The MPU-401 has soldiered on and done a good job so far, but it is not enough by itself for the newer designs that have onboard RAM. I think that once we discard the world of DOS and make the transition to Windows 95 (which has a software standard for every peripheral), this won't be such a problem.

As a game designer, what sound cards do you utilize and why?

The sound card we use as a reference platform for music is the Roland SCC-1. It has a locked-down sound quality and behavior pattern. It has the nicest sound quality. Its 24 voices are enough at present for our needs, although I can see us making a transition to 32-voice music at some point (Ultrasound, AWE32, Soundscape, etc.).

With *Wing Commander III* we have crossed over the edge of sound card requirements into a new world where we can use any sound-making device we want, namely, into the world of continuously streamed digital audio. This takes up a lot of space and is only available on CD-ROM games. But all you need is a simple DAC card, for the likes of which we don't have to worry about how much polyphony you have because suddenly you're dealing with a recording. It is for this reason that on the latest game we have harnessed two Kurzweil K2000's and bought other synthesizers, effects units, and libraries to create new and original sound effects. We used a 40-track digital tape setup with Dolby Surround encoding to get the best audio possible. Unfortunately, data space and CPU power limitations forced us

World Radio History

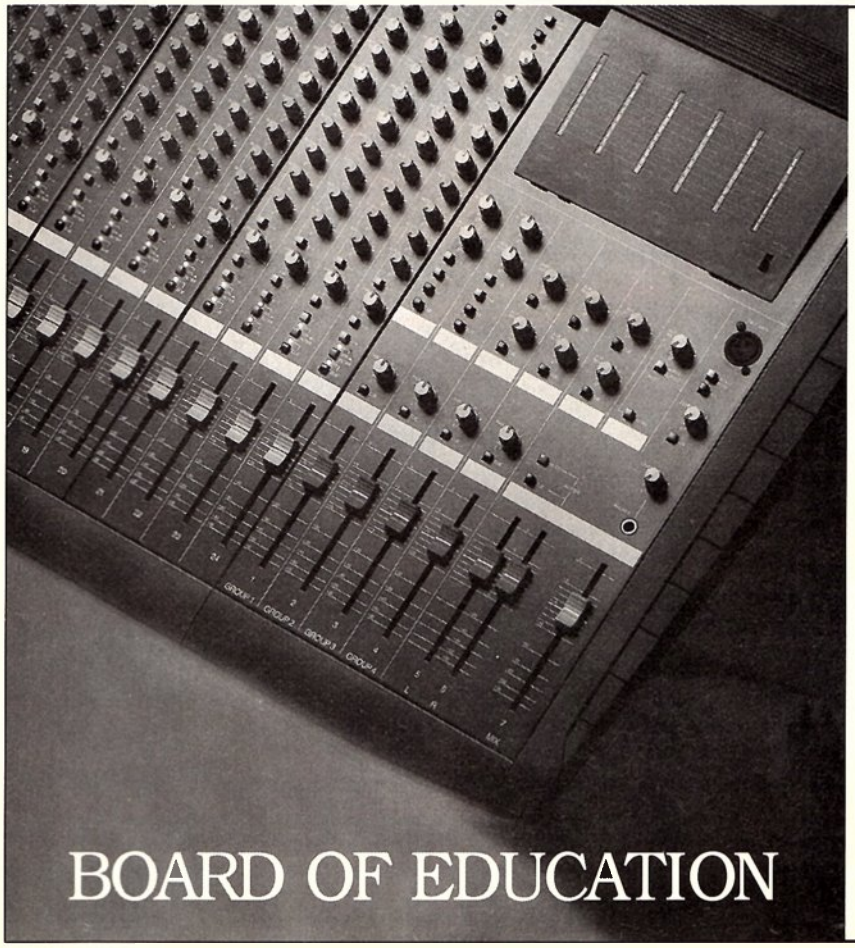
to do a mono mix of the sound for the PC, but it's still light years ahead of our previous games. We are using a 22050s/s 16-bit data rate. In the future we may go to stereo playback since we will always be developing in stereo/surround anyway. A couple of years away means Redbook quality. We only use the 24-voice type of sound card (be it SCC-1, Ultrasound, or whatever) for the space flight interactive portions of the game where the music is performed as you play, i.e., where it changes according to your performance during a battle. Again, data space and CPU limitations forced us to use this solution rather than playing back a continuous digital audio stream for music — otherwise the game would have had completely digital audio, rendering the debate over sound cards mute.

