PRODUCTS IN REVIEW: DOD PA PROCESSOR • ENSONIQ KEYBOARD
D3 MICROPHONE SWITCH • SAMPLE CDs

EQ

THE PROJECT RECORDING & SOUND MAGAZINE

1995 • ISSUE FIVE

MY LIFE IN RECORDING
BY AL SCHMITT

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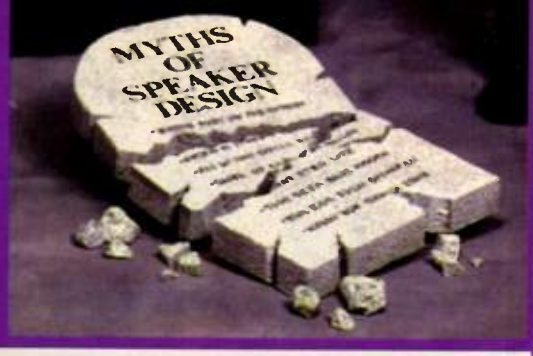

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From Sam Cooke and Nat King Cole to Jefferson Airplane and Natalie Cole, Al Schmitt has seen and done it all. Find out how he survived (and thrived) in this *EQ* exclusive.

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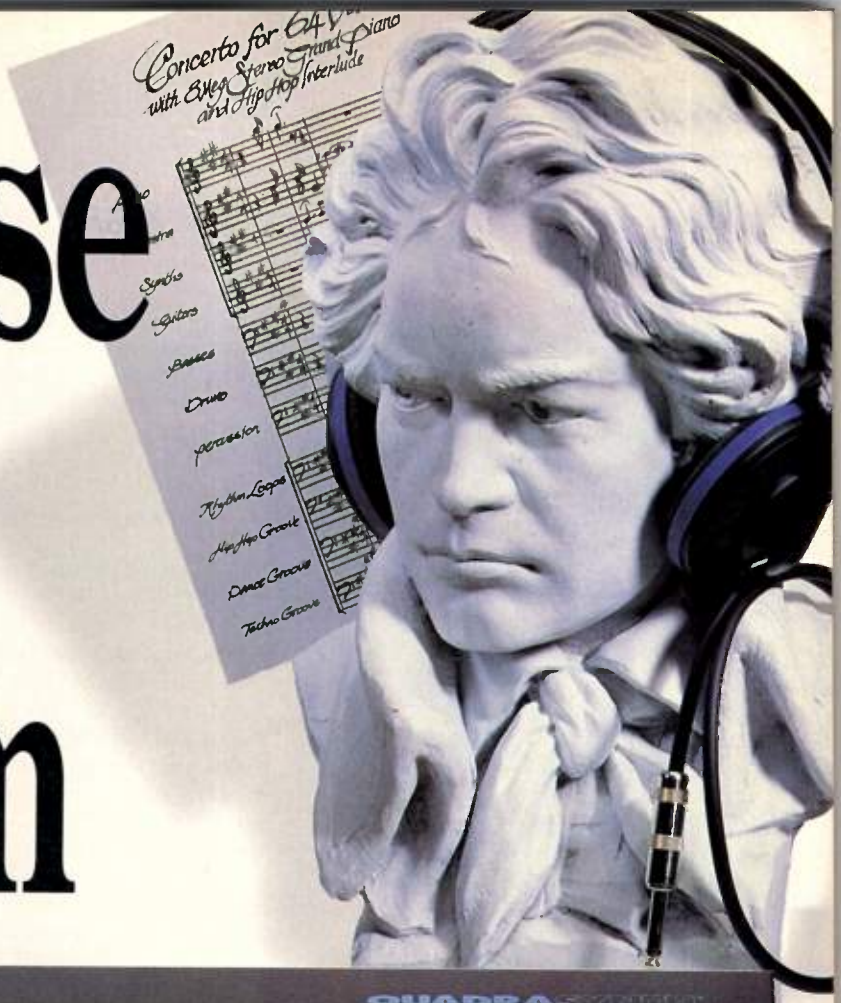

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Editorial/Design Consultants

MATT CHARLES
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RIVA DANZIG
Creative Director

MARK ALHADEFF
Art Director

SUSAN FALCO
Assistant Art Director

FRED VEGA
Production Manager

Editorial Offices
939 Port Washington Blvd.
Port Washington, NY 11050
Tel: (516) 944-5940, Fax: (516) 767-1745

Administrative/Sales Offices
2 Park Avenue, Suite 1820
New York, NY 10016
Tel: (212) 213-3444, Fax: (212) 213-3484

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KNOW YOUR TUVANS!

Your *EQ* People department in the April 1995 issue contains some erroneous information. In the article about Jeff Lorber written by Liana Jonas, I quote: "Jeff Lorber is the first American artist/engineer to record the phenomenen known as throat singing..." And, "Lorber learned of Kongar-ool's throat singing from Ralph Layton [sic], head of the Friends of Tuva."

A group from Tuva known as Huun-huur-tu have recorded two excellent albums for Shanachie Records as early as 1992 in America. The albums are *Sixty Horses In My Herd* and *The Orphan's Lament*. They have been touring America for the last three years and have given throat-singing workshops, one of which I attended in New York. Their Russian manager is even on-line. A few weeks before he died, Frank Zappa recorded with two members of the group and it is well documented on a *Nova* television special.

Ralph Leighton (that is how his name is spelled) wrote a fantastic book about how he "discovered" Tuva after his mentor, legendary scientist Richard Feyhnman (you'll have to check my spelling now) challenged him as to whether the country even existed, the evidence being a few triangular postage stamps. The name of this book is *Tuva or Bust* and it contains a floppy 45 rpm disk of the first throat singing ever heard in the United States after years of trying to contact real Tuvans.

Sorry about Jeff Lorber not being the first to record a throat singer in the U.S. Engineer David Wonsey of Quad Recording Studios in New York beat him by at least two years or more with the Shanachie recordings.

Tony Visconti
Record Producer
via America Online

OUT OF AFRICA

I play in an African marimba band, and recording these instruments can really be a challenge. The soprano marimbas are very bright and piercing, the tenors are a lot more mellow, and the baritone and bass, which are about six feet long, really thunder! The sound comes out from several directions. First, the impact of the mallet (knobs, as we call them) and then the resonance in the tube, and finally the membrane buzzer at the bottom of the tube.

Sometimes you can capture the ancestral voices (square wave overtones), as it has been told by several people at the annual Zimbabwe Music Festival.

I would invite anyone who has experience or would like to know more about recording these instruments to contact me.

Thanks for a great mag!

RTwoHawks@aol.com
via America Online

TRACK & YIELD

Your response to Wendell E. Jones' query regarding 2-track recording in the February issue of *EQ* was inappropriately flip and dismissive. There are many kinds of music for which 2-track recording is by far the best choice. Certainly this applies to most acoustic instruments, both solo and in ensembles. As a world music producer, I've worked with many artists in remote places during the past three decades. Ninety-nine percent of the time, a simple stereo setup using two microphones has been ideal. Certainly this is true for Tibetan rituals, Balinese gamelans of all sizes, Himalayan folk musicians, and the majority of conjuntos in Central and South America.

David Lewiston
Kihei, HI

[*You're right — 2-track recording is important and a valuable technique of recording engineers. To make amends, last issue* EQ *presented Bruce Bartlett's take on the art of 2-track recording in the Techniques section of the issue.— Ed.*]

STICKY SITUATION

We noticed that the Melissa Etheridge story on page 98 of the March issue unfortunately misuses the registered trademark VELCRO®. We are sure the misuse was unintentional, but such an oversight can serve to weaken the identity and value of our VELCRO® hook and loop fastener mark.

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- *Poly and Legato Receive Modes*
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- *200 Presets*
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Todd D. Hammond
Legal Assistant
VELCRO®

COLD SHOULDER

At the start of every semester of the audio engineering course I teach, I introduce my students to the array of audio magazines. "Check these out," I say, "and pay special attention to the ads. Even if you don't understand everything, you'll begin to get the flavor of the business and the gear." Then I pass out the magazines, *EQ* included.

Every woman in the class this semester reacted to the Symetrix DYNA-Squeeze ad. One asked, "Why the bra?" I replied with a brief introduction to compression — after all, this was the first class — but she did not seem to be convinced, and, frankly, I was uncomfortable about my answer.

For an industry that's trying to encourage women to participate, as well as trying to outgrow a reputation for overgrown adolescence, this is kind of a chilly welcome, don't you think?

Julian McBrowne
via America Online

NOT SO WONDER-FUL

I am writing in response to Lisa K. Johnson's letter (*EQ* 3/95) regarding Symetrix's "Wonderbra" ad, and Symetrix's response by Jon Bosaw. As a "male audio-type dude," I find myself in total agreement with Ms. Johnson regarding not just the sexism of the ad, but also the sophomoric brain-set that perpetuates this kind of cheesy advertising. Don't get me wrong, I'm not advocating censorship of this or any similar ad. If you, or any one else wants to print such ads, that's your right. Just don't expect males over the age of 16 (physically and mentally) to see the humor. That ad would find a much more receptive audience in *Creem*, *Circus*, *Hit Parade*, *Tiger Beat*, etc.

I must also add that I was put off with Mr. Bosaw's seemingly personal attack on Ms. Johnson. I'm sure he'd reply that her letter was an attack, too, but his degenerated into a smarmy advertisement for Symetrix at her expense. Her points regarding the audio industry's and society's attitude toward women don't fall on deaf ears (I couldn't resist). This explains in part why Madonna and her ilk are more successful than, say, Laurie Anderson or Suzanne Vega. Sex sells, and the "good ol' boys" up at Symetrix know it. It's just a shame they don't use their minds to come up with a winning ad campaign that isn't sexually retarded. I bought a Symetrix 425 compressor/limiter/expander two years ago without such advertising. The product sold itself! I guess my point is grow up and put some creativity into your ads Symetrix. I for one will not buy another one of your products until you do.

Bill Dant
See Hear Now
Portland, OR

WRITE US!

Send all your thoughts, queries, comments, tips, ideas, praise, jokes, and gifts to:
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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.

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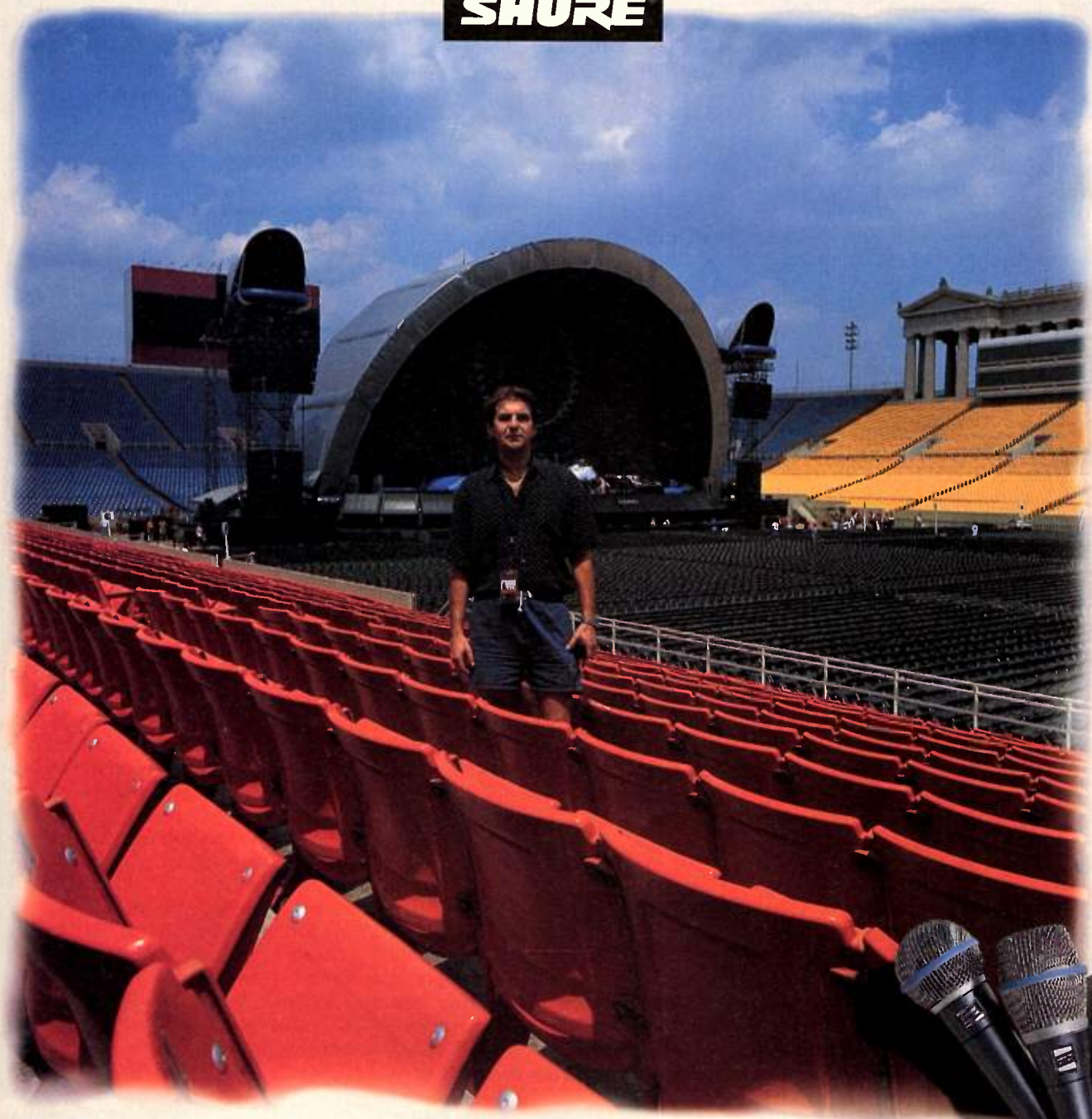

Seth Goldman, Pink Floyd Monitor Engineer, Soldier Field, Chicago.

CIRCLE 86 ON FREE INFO CARD

World Radio History

WHY ASK WHY?

Q I keep hearing about data compression, as used by the ill-fated DCC and MiniDisc. How does this work, and why bother in the first place?

Alex Arkanen
Burbank, CA

A Digital audio data hogs memory (10 MB/min. for stereo, 16-bit, 44.1 kHz recording). Although data compression colors the sound to some degree, it does offer an advantage in that it dramatically cuts memory requirements.

One approach is not to store sounds that can't be heard. For example, if someone's whispering in a room, they'll be drowned out if there's a jet flying a couple hundred feet above. The jet is said to "mask" the sound of the whispers. Therefore, you need to store only the jet sound; you don't need the resolution necessary to store the whisper, too.

DCC uses Precision Adaptive Subband Coding (PASC), and reduces the data stream by about 75 percent. This method splits the audible frequency spectrum into 32 subbands, which are 750 Hz wide. A DSP chip monitors these bands and calculates their average levels every 8 milliseconds. Using this data, the chip ignores any bands that are masked by high-level adjacent bands, as well as any sounds below the threshold of hearing. Therefore, only the data for some of the bands needs to be encoded, not the entire signal.

The MiniDisc uses what Sony calls ATRAC, for Adaptive Transform Acoustic Coding. ATRAC divides the signal into three subbands (0 to 5.5 kHz, 5.5 to 11 kHz, and 11 to 22 kHz). Instead of sampling every 8 ms like DCC, MD samples for 1.45, 2.9, or 11.6 ms, depending on the signal's rate of change. It is reputed to be slightly more efficient than PASC.

Eventually, more efficient data compression algorithms should allow for less coloration while retaining substantial memory savings.

Craig Anderton
Technology Editor

UPS, UPS, & AWAY

Q I own a 4-channel Digidesign Pro Tools setup that I would like to run on a UPS (Uninterruptable Power Supply). I have heard, however, that some UPS systems output a square wave power supply, rather than a sine wave, and that this can cause difficulties with running the audio interfaces, as well as the computer from it. Specifically, a square wave power source would cause audio glitches and artifacts.

I was wondering if there is a UPS system that is reasonably affordable and that would supply sine wave power output. Or would it be possible to run a power conditioner between the DAW and the UPS to neutralize any problems with the UPS?

Tom Luekens
Petaluma, CA

A An Uninterruptable Power Supply (UPS) not only protects your work from unpredictable power, it also isolates power line hash, and, in doing so, provides clean, glitch-free power.

All computer equipment relies on switching power supplies — the same supplies that form the core of a UPS. A square wave wouldn't change the way AC is converted to DC in most equipment.

Although it is hard to produce a perfect sine wave for power distribution, the output from a UPS will not create glitches that will corrupt your data. A glitch is a spike — either an interruption or a surge — that falsely triggers digital circuitry.

If hums and buzzes are a concern, keep an eye on my monthly maintenance column. In addition to tips on keeping noise at bay, I will be investigating the Equi=Tech Symmetrical Power Distribution Systems in the coming months.

Eddie Ciletti
Contributing Editor

AMP DAMPING

Q What is a power amplifier's "damping factor"? Is it true damping is very important in producing solid low/mid punch from studio monitors? What kinds of damping specification numbers should I look for when buying a power amp?

Leon Desmond
Santa Cruz, CA

A Damping factor indicates an amplifier's ability to control the moving mass of a loudspeaker. The amplifier's damping factor is the ratio between the rated load (usually 8 ohms) and its output impedance. A very low output impedance will produce a high damping factor and allows the amplifier to exert more control over the inertial motions of a large cone. This control is a sort of "braking force" that will prevent a speaker from continuing to move after the signal has been removed. This is most relevant at lower frequencies, where poorly controlled drivers can result in flabby-sounding bass, or hollow midrange. A damping factor of 200 or greater at 1 kHz can easily be achieved in solid-state amplifiers and is generally regarded as an acceptable number.

Be aware that the actual working damping factor of a sound system is also influenced by any impedance between the amplifier and the speaker. In a typical studio system, where the speakers are located near the amplifier, the amplifier's damping factor is more likely to dominate the system damping factor. In large sound-reinforcement systems with long cable runs and multiple speakers, the amplifier's damping factor becomes less significant.

In this system (SR), cable resistance and speaker impedance have more influence on the system damping factor. To calculate the real damping factor of a system, divide the nominal speaker impedance by the sum of the amplifier output impedance and any other impedance between the amplifier and the speaker — such as speaker wire resistance or contact resistance. It is possible that a system with long wire runs, or cheap wire of any length, can obliterate the significance of the amplifier's damping factor. Also, notice that the system damping factor is directly related to the speaker impedance. So in a system with low-impedance speakers, the amplifier damping factor and speaker wire resistance become more critical.

Mark Albers
Senior Design Engineer
Hafler Professional

World Radio History

WITH WORD-OF-MOUTH LIKE THIS, WHO NEEDS AN AD AGENCY?

"The ProMix 01 gives me the flexibility to control all the elements of a show from my computer. Superb sonic quality and remarkable features, you just can't beat it."

- Stan Miller, Sound Designer, Neil Diamond Tour

"I bought four of them for the Steely Dan Tour, and I haven't shut up about the 01 yet."

- Roger Nichols, Engineer, Steely Dan

"Bottom line, the ProMix really does live up to all the hype. It's very quiet, it sounds great, it operates very cleanly." "One of the most amazing introductions in years."

- Recording Magazine, October 1994

"I did my latest project on the ProMix. And it's one of my best sounding yet. The ProMix 01 is really great!"

-Hans Zimmer, Composer, The Lion King

"ProMix 01 stands every chance of becoming a landmark product, changing the way a lot of people currently work."

- Studio Sound And Broadcast Engineering, July 1994

"We're not normally violent, but in this case, we're willing to make an exception. We're not letting this mixer go."

- Mix Magazine, November 1994

"Premium sound quality with all the trimmin's. Yamaha has come through again."

- Steve Porcaro, Songwriter/Musician/Producer

"As a sound designer, I create illusions. Yet, the power and flexibility of the ProMix is no illusion. It most certainly contributes to the prestige of Machine Head."

- Stephen Dewey, Sound Designer/Founder, Machine Head

"After working with ProMix 01, I am convinced its sound, quality and flexibility rivals that of mixing consoles costing many times more."

- Calvin L. Harris, Engineer/Producer - Lionel Richie, Diana Ross, Stevie Wonder

"My two ProMix 01s store all the parameters of my mix and play it back exactly as I heard it at the moment of creation. More importantly, they sound great!"

- David Schwartz, Composer for Northern Exposure

"Yamaha has done it again, just as it did in the early '80s with the DX-7 keyboard. It has created a cool piece of gear that does more, does it better, and costs less."

- EQ Magazine, December 1994

"It took Yamaha to create a brilliant sounding digital mixer with full MIDI control. I have no doubt that the ProMix 01 will quickly become an industry standard."

- Jeff Bova, Keyboardist/Arranger/Composer - Vanessa Williams, Robert Palmer

"Clean, quiet, powerful. The best words I can think of to describe the ProMix 01, the latest addition to my toolbox."

-Tom Jung, Producer/Engineer/President, DMP Records

If you think the ProMix 01 sounds good here, wait 'til you hear it in action. Call our 800 # and send for your free CD of The ProMix Sessions, produced and engineered by Tom Jung, President of DMP Records. Our ad agency thought we needed to say something clever here, but we told them we had enough opinions already. To order your CD, call 1-800-937-7171, Ext. 450.