What would you like to see in future sound cards?

A lower noise floor. Some of the current crop of cards have a lot of bus noise, and you can "hear" whatever the computer's doing over your speakers when there's no sound playing. Roland is among the best in guarding against this, so far. Thirty-two voices are enough for most music and sound effects, but I can see scenarios where we'd want 64 voices, so that'd be nice. Playing from onboard ROM or RAM makes this easier, as the card does not have to get its data from the PC. I would like to see more effects processing like reverb and chorus, and more than one effects unit on the card (perhaps one per MIDI channel). I would like to see a more specific standard to supersede General MIDI — for example, there's no guarantee of a particular level of polyphony, and note-stealing algorithms carry from manufacturer to manufacturer (and they often don't publish them). A new General MIDI standard could resolve this.

Anything else?

Just that the particular capabilities of sound cards as measured against one another are going to mean less and less, apart from their having a stereo 16-bit DAC that can play up to 44100s/s. In a few years that's all we will be using. I can see a scenario where the various designs of card and synthesis techniques are so numerous that it's too much of a headache for the content developer to do anything but all his own sound synthesis, and then using a mere fraction of the card's power to output the data. That's what we've done for the 3.5 hours of movie footage in *Wing Commander III*. As development on *Wing III* comes to a close, we have been saying, "Darn, I wish we'd commissioned an orchestra instead of using these Kurzweils," and so forth. We will definitely use one on the next appropriate project. In the future we may use regular rock bands just playing recordings of their music. Perhaps Vangelis might like to compose some music, as he does for the odd movie now and again. General MIDI will mean less and less! The only parts of the game where the card's capabilities will be used will be the more interactive parts, where you have to compose on the fly, but I still think this can be done by the CPU eventually. I think what manufacturers will have to rely on to sell their cards will be, perhaps, THD, S/N ratios, price, and whatever cool bundled software they can find to ship with the card. EQ



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ACROSS THE BOARD

continued from page 154

more time at the higher speed.

Pioneer played some music that was recorded at both 48 kHz and 96 kHz. They played back both tapes and performed an A-B comparison. The 96 kHz tapes sounded much better than the 48 kHz tapes. They sounded so much better that I am going to reserve final judgment until I can do some testing myself. My first impression was that the 96 kHz tapes sounded the way I expect digital recordings to sound if done well, while the 48 kHz tapes sounded a little on the substandard side. It sounded as though the originals were recorded at 96 kHz, but some grunge crept into the 48 kHz copies to make the difference a little more apparent. Pioneer assured me that this wasn't the case. I'll give you an update when I get around to it.

SHELL GAME

Let's say you want to prove to someone that DATs are no better than cassettes. Try this: Record something on a cassette. Make a copy of it on your DAT machine. I don't care if you use the best, most expensive converters in the world, when you play them both back you will not be able to tell the difference between the DAT and the cassette. I performed a similar test just the other day. I unpacked my old Technics turntable with the straight-line tracking M&K modified Rabco tone arm, opened up a vinyl LP that has remained unopened since it was new in 1972, placed it on the turntable, and, during the first pass, recorded the record onto my Marantz 610 CD recorder. I played the LP and the CD back and switched between them. My neighbors stood around with their mouths open. I initially just thought that here in Tennessee that it was the neighborly thing to do. Alas, it was wonderment in the scientific proof that the CD and the LP sounded no different. Julius Sumner Miller (trivia test, and to see if Steve St.Croix is paying attention) would have been proud of me. None of them said a word. They just all walked away shaking their heads in amazement.

DEER JOHN DOE

I had Thanksgiving Day off. I used my Meyer SIM machine to tune the stereo in my new car. Everything was sounding great. I loaded the family into the stereo — I mean car — and we were on the way to a nice Thanksgiving dinner.

Just as I was thinking of how well the CD player in the car tracked over Mother Nature's speed bumps, I saw a deer run across the road in front of me. I hit the brakes — but not quick enough. FLUMP. The deer hit my left front fender, bounced into the air, and came down on the hood of the car. The CD player never missed a beat. As the kids looked up, they saw the deer appear to come out of the sky and splat against the windshield like a giant bug. My youngest yelled, "Bambi!" The oldest said, "It looks more like Rudolph to me." My wife said, "Poor deer." I said, "No, I'm OK, thanks." She said, "No, I meant the deer on the hood."

Everything turned out OK. The deer lived and the insurance company is fixing the car. They (the insurance company, not the deer) did call to say that they don't know if they will be able to get the deer lip suction prints off the windshield. The repair shop asked if they could keep the car for an extra few days so they could bring in some of their own CDs. EQ

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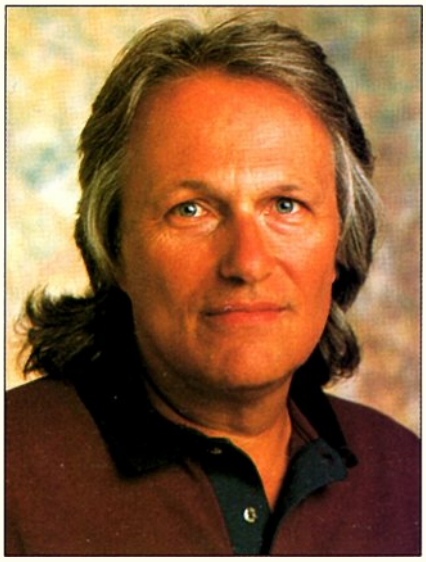

The digital highlights from this year's AES Convention

BY ROGER NICHOLS

I went to the AES Show in San Francisco in November to see what was worth seeing. Solid State Logic showed a new 9000 Series analog console with built-in hard disk recording. This little puppy started at $600,000. SSL also had its new digital console that also cost around $600,000. This, is all good news for project studios. Studios with these consoles are going to have to charge a lot of money for studio time. It makes sense that more (preproduction and production) work will be conducted in project studios in order to make the budgets come out somewhere closer to reality.

In the digital 8-track market, Panasonic signed on with Alesis to produce an ADAT-compatible machine. This makes three manufacturers in the ADAT camp; Alesis, Fostex, and now Panasonic. Alesis has already dropped its prices on ADAT machines. Sony showed its new PCM-800 digital 8-track machine. It is of the TASCAM DA-88 format. The Sony machine appears to cost more than the TASCAM until you realize that most of the TASCAM options are included in the Sony. After piling the options on the DA-88, the prices actually come out to be about the same. I was actually surprised that the Sony version wasn't a lot more money. I hope they don't read this and raise their prices.

I have heard that many of the postproduction facilities are leaning toward the TASCAM DA-88 format because of shorter rewind and lock-up times. I think that Sony sees this as its initial market niche because of all the other Sony products pervading the postproduction machine rooms. Alesis is combating this trend with newer software, faster transports, and the ability to use longer tapes to stretch the recording times. Alesis's relationship with Panasonic should also help. The next year will tell.

BLANK TAPE

Have you ever recorded something on a 8mm or VHS video deck and then played it back in slow motion or freeze frame? Did you notice all of the noise and white streaks across the frames? In each frame the dropouts would be in a different place. Because of the image retention characteristics of human sight, these anomalies are not noticed when the tape is played back at the normal speed. When the same tape is used for digital audio storage, the drop-out count per second considered acceptable for video is no longer acceptable for digital audio. If the drop-out is so big that the digital audio error correction cannot correct it, then you hear clicks and pops and other digital distortion artifacts. It is becoming clear that videotape intended for video is not up to the task of digital audio recording.

3M, DIC, Ampex, and other tape manufacturers are producing blank tape specifically for the digital 8-track machines. There have been plenty of horror stories about tapes not playing back because of drop-outs. This has happened for both the DA-88 format and the ADAT format tapes. If I were you (or if I were me, for that matter) I would only use tape specifically targeted for digital audio recording.

A/D CONVERTERS

Apogee showed their new AD-1000, 20-bit A/D converter. It interfaces to everything except a paper tape puncher (for you real old computer guys). It has a limited version of Apogee's UV-22 noise shaping built in just in case you do not have anywhere to store your 20-bit data. Capturing the audio in 20-bit resolution and then using that information to enhance the least significant 16 bits sounds much better than recording straight 16-bit.