YAMAHA 20 BIT TECHNOLOGY

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Smart Mixing.

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CIRCLE 74 ON FREE INFO CARD

World Radio History

HUSH UP

Q My recent purchase of a digital multitrack was motivated, in part, by a desire to get rid of tape hiss. So what do I get instead? Every bit of available noise from my sound sources! The dual noise gates on my compressor-limiter are only a little help. What should I do?

Sandra Murphy
Springfield, OH

A An analogy appropriate to most noise gates is that they're like stuck clocks: they're only right once in a while. This is not to deride gates as a noise reduction medium: for live sound, they're often indispensable, and a really good gate can go a long way (especially during pauses) toward cleaning up noisy recordings. Unfortunately, gating is a static process in that most gates lack the flexibility to cover the noise potentials of the expansive dynamic range endemic to digital recording.

What we'd recommend to solve your noise blues is some sort of single-ended noise reduction that operates on a dynamic filter principal. These kinds of devices contain circuitry that, to oversimplify, can discriminate between noise, hiss, or rumble and musical information, and actively seek out and eradicate nastiness while leaving your music intact. Unlike gates, good dynamic-filter-based noise reduction can, for example, ride the tail of a sustained chord or reverb, without chopping off desirable signal.

Several manufacturers make filter-based noise reduction units, many of which are very good. We at HUSH Systems® are quite partial to ours, as we possess a slew of patents attesting to our passion toward noise eradication. While HUSH relies on dynamic filtering, we also have a Variable Integration Release™ circuit that we feel is incomparable in maintaining the integrity of a musical signal while eliminating undesirable information. For digital recording, we'd suggest our HUSH Elite™, which combines both high and low dynamic filters, a gate-like expander, and auto mode, which gives you set-and-forget convenience during both tracking and mixdown.

All plugs aside, there are several units on the market that should suit your needs. The easiest demo for them is to grab a guitar with single-coil pickups and some sort of fuzz box and patch them into a mixer, fuzz maxed, with the noise-reduction unit either inserted or run in-line. With the NR engaged, you should get the full brunt of the guitar signal without losing any high end or sustain. In essence, the unit should be transparent. If you can achieve this kind of transparency doing the above demo with a unit in your price range, you're in business.

By all means hang on to your gates. They can still fulfill many purposes (drum isolation, hard cutoff effects, etc). But for digital recording (especially without onboard NR), you need some sort of adaptive noise reduction.

Bill Rowe
Sales Manager
Hush Systems

Send your queries to:
EQ Editorial Offices,
939 Port Washington Blvd.,
Port Washington, NY 11050
E-mail: EQMagazine@AOL.COM

Sound Solutions

ASHLY has been building world-class equalizers for well over 20 years. Our new GQX-Series models take advantage of this experience with some true advances in the technology. Precision Wein-Bridge filters, and newly designed summing amplifiers, provide extremely accurate response, low noise, negligible distortion, and excellent immunity to magnetic fields. All filters exhibit true constant "Q" response, with absolute minimum ripple. The full-throw faders are a custom-manufactured metal-shaft type, with the center detented position being utilized as an "on/off" switch for that filter (to minimize any possible degradation in signal noise levels.) Combine these features with our full Five Year Worry-Free Warranty. It's obvious why **ASHLY** equalizers are the best solution to your equalization situation.

Ashly Audio Inc., 100 Fernwood Avenue Rochester, NY 14621 • Toll Free: 800-828-6308 • 716-544-5191 • FAX: 716-266-4589
In Canada: Gerraudio Dist Inc., 2 Thorncliffe Park Dr - Unit 22, Toronto, Ontario M4H 1H2 • 416-696-2779 • FAX: 416-467-5819

CIRCLE 08 ON FREE INFO CARD

World Radio History

Born Digital. Bred For Gold.

Ampex 489 ADAT, 488 Audio Hi8 and 467 R-DAT. Highest consistency, lowest error rates. No wonder more studios go gold on Ampex than on all other tapes combined.

You're on the cutting edge. You record in the newest generation studio. You need tapes that are designed specifically for digital audio applications.

So we consulted with the most demanding artists and engineers in digital recording and spent months in development back at the lab. The results are Ampex 489 S-VHS, 488 Audio Hi8, and 467 R-DAT, designed specifically for digital mastering.

They are simply the finest mastering tapes you can buy. In fact, more artists, engineers and studios go gold on Ampex than on all other tapes combined.

Thanks to our unique dual coating technology, Ampex 489 and 488 feature low dropouts, high output, and the most consistent quality tape after tape. Plus, low abrasivity to ensure long headlife. Which is why Alesis, the creator of the ADAT format, recommends Ampex 489 ADAT.

Ampex 489 is now available in our new 60 minute extended play configuration – for use on ADAT System 4 recorders or newer. Ampex 488 Audio Hi8, in 30, 60, and 113 minute configurations.

And for two track mastering tape, try Ampex 467 R-DAT. They're all easy to find, thanks to the industry's largest distribution network. And they're backed with the service and support that has long been the industry standard.

For more information, or the name of your nearest distributor, just call us at **800 227-8443.** Ampex 489, 488 and 467 audio mastering tapes. Born digital. Bred for gold.

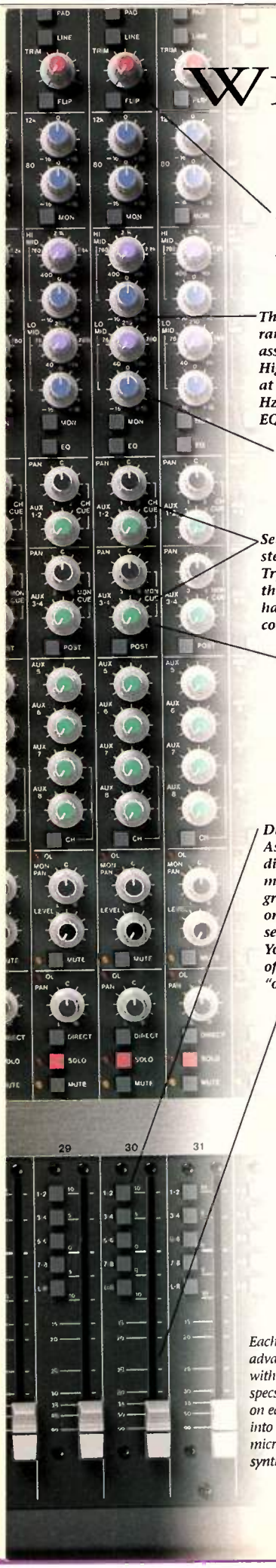
AMPEX

Ampex Recording Media Corporation, 401 Broadway, M.S. 22-02, Redwood City, California 94063

CIRCLE 02 ON FREE INFO CARD

World Radio History

WHEN IT COMES TO RECORDI
WILL PUT YOU IN A COM



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.

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.

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.

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)*.

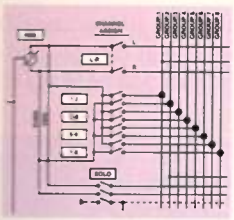
So forget compromises. Invest in a true recording console. The TASCAM M-2600.

World Radio History

ORDING, MOST OTHER CONSOLES COMPROMISING 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.

TASCAM®

Take advantage of our experience.

7733 Telegraph Road, Montebello, CA 90640 (213) 726-0303

CIRCLE 68 ON FREE INFO CARD

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EQ PRODUCT VIEWS

ANOTHER APOGEE

Apogee Acoustics, Inc., inventors of the first patented Full Range Ribbon loudspeaker, has introduced a professional monitor speaker designed for console monitoring as well as on-site recording sessions. The Ribbon Monitor incorporates Apogee's midrange/tweeter ribbon in a new 4-inch structure with a 6 1/2-inch dynamic woofer, and a high-power voice coil in a ported enclosure. Frequency response is 45 Hz to above 25 kHz (±3 dB), and weight is 26 lbs. per speaker. Dimensions are 16.5 x 9 x 11.5-inch. Features include biwired gold-plated speaker terminals and magnetic shielding. Retail price is $1000 per pair. For more details, contact Apogee Acoustics, 35 York Ave., Randolph, MA 02368. Tel: 617-963-0124. Circle EQ free lit. #102.

ON A LARC

Lexicon has expanded its family of digital effects processors with the 300L. The 300L is a new version of the still available 300 processor. All operations of the 300L are controlled by the LARC, which is Lexicon's proprietary remote controller. The 300L, in its standard configuration, ships with a LARC control head. It is also available as a mainframe only. With its new operational interface, the 300L comes with over 150 reverb, ambience, delay/pitch effects, compression/expansion, and mastering programs. A complete 300L system including LARC with cable retails at $5495. For more information, contact Lexicon, 100 Beaver St., Waltham, MA 02154-8441. Tel: 617-736-0300. Circle EQ free lit. #101.

RECORD ON ME

There's a new recordable CD on the market, and it's from HHB Communications. The 680 MB/74 minute recordable CD has been designed for usage in professional audio, multimedia, graphics, and general CD-ROM disc applications. The 680 MB employs a new Phthalocyanine organic dye-recording layer that is less susceptible to the effects of UV light. In addition, the discs are double-coated for further protection against scratches, fingerprints, and the effects from extreme heat and humidity. The 680 MB discs are compatible with all leading CD writers and are capable of recording at 1x, 2x, 4x, and 6x speeds. For details, contact Independent Audio, Inc., 295 Forest Ave., Suite 121, Portland, ME 04101. Tel: 207-773-2424. Circle EQ free lit. #103.

A DAT WITH BYTE

For those of you who want more bang for the buck, Sony has created the PCM-2600 cost-efficient professional DAT recorder. It offers a four-motor tape drive transport and Super Bit Map (SBM) capability. The PCM-2600 offers high-resolution digital conversion, switchable SBM processing, and a precision transport. The PCM-2600 was designed to replace the PCM-2300 and features balanced analog and AES/EBU digital inputs/outputs to make interfacing with other studio equipment easy. Retail price is $1349. For more information, contact Sony, 3 Paragon Drive, Montvale, NJ 07645-1735. Tel: 800-635-SONY. Circle EQ free lit. #104.