Rane was showing the PaqRat that I talked about a month or so ago. It is the box that allows you to store 24-bit, 20-bit, or 18-bit data on four tracks of a TASCAM DA-88. There seemed to be a lot of interest and I think it is going to be a hot product. Other manufacturers are talking to them about producing products that are compatible with the PaqRat data stream. I think there is also going to be an ADAT version.

Z-Systems is shipping its new little sample-rate converter. It is about the size of a Walkman and will convert between 48 kHz and 44.1 kHz. There is an option that allows the output sample rate to be synchronized to an external reference. I think the prices start at about $350. Finally, sample-rate conversion for the masses.

HI RES DAT

Pioneer had a demonstration room where they presented a new line of DAT machines that recorded at a 96 kHz sample rate. This is double the DAT standard of 48 kHz. The 96 kHz machine is able to perform this feat by doubling the DAT speed. Twice as much data is recorded each second, so the tapes only last half as long. A 120 tape will last one hour. The machines are not set up to use the three hour DAT tapes used for computer backup. Apogee is looking into the possibility of loading some extra DAT tape into the shell to extend the recording time by a few minutes, but it won't be much

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Neumann's new KM 184 Microphone shown actual size

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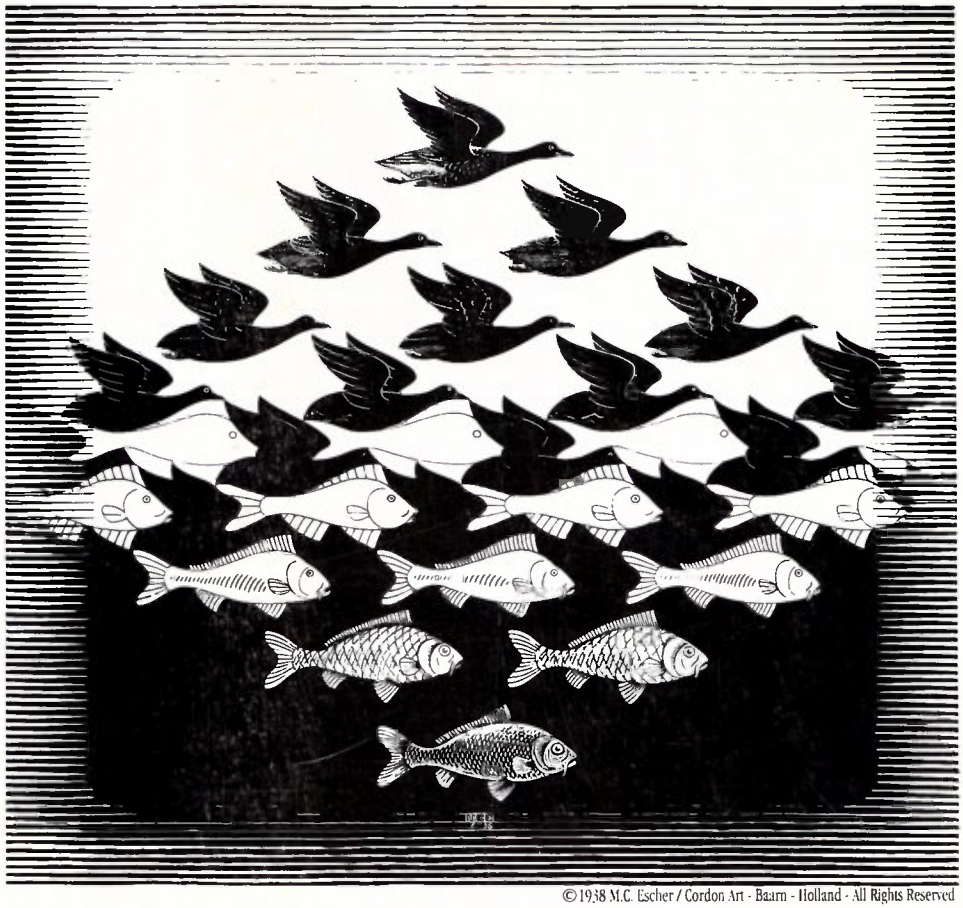

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Study the illustration. Are the geese becoming fish, the fish becoming geese, or perhaps both? Seasoned recording engineers will agree that your eyes *and* your ears can play tricks on you. In the studio, sometimes what you think you hear isn't there.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

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