World Radio History

HOT SPOT

Landing in studios across the country from a galaxy not-so-far away is the Micro Spot personal monitor speaker from Galaxy Audio. The Micro Spot is a subcompact controlled-bandwidth speaker featuring Galaxy's proprietary 5-inch driver and an 8-ohm impedance. It is designed to reduce space requirements wherever high volume levels must be achieved in a small space. The Micro Spot has a power handling capacity of 100 watts RMS, a sensitivity of 92 dB, and a bandwidth focused from 200 Hz to 18 kHz with a peak at 3 kHz to enhance speech or vocals. The speaker is available in 25-, 70-, and 100-volt transformer versions. To find out more, contact Galaxy Audio, 625 East Pawnee Ave., Wichita, KS 67211. Tel: 316-263-2852. Circle EQ free lit. #105.

DIS-STRESSED OUT

Adding compression to your mix without having it sound like there's compression on it is something we all strive to do, unless you're going for an effect. Empirical Labs boasts that its new compressor unit, the Distressor, does just that. The Distressor was designed using a discrete, class A nonlinear gain-control device with an additional harmonic distortion generator that can closely emulate tube, class A, and tape saturation distortion characteristics. For more information, call Mercenary Audio, Tel: 508-543-0069 or Sam Ash Pro, Tel: 212-719-2641. Circle EQ free lit. #106.

KINETIC ENERGY

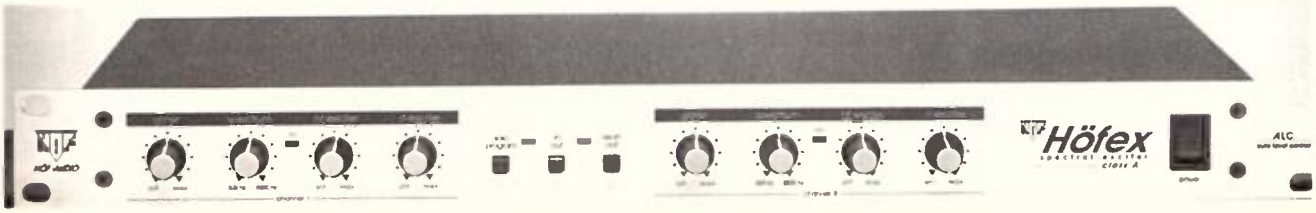
Kinetics Systems new ada 20-16 is a 1U 19-inch rack-mounting A/D, D/A converter. This unit can simultaneously handle 20-bit (AES/EBU or serial) and 16-bit (SPDIF) outputs, providing engineers with complete access to the digital domain. Linear phase filters, together with simultaneous sampling, work together to provide users with good phase response and stereo imaging. The ada 20-16 also offers variable output headroom and analog gain controls with front-panel access. The front-panel display provides information on sampling frequency, signal source format, and de-emphasis. For details, contact Kinetic Systems, Ltd., Kinetic Center, Theobald St., Borehamwood, Hertfordshire WD6 4PJ, UK. Tel: 44-(0)81-953-8118. Circle EQ free lit. #107.

DO IT YOURSELF

Feeling handy? With PAVO's MIDItools Custom Instrument Kit, you can create a MIDI controller. The kit includes a painted rack-mount enclosure, backlit LCD, all components, and instructions for selecting and connecting a variety of sensors and switches. Once the kit is assembled, you can attach up to 64 switches or sensors and connect your new creation to your MIDI sound module. Some possible applications are a DJ sample trigger control or adding MIDI to your piano. For more details, contact PAVO, 10 S. Front St., Philadelphia, PA 19106. Tel: 215-413-2355. Circle EQ free lit. #108.

LET'S GET EXCITED

The engineers at Hofex have designed their Spectral Exciter II to provide a more clear and defined sound with an emphasis paid to stereo field clarity, stereo imaging, smoothness of high frequencies, and adding a live-like character to recorded music. The unit has four sound range levels: Glitter, HF Exciter, LF Exciter, and Room Exciter. There is a solo function for listening to effect sidechains, and an automatic level control that is active from –20 dBu up to maximum input. Other features include servo-balanced inputs/outputs, and a feedback suppresser. To get details, contact HOF Professional Audio, distributed by Radikal Technologies, 1119 North Wilson Avenue, Teaneck, NJ 07666-1917. Tel: 201-836-5116. Circle EQ free lit. #109.



World Radio History

EQ PRODUCT VIEWS

TWIDDLE THESE KNOBS

If you're looking to get your hands on some good knobs, then check out the knobs from Selco. Selco's Trio range knobs offer a three-shot rotary control knob. An innovative molding technology provides the opportunity to mold three components in a single operation, allowing the product appearance to be enhanced by the use of shades of color. These knobs are made of nylon, have a matte-finish body, and a contrasting gloss pointer. There are two 11 mm diameter versions, one with and without integral nut cover, and shaft diameters of up to 6 mm can be accommodated. Soft touch finishes can be incorporated. Also offered is a 3-shot capability to the market for custom products, whether it is a knob or any other molded part. To find out more, contact Selco Products Company, 7580 Stage Rd., Buena Park, CA 90621. Tel: 800-229-2332. Circle EQ free lit. #110.

GO TO YOUR ROOM

The engineers over at Folded Space Technologies are keeping the neighbors in mind with their latest effort, the Micro Room. The Micro Room allows recording on your favorite amplifier at its loudest volume without disrupting the peace. It features a compact 12 x 12 x 12-inch isolation enclosure complete with adjustable power attenuator, Shure SM-57, vintage-type speaker, and Studiofoam acoustic treatment. Construction is 3/4-inch hardwood ply. Speaker and microphone options are available. Because the enclosure is isolated, problems associated with "open" speakers such as sonic bleed are eliminated. Net price of the Micro Room is $395. For details, contact Folded Space Technologies, P.O. Box 801008, Acworth, GA 30101. Tel: 404-633-2507. Circle EQ free lit. #111.

LET THE MUSIC PLAY

Kurzweil has extended its K2500 series of electronic musical instruments with the K2500 76-note and K2500X 88-note keyboards. The K2500 features a semiweighted piano-style keyboard and the K2500X features a fully-weighted piano-action keyboard. Both instruments offer a front panel that boasts eight control sliders, 11 independently assignable buttons, and two ribbon controllers. The small ribbon is pressure and direction sensitive and is housed below the pitch and mod wheels. The long, 600 mm ribbon lies just above the keyboard, and can be used as one zone or divided into three zones. All K2500 Series instruments are based on a 68340 CPU processor and feature true 48-note polyphony, 60 internal DSP, dual SCSI ports, and a wide range of interfacing options. Additionally, the K2500s offer a full-function 32-track sequencer and the AFMS hierarchical file directory system for advanced file management. For more details, contact Kurzweil, 13336 Alondra Ave., CA 90703. Tel: 310-926-3200. Circle EQ free lit. #112.

THE LITTLE MIXER THAT COULD

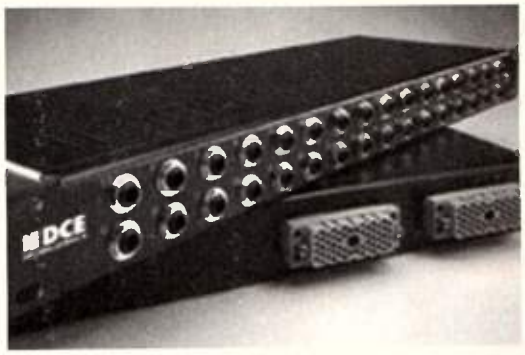
Yamaha's MM1402 Portable Mixing Console is a slim mixer that crams a lot of features into a slim, lightweight unit that is designed for use in project studios and on the road. This 14-channel mixer sports 6 mono inputs that offer XLR connectors with phantom power, 1/4-inch connectors, a 3-band EQ, and two aux sends (one pre and one post). There are also pan and variable gain controls. The MM1402 also includes four stereo inputs (unbalanced phone jacks) with switchable line level control, one aux send, a balance control, and a 2-band EQ is provided for performing detailed equalization of the stereo source. All input channels on the MM1402 feature peak indicators and include prefader listen switches. For more details, contact Yamaha, P.O. Box 6600, Buena Park, CA 90622-6600. Tel: 714-522-9011. Circle EQ free lit. #113.

World Radio History

World Radio History

EQ PRODUCT VIEWS

BUZZ-BE-GONE



David Carroll Electronics has designed the SynthDriver to eliminate the hums and buzzes found in MIDI/ Synthesizer studios from unbalanced sources. The SynthDriver provides a high-density balancing interface for synthesizer and MIDI voices. It boasts a 6 dB fixed gain with high common mode rejection and no sonic degradation. Each SynthDriver channel features a balanced input. The SynthDriver is available in 8, 16, and 32 channels. To find out more about the SynthDriver, contact David Carroll Electronics, 3219 Pierce St., Richmond, CA 94804. Tel: 510-528-8054. Circle EQ free lit. #114.

20-BIT CONVERSION

Symetrix has introduced the latest product in the 600 series of its digital productivity tools, the 620 20-bit A/D converter. Designed for usage in a variety of professional audio applications, the 620 can serve as an alternative to the onboard A/D converters found in professional DAT recorders. Symetrix's new converter features true 20-bit quantization, selectable output word size, dither, and noise shaping. The 620 outputs digital data in either AES/EBU or S/PDIF digital formats at sample rates of 48, 44.1, 32, or 22.05 kHz. Digital inputs are provided as well, and for multimedia production applications, the 620 converts samples from 44.1 kHz to 22.05 kHz, as well as bit-rate converting from 16 bits to 8 bits. Retail price is $995. To find out more, contact Symetrix, Inc., 14926 35th Ave. West, Lynnwood, WA 98037. Tel: 206-787-3222. Circle EQ free lit. #115.

HOT ZONE

Whirlwind's HotBox is an active direct box with extra-wide bandwidth and dynamic range. It's got a frequency response of 3 Hz–80 kHz, and –100 dBu residual output noise. It operates on 9-volt batteries or on phantom power, and features a ground lift switch. For info, contact Whirlwind, 99 Ling Road, Rochester, NY 14612. Tel: 716-663-8820. Circle EQ free lit. #116.

AMEK'S 8-BUS BOARDS ARE NUMBER ONE WITH A (TAC) BULLET

The TAC Bullet Custom and B2 Custom consoles manufactured by AMEK are intended for use in sound reinforcement, audio-for-video, and broadcast applications. Both consoles are available in 4- and 8-bus versions and can be configured with up to 28 inputs. Three frames sizes are available with the smallest frame being rack-mountable. The B2 Custom features a monitor section with four 15 segment LED meters and a 4-track monitor section that can accept either a multitrack tape machine or can be used as four effect returns. The Bullet Custom is fitted with an LED meter bridge that can optionally be supplied with VU meters. Stereo or mono input modules can be ordered for either console; the mono input module features electronically balanced mic and line inputs, six auxiliary sends, a 4-band equalizer, and PFL and mute switches. The master section offers two pairs of speaker outputs, a stereo tape return for a 2-track tape machine, and inserts on the L-R master bus. Consoles can be ordered short-loaded and and fitted with extra input modules at a later time. For more information, contact AMEK US operations at Tel: 818-508-9788; Fax: 818-508-8619. Circle EQ free lit. #117.

World Radio History

What do you like best about your DA-88?

"Built-in headroom. It makes a big difference when you're trying to track quickly."

"MIDI synching is so easy and clean. It's hard to know where the virtual recording ends and the taped recording begins."

"It sounds great. Especially in the upper frequencies."

"Bouncing. I can bounce forever, it seems. The DA-88 just doesn't distort like other digital decks."

"We really like the convenience of the Hi8 format. You don't get tape stretch, you get much more time per tape, and it's really cost-effective."

"The Hi8 format is a superior recording medium, and it's a TASCAM."

"I can't help but notice the difference in the sound. Unbelievable."

"It locks up a helluva lot faster than our other digital multitrack recorder."

"It's trouble free. All I have to do is clean the heads. I'd call it the stress-free modular digital multitrack!"

"I needed over an hour and a half recording time. The DA-88 is the only digital recorder to offer that."

"The frame accuracy is so fantastic, I can edit voice-overs and guitar parts as small as two frames using the Absolute Time capability."

"Punching in and out is so simple. That fact alone made it worth buying a DA-88."

"The punches are very clean and accurate. A dream."

"I've been on the DA-88 nonstop for three weeks now. The transport is phenomenal."

"I like the size, the editing capabilities, and the price. I even like the way it looks."

"I just finished scoring two movies on it. Unbelievable machine."

"Two things. First, the DA-88 gives me a full one-hour and fifty minutes of record time. Second, the wind times are so wonderfully tight and quick... it takes my other digital recorder a day and a half to rewind."

"The TASCAM unit is clearly more dependable."

"I've had a lot of experience with TASCAM... the dependability and the value. It was a no risk investment for us."

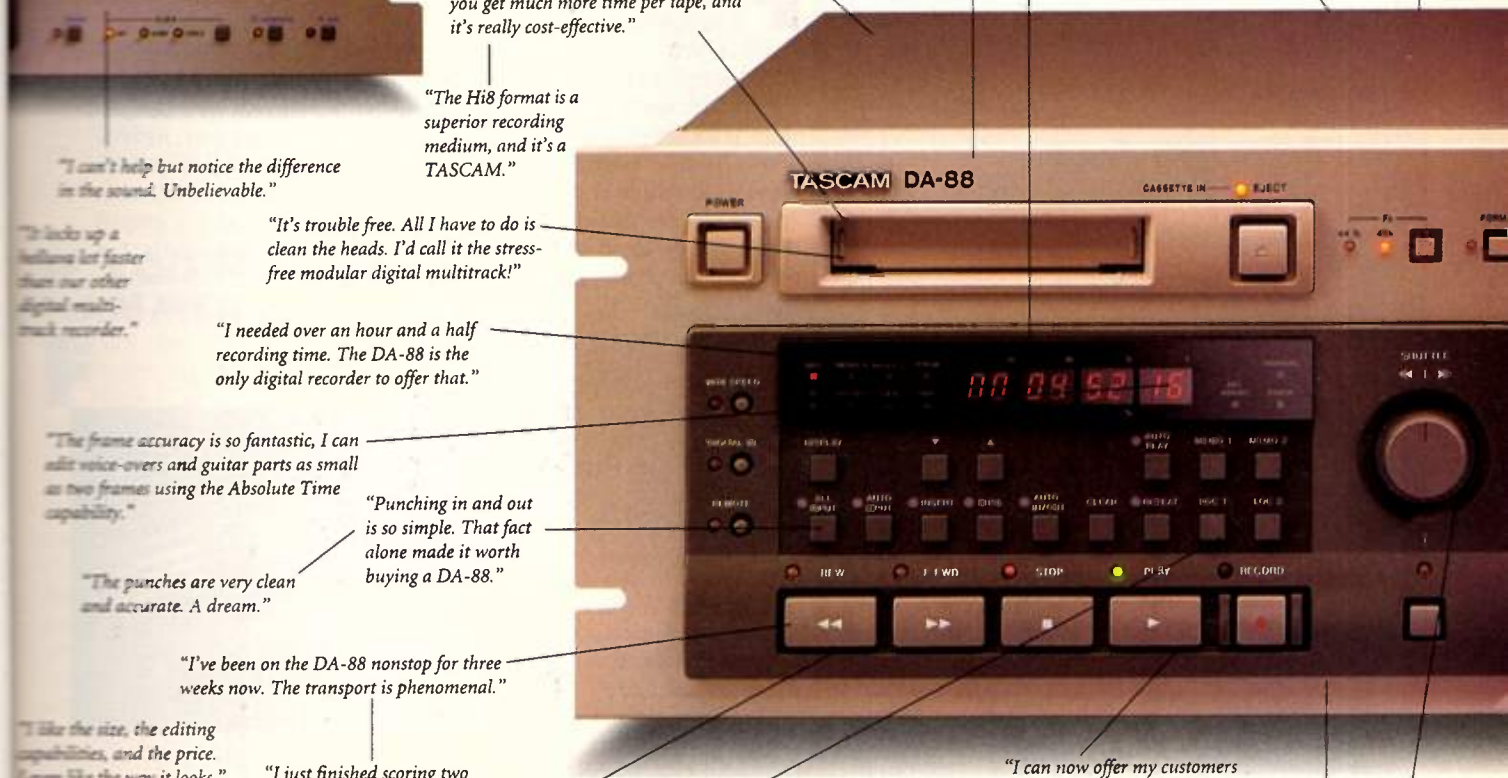
"The sync card has built-in SMPTE, video sync and Sony 9-pin. Perfect for our video house."

"I like having the A/D and D/A converters on an interface card because you can drop in a new card without having to disassemble the whole machine."

"With the sync card it's so easy to synchronize our audio both to video and other audio reels, including our DAT reels."

"The 108 minutes of recording time means we can do something we never could before — get an entire performance on a single piece of tape."

"Our DA-88 ended up in a pile on the floor after the earthquake. I put it back together, turned it on, and it worked fine. It's earthquake proof."



"I like the auto-locator and rehearsal modes, and of course we're doing our next album on it."

"I can now offer my customers digital recording at analog prices."

"It's just faster. Speed counts. Time is money."

"It just feels better than any other recorder in its price range."

"We love the jog/shuttle wheel. It's working out great."

No wonder the DA-88 is the preferred digital multitrack.

It features the latest generation in digital multitrack recording technology. According to users, it's the best sounding, best built, most functional and affordable digital multitrack on the market. You're going to love the DA-88. Get to your dealer now and see why!

"It's the name. They make the best recording equipment, period."

"I can lock it to video and my analog machines with no hassle. Life is so easy now that I have my DA-88."

"I wanted the serious machine for music production. That's TASCAM."

"I'm focused on the TASCAM. It will become the standard. And I don't want to be left out."

TEC 1994 WINNER

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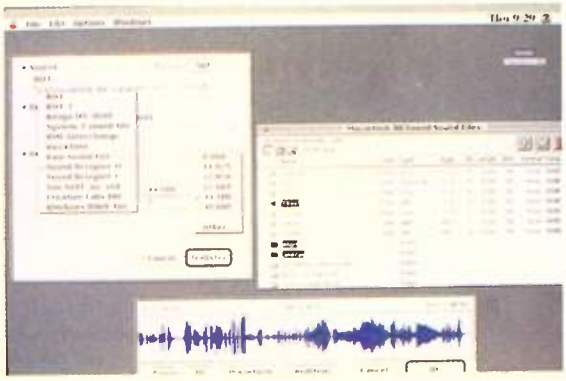
World Radio History

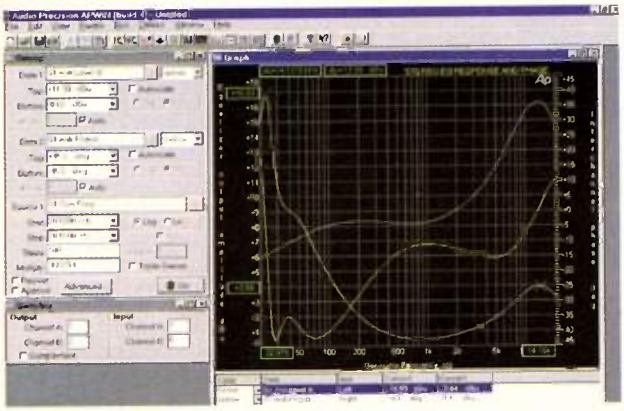
EQ STUDIO WARE



THE MISSING S/LINK

Designed to translate incompatible digital audio formats between professional production systems and multimedia authoring stations, Synclavier's S/Link 2.0 is a batch audio file transfer and conversion utility for the Macintosh. Among the multimedia formats that S/Link 2.0 supports are .WAV; VOC; AIFF/AIFF-C; QuickTime; SoundEdit; MOD and IFF/8SVX; and .SND/.AU. For more info, contact The Synclavier Company, Rivermill Complex, Lebanon, NH 03766. Tel: 603-448-8887. Circle EQ free lit. #118.

APWIN...*Windows Software for System One and System Tv*

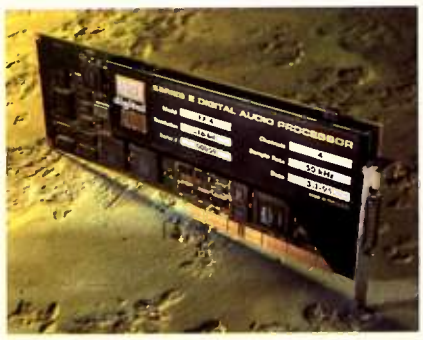


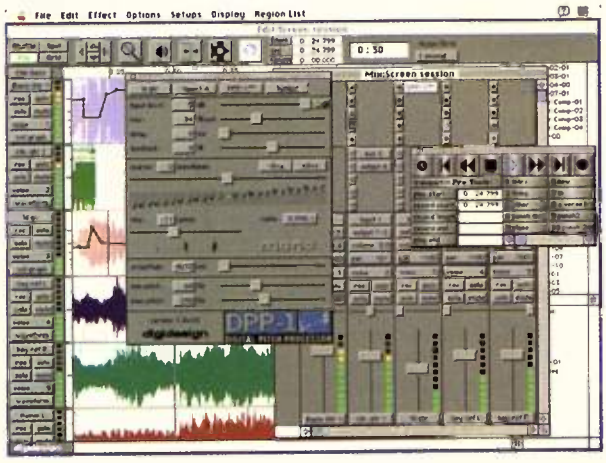
THIS IS ONLY A TEST

For users of Audio Precision's System One and System Two, the company has designed APWIN, a new Windows-based software program for controlling these audio test and measurement systems. APWIN is compatible with Windows 3.1 and Windows for Workgroups 3.11. System Two units will be supplied with APWIN as a standard, while System One users using the current S1.EXE software package may upgrade to APWIN at a moderate cost. APWIN allows users to assemble a "virtual test bench" by determining which panels are visible and in what orientation. It provides five different "pages" where test instrument panels, bargraphs, and X-Y graphs displaying up to six parameters may be viewed simultaneously. For more information, contact Audio Precision, P.O. Box 2209, Beaverton, OR 97075-3070. Tel: 800-231-7350. Circle EQ free lit. #119.

FOUR MORE CHANNELS PLEASE

If four more channels of digital audio is what the doctor ordered, then Antex might have your remedy. The Antex Series 2/Model EX-4 32-bit add-in card incorporates a programmable Texas Instruments floating point DSP chip, and has been designed for use in video and multimedia applications. The EX-4 supports both record and playback functions simultaneously on four independent mono channels and can sync to an external time source with its two external clock inputs. It also features 16-bit balanced analog inputs and 18-bit balanced analog outputs. The EX-4 also accommodates 32-bit data transfers, and it is EISA compatible. The EX-4 incorporates 64x oversampling A/D and D/A converters. For more information, contact Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248. Tel: 310-532-3092. Circle EQ free lit. #120.

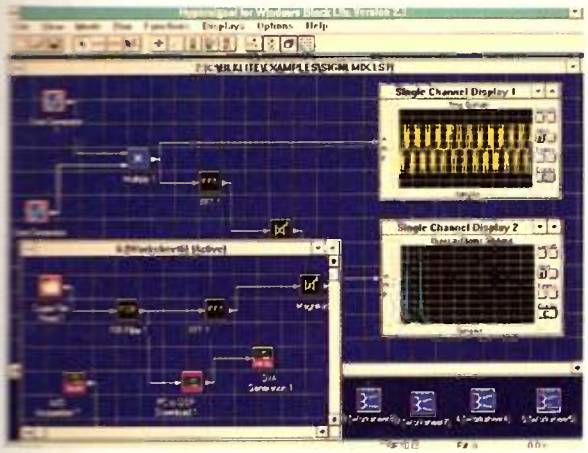




IN SESSION

Digidesign has debuted Session Software, a multitrack audio editing software application for Macintosh. Session Software is a software-only professional multitrack audio production environment that offers a variety of features. Session Software offers 4 to 12 tracks of record/playback, parametric EQ, synchronization with third-party sequencing software programs, synchronization with QuickTime video, and integration with other Digidesign products. Session Software utilizes the digital audio capabilities of the Power Macintosh line of Apple's Macintosh computers. In addition, it can be used with Digidesign's Audiomedia II and Sound Tools II systems. Retail price is $395. To find out more, contact Digidesign, 1360 Willow Rd., Menlo Park, CA 94025. Tel: 415-688-0600. Circle EQ free lit. #121.

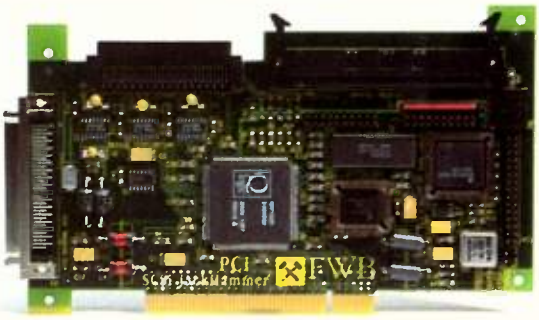
World Radio History



SOFTWARE FOR BLOCKHEADS

Hyperception has released Block-Lite software for Windows. The new software is designed to be an abridged version of the company's Hypersignal for Windows block diagram program. Block-Lite strives to introduce the concept of real-time visual DSP design in a cost-effective manner. Block-Lite teaches the principles behind digital signal processing, and is suited for many OEM applications while it can also work with a variety of plug-in DSP hardware boards. Users of the software choose block functions from an included library that are arranged graphically by the user to implement an algorithm or process. By arranging and connecting block icons, signal processing and other algorithms can be programmed, adjusted, and tested. Block-Lite graphical designs are upwardly compatible with the more powerful Hypersignal Block Diagram product, which allows for upgrading at any time. Block-Lite includes signal generators, DSP functions, arithmetic operations, high-level file I/O for postprocessing applications, and real-time I/O utilities such as A/D and D/A. For information, contact Hyperception, 9550 Skillman, LB 125, Dallas, TX 75243. Tel: 214-343-8525. Circle EQ free lit. #122.

IF YOU HAD A HAMMER...



FWB, Inc., the manufacturer of the Hammer brand of mass-storage products, is now offering the PCI SCSI JackHammer. It's a SCSI-2 coprocessing PCI (Peripheral Component Interconnect) accelerator for Apple Computer's new Power Macintosh systems. The JackHammer was specifically engineered for applications that require high levels of fault tolerance, and operates at 40 MHz RISC-based Fast and Wide. The Bus Master architecture of the PCI SCSI off-loads I/O tasks from the CPU, enabling high-speed PCI bus transfers of up to 132 MB/sec. over a 32-bit data path. DMA transfer rates reach up to 105 MB/sec. Retail price is $499. For details, contact FWB, Inc., 1555 Adams Drive, Menlo Park, CA 94025. Tel: 415-325-4FWB. Circle EQ free lit. #123.

THE ZIP CODE

The engineers at Revelation Products Corporation are providing high-performance CD recording for users of the Yamaha 4X CD Recording System by creating Zip-CD AV Series. These plug-and-play CD recording bundles combine the Yamaha recorders (internal model CDR-100; external model CDE-100) with premastering software components such as Incatsystem's Easy-CD Pro for Windows and Toast CD Pro Premastering software for Macintosh workstations. All bundles include 10 pieces of 4X certified media, caddy, SCSI adapters, and the appropriate cable. Also offered is a ZIP-CD bundle that integrates either a 1.0 or 2.0 GB AV Hard Drive into the CDE-100. For more information, contact Revelation Products Corporation, 1220 Valley Forge Road, P.O. Box 2225, Valley Forge, PA 19482-2225. Tel: 800-836-1823. Circle EQ free lit. #124.

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World Radio History

STARVED FOR LINE INPUTS? FEAST ON TH

Introducing the ultimate line/keyboard mixer with more inputs than nature ever intended. The new LM-3204 has 16 stereo channels and up to 40 mono inputs. In just 5 rack spaces. Serious input gluttons can add LM-3204E expander units for 80, 120 or even 160 inputs!

The LM-3204 wasn't cooked up by a marketing department. It was designed by keyboard and sequencing nuts who never have enough inputs. It's the line mixer we've always wanted in our own studios.

We cherry-picked the best features from our proven CR-1604 and then blended in new recording and monitoring capabilities. And, even though this is a "line" mixer, we garnished the LM-3204 with two of our highly-respected mic preamps for sampling, voice-overs and single/duo club acts. Yum.

This typically wordy Mackie ad is just a taste of the LM-3204's mega menu of features.

Call tollfree and then digest our brand new 40-page product brochure and Hook-Up Guide. It covers the LM-3204 in delicous detail.

More than just 40 inputs in 5 rack spaces.

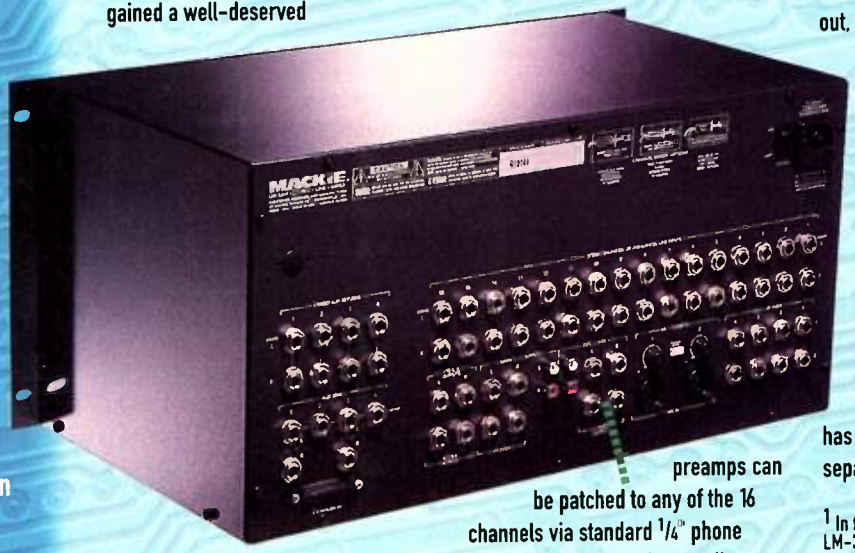
Lots of companies make line mixers[1]. But only our new LM-3204 was built to handle hordes of hot inputs and still have lots of headroom.

The headroom bottleneck in any mixer is the mix amp where signals from all channels are combined. If this circuit overloads, the sound breaks up. (And bringing down the master gain control doesn't help a bit). Product specs can't express a mixer's ability to handle multiple simultaneous inputs. So you find out that you bought a line mixer with poor mix amp headroom only *after* you get it home.

Unless you buy an LM-3204. Its unique mix amp architecture lets you cram sixteen sadistically sizzling stereo inputs into the LM-3204 without getting scratchy garbage at the outputs. Need proof? Consider our CR-1604, MS1202 and 8•Bus consoles. Naturally, the LM-3204 has the same headroom pedigree.

Two mic preamps.

Mackie's mic preamp design has gained a well-deserved reputation among seasoned recording engineers — several even use a CR-1604 or MS1202's preamps instead of those on their ultra-expensive main console[2]. So we added two mic preamps (with phantom power and input trim controls) to the LM-3204. Both preamps can be patched to any of the 16 channels via standard 1/4" phone cords. Perfect for project studio sampling, live sounds orsmall lounge acts.



Sealed rotary controls *resist dust, moisture & other contamination.*

4 AUX sends *(2 stereo/2 mono) per channel accessed from 2 knobs.*

Signal present LEDs on every channel.

To some, –20dB "blinkies" may seem like a minor feature. To those who work with a mixer day in and day out, it's major cause for celebration.

The LM-3204 features the same "expressive" sensing design that we developed for our 8•Bus console's signal present LEDs. One famous engineer says he can practically run his board based on the behavior of our ultra-responsive LED blinkies.

Monitoring made easy.

By popular request (and our own experience), the LM-3204 has a Tape Monitor switch plus separate Control Room and Phone

[1] In fact, we were so late in shipping the LM-3204 (what else is new?) that one of our competitors came out with *their* version before we could release the original!

[2] Actually, we can go one better than that. What does Neumann use at trade shows to demo their finest microphones? A Mackie compact mixer with the same mic preamps as the LM-3204.

World Radio History

ON THE LM-3204.

/2 mono) per
om 2 knobs.

3-band EQ. 80Hz, 2.5k and 12khz just like our famous CR-1604.

2 new Secret Buttons add mixing & monitoring flexibility (see below).

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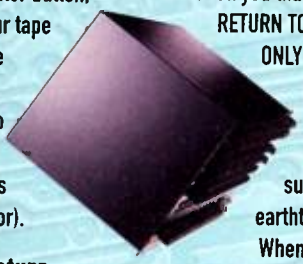
monitoring outputs with their own level controls. For added convenience, we made the Control Room volume adjustment a 45mm fader instead of a rotary knob.

Both Phones and Control Room monitor the main left and right buses. If you press the Tape Monitor button, you hear the output of your tape recorder[3] (or other source plugged into the Tape In jacks). Or monitor the solo bus when any channel's Solo switch is pushed (this also overrides Tape Monitor).

LM-3204 Aux Return Bonus Switches.

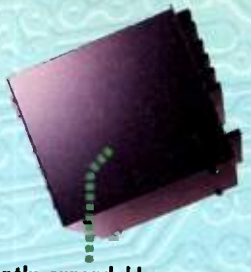
Naturally the LM-3204 has our trademark ALT 3/4 extra stereo bus. It also has a special aux return circuit that lets you get even more mileage out of ALT 3/4. Normally, AUX Return 3 is just that: an aux return. But press the SOURCE ALT 3/4 button and the outputs of the ALT 3/4 bus are routed into the Aux Return 3 control and circuitry. This lets you use ALT 3/4 as a pair of submix buses...and then mix 'em back into the main L/R buses.

AUX 4 also has it own trick circuit. If we tell you that it's called the AUX RETURN TO CONTROL ROOM ONLY switch, can you guess what it does? Correct! You win a year's supply of designer earthtone patch cords.



When AUX RETURN TO CONTROL ROOM ONLY is engaged, AUX Return 4 is disconnected from the main left and right buses. It's reconnected to the Control Room Monitor and Headphone circuits. Now you can "wet monitor"[4] or play along to a cue or click feed without having it go onto tape.

[3] Speaking of taping, the LM-3204 has electronically-balanced main outputs capable of driving either –10dBV or +4dBu recorders, 1/4" TS Tape In jacks and unbalanced "RCA"-type Tape In and Tape Out sockets.



Instantly expandable.

When 16 stereo channels aren't enough, add an LM-3204E *Expander*. It's basically an LM-3204 without the master section. It connects in seconds via ribbon cable to provide 40 more inputs. And you can daisy chain two or three LM-34204Es without headroom or noise penalties.

Already making a name for itself among the pros.

It hasn't been out for long, but the LM-3204 is already distinguishing itself by the company it keeps. All the members of *Boyz II Men* are currently using LM-3204s in their project studios. *Saturday Night Live* band drummer Shawn Pelton submixes with one. Keyboard supertechs Terry Lawless (*Madonna, Paula Abdul*) and Russ Achzet (*Moody Blues, Chicago, Jimmy Buffet*) swear by their LM-3204s. Electronic percussion wizard Pat Mastellotto uses an LM-3204 on *King Crimson*'s world tour (he recently sent us a nice postcard from Paris). We could go on and on[5].

The affordable line input mixing solution.

The LM-3204 retails for $995[6]. You can add LM-3204Es for $899[6] each.

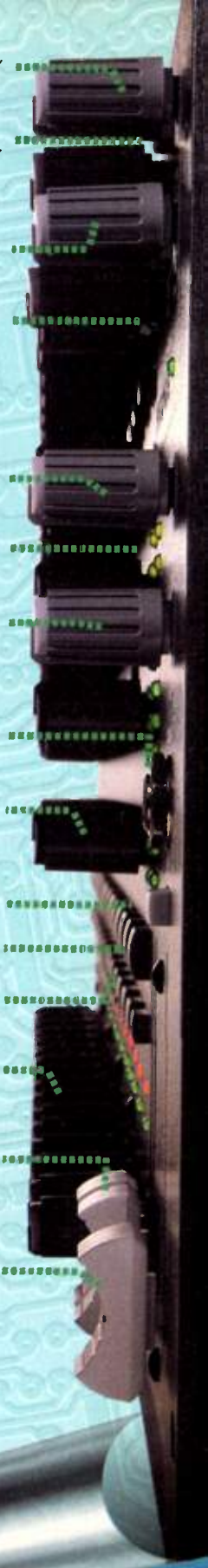
At this price, there's no excuse not to have enough line inputs. For effects or instrument submixes. As a project studio's mixer. Or for live club performance.

Call us today or visit your nearest Mackie Designs dealer.

[4] *Wet monitoring*: Monitoring with echo or delay but without actually applying the effect to the main left and right outputs.

[5] Indicates use and ownership by individuals but not specific endorsement by the group.

[6] Suggested retail price. Your mileage may vary as part of a balanced diet or when you close cover before striking. Price is higher in Canada.



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World Radio History

Street Smart

From TV projects to personal albums, David Benoit uses his project studio to do it all

STUDIO NAME: 29th Street Studio
LOCATION: South Bay, Torrance CA
KEY PERSONNEL: David Benoit, owner; Dianna Newell, studio manager; Tim Aller, technical coordinator/chief audio engineer; Clark Germain, Benoit's engineer; Bill Winnett, staff second engineer
PROJECTS/ARTISTS RECORDED: Various David Benoit projects, including: *The Benoit/Freeman Project, Shaken Not Stirred* [GRP '95]; *All My Children* theme; soundtrack for *The Stars Fell on Henrietta* (Warner Bros feature film, '95); *Sisters* (prime time television show). Other artists recorded include: Steve Allen, Steve Bailey, Dan Segal, Russ Freeman, Kilaeua, Dave Koz, Hubert Laws, and Simon Phillips
CONSOLE: Soundcraft Sapphyre (36-channel) with patchbay
KEYBOARDS: Yamaha seven-foot C7 FII Conservatory grand piano with integrated Disklavier system; Rhodes MK80; Korg O1/W FD
SYNTHESIZER MODULES: Yamaha TG77; Kawaii K1R; Yamaha TX802; Alesis D4; Korg M1R; Roland D550
MONITORS: UREI 838; Yamaha NS-10M; JBL 4333
AMPLIFIERS: UREI 6300; Hafler Pro 1200 and 2400; Yamaha PC2602
COMPUTERS AND SOFTWARE: Atari 1040 ST; Hybrid Arts SMPTE Mate Plus sync box
RECORDERS: MCI JH24 24 track with remote; Ampex ATR 104 1/2-inch 4 track and 1/4-inch 2-track; MCI JH18 2-track (1/4-inch and 1/2-inch headstacks); Yamaha C300 cassette deck; Alesis ADAT with BRC
DAT MACHINES: Panasonic 3700 DAT with remote; Panasonic 3200 DAT with remote
VIDEO: Sony 5850 and 5600 3/4-inch machines; Toshiba 25-inch color monitor with remote
OUTBOARD GEAR: API 312 mic preamp [2]; API 550A EQ modules [6]; Time-Line Micro Lynx sync system w/remote keyboard; Horita house sync generator; Summit TPA 200B stereo preamp; Summit TLA 100A compressors [2]; EMT 140 stereo reverb plate; Aphex Impulse trigger interface; Garfield digital click; Yamaha SPX900; Lexicon LXP1 [2]; Lexicon MRC; Roland SRV 2000 digital reverb; Fostex 4030 synchronizer; Orban Parasound Sibilance controller; dbx 160 compressor
MICROPHONES: AKG C12A [2]; Neumann U47 FET; AKG 451 [4]; Sennheiser 421 [5]; Shure SM57 [4]; Fostex MS Stereo
STUDIO NOTES: Benoit states: My original thought in designing 29th Street was to primarily do TV/film, and if I could do my own records here that'd be an added bonus. We built the studio when I was doing music for the TV show *Sirens*, and I've found it really gives me a chance to take time to do things right.

One of the things I'm really proud of about 29th Street is the interior design, which I was very involved in. My concept for the studio was to have a very light, airy atmosphere with light pastel colors, no dark colors. I picked out every single fixture and placed it where I wanted it so we could dim it if we wanted. The concept was to build an environment that was comfortable to work in but one that also means business.
EQUIPMENT NOTES: Benoit continues: The seven-foot Yamaha C7 piano is very unique, and we're getting a lot of clients who are coming just for the piano. In addition to being a real concert instrument from Yamaha, it also has a Disklavier system that allows the composer to take whatever they've sequenced from any computer format and MIDI that into our studio and have the grand piano play the sequence. One of the neat advantages to me as a composer is that a lot of times I'll look at a scene and I'll put it up on the computer and can play piano right to the scene, sequence it to the computer, and then fly it out to the piano so that it saves me from having to write out all of the piano music or hire another pianist. EQ

Photo by Ed Colver

World Radio History

World Radio History

Virtual Dylan

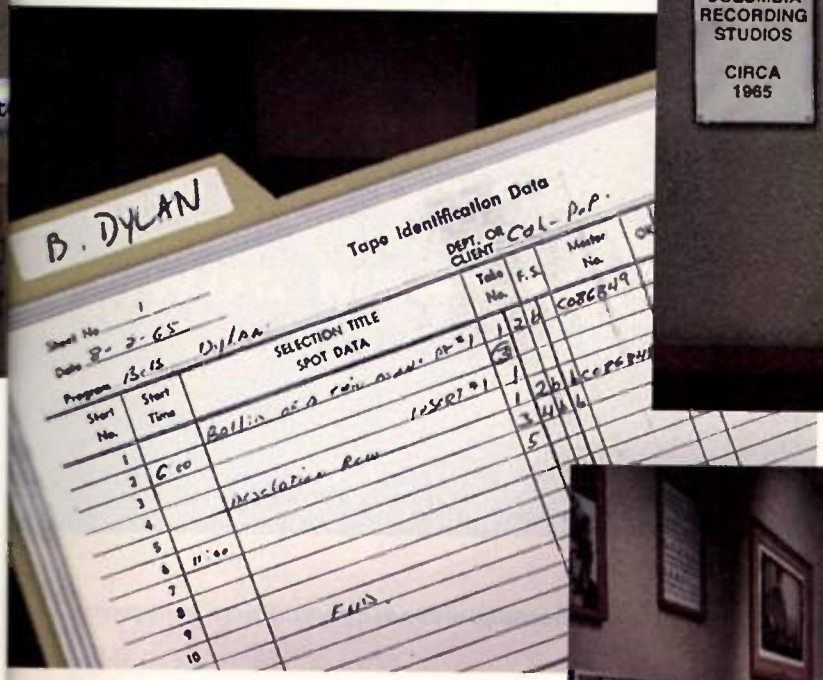
Visit Columbia Recording Studios in the sixties and record with Dylan

PLACE: Columbia Recording Studios, New York City
TIME: Circa 1965
TALENT: Bob Dylan
ENGINEER: Bob Johnston
TIME MACHINE: *Bob Dylan: Highway 61 Interactive,* Graphix Zone, CD-ROM for Windows and Macintosh ($59.95)
THE DEAL: It's 1965, and you are there as Dylan records "Like A Rolling Stone." Take a tour of the studio and control room and interact with many of the objects in the room. You can hear war stories from session-player and famed-keyboardist Al Kooper and engineer Bob Johnston. Witness the evolution of "Stone" with five never-before-released takes. You can also hear Dylan sing a previously unreleased electric version of "House of the Rising Sun" (recorded two years before the Animals' version).

WHAT YOU'LL HEAR: Stop by to see Bob Johnston in the control room and you'll hear him tell this tale of mid-'60s studio recording: "...the engineers were fairly...I keep using the word obsolete, but it was crazy the way they did things. They had a tape [operator] who actually pressed the button for the machine when you said stop or go. And then they had another guy standing here, and these were all behind a partition and a guy at the head of it, and then you had the engineer and the assistant engineer. So the engineer with Dylan would say, 'Let's roll this thing,' and the engineer would say, 'Roll it,' and the next guy would say, 'Roll it,' and this guy would say, 'Now? Now? Do you want me to punch it now?' And he usually punched the wrong button anyway. But he'd punch that button and then he'd holler out, 'Yeah, the button's punched!' And so they'd turn the red light on and go through all of that. And I [didn't] want to put up with that all the time, so I got a long piece of string and tied it to the original guy and bypassed the others, who went to the union because they said I wasn't using them. But I said the string was just to remind him, so it didn't have anything to do with business. It was just a string. You can't convict a string. They really couldn't do anything about it. So I just pulled the string."
FIND OUT MORE: Contact the Graphix Zone at 38 Corporate Park, Suite 100, Irvine, CA 92714. Tel: 714-833-3838. Circle EQ free lit. #125.

CBS Recording Studios, 1962

World Radio History



DYLAN DALLYING: Some of the scenes you'll see on *Bob Dylan: Highway 61* CD-ROM includes a virtual look at Columbia Recording Studios, the track sheets for some of Dylan's best-known songs (above), and a real look at Columbia Recording Studios and Dylan in the photo gallery (below).

First Photo Session with Columbia Records, 1962

World Radio History

THE NEW TSR-24S LETS YOU CREATE YOUR OWN SOUNDS IN TWO STEPS. 1-DREAM THEM UP. 2-LAY THEM DOWN.

With the TSR-24S, frustrating menus and time-consuming steps don't control your programming. You do. Choose the effects you want, in the order you want, then program and listen to them instantly. No catches. Naturally, the TSR-24S has plenty of raw material, with an arsenal of more than 75 effects. Plus, multiple modulation effects

S-DISC™ PROCESSING

SPECIAL EFFECTS

94 DB S/N RATIO

When it comes to sound, not even compact discs are as clean as the TSR-24S. Our Silencer™ digital noise gate wipes out noise by writing digital zeros when there's no signal present.

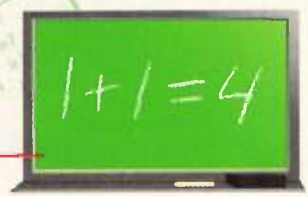
94 dB

OVER 75 EFFECTS

Gigaverb (the world's most flexible reverb), crystal clear sampling, multitap and modulated delays, multi-phase choruses and flangers, duckers, auto panners, 4-voice phasers, 10 separate EQs, 4 octaves of multi-voiced pitch shifting, arpeggiators, and more.

DUAL DISCRETE STEREO

Take true stereo inputs, add four assignable outputs, and you get a lot of routing configurations. Let's see, there's stereo in, quad out; mono in, quad out; dual mono in, dual stereo out...well, you count 'em.



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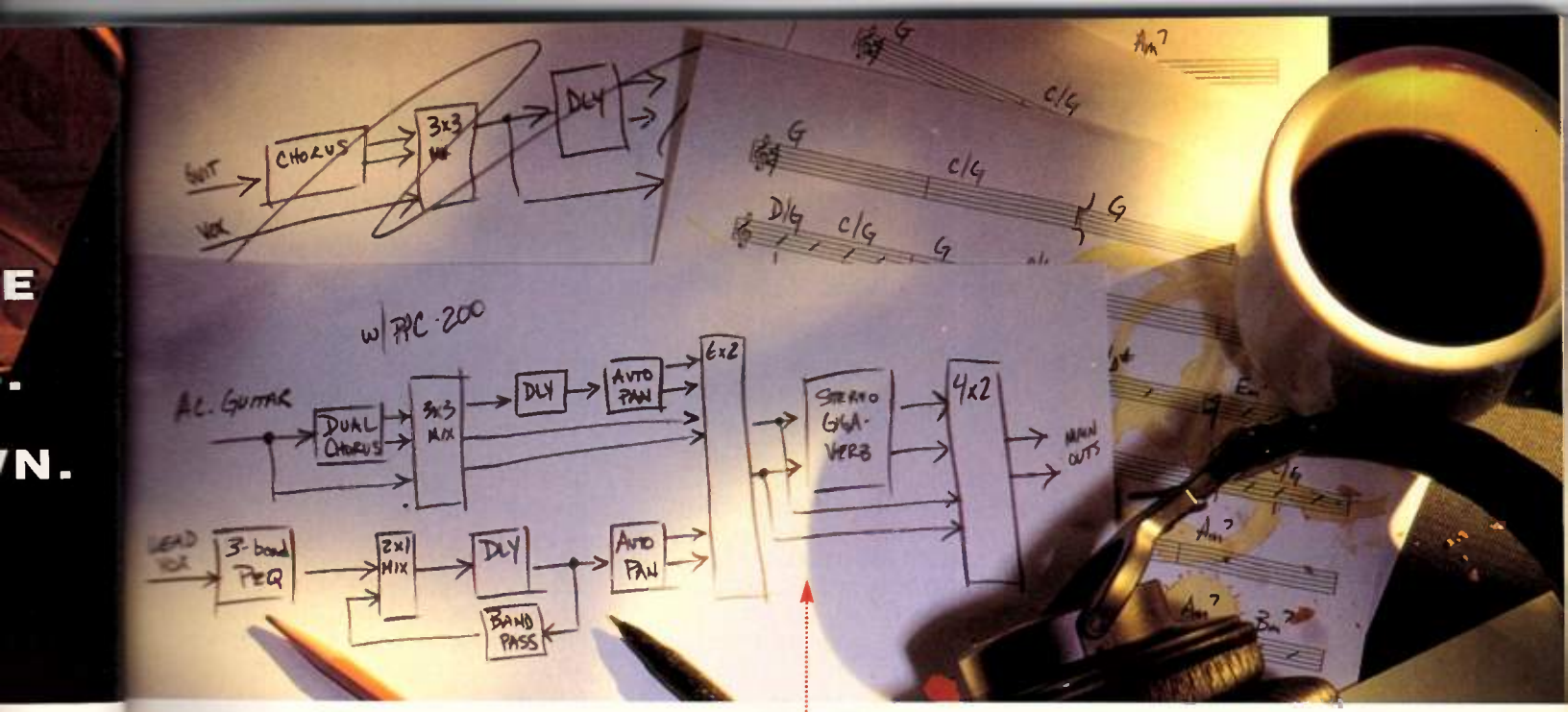
World Radio History



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CIRCLE 20 ON FREE INFO CARD

World Radio History

Audix D-Series Microphones

Don't let their small size fool you, these mics can rock

MICROPHONE NAME: Audix D-One
PRICE: $199
TYPE OF MIC: Transformerless dynamic
POLAR PATTERN: Hypercardioid
FREQUENCY RESPONSE: 38–21,000 Hz
SENSITIVITY: –71.5 dB (0 dB=1V/ubar)
RATED SOURCE IMPEDANCE: 250 ohms
SIGNAL-TO-NOISE RATIO: >120 dB
MAXIMUM INPUT SPL: 144 dB
DIMENSIONS: 4" (length) x 1" (diameter)
WEIGHT: 4.5 ounces
MIC NOTES: The Audix D-One has a gentle rise in the frequency range between 1 kHz and 5 kHz, making it an appropriate choice for miking snare drums and higher-pitched percussion.

MICROPHONE NAME: Audix D-Two
PRICE: $199
TYPE OF MICROPHONE: Transformerless dynamic
POLAR PATTERN: Hypercardioid
FREQUENCY RESPONSE: 38–21,000 Hz
SENSITIVITY: –71.5 dB (0 dB=1V/ubar
RATED SOURCE IMPEDANCE: 250 ohms
SIGNAL-TO NOISE RATIO: >120 dB
MAXIMUM INPUT SPL: 144 dB
DIMENSIONS: 4" (length) x 1" (diameter)
WEIGHT: 4.5 ounces
MIC NOTES: The Audix D-Two was developed specifically for miking of instruments such as toms, kick drums, congas, and sax where a full low-frequency response is required.

MICROPHONE NAME: Audix D-Three
PRICE: $229
TYPE OF MIC: Transformerless dynamic
POLAR PATTERN: Hypercardioid
FREQUENCY RESPONSE: 38–21,000 Hz
SENSITIVITY: –75 dB (0 dB=1V/ubar
RATED SOURCE IMPEDANCE: 150 ohms
SIGNAL-TO-NOISE RATIO: >120 dB
MAXIMUM INPUT SPL: 144 dB
DIMENSIONS: 4" (length) x 1" (diameter)
WEIGHT: 4.5 ounces
MIC NOTES: The D-Three was developed by Audix to be an "all-around" flat-response microphone capable of withstanding high SPLs from guitar amps and horns as well as drums.

In spite of their compact profile, all of the microphones in the D-Series utilize full-size diaphragms, allowing for response across the entire frequency range. These diaphragms employ the VLM (Very Low Mass) diaphragm technology from Audix for quick reaction to transients. The VLM Type B (used in the D-One and D-Two) provides higher output from those mics, while the Type C technology (used in the D-Three) allows that diaphragm to handle higher sound pressure levels without distortion or feedback. All of the Audix D-Series have a tight pickup pattern for reduced leakage and are housed in a block of milled aluminum. EQ

Photo by Ed Colver

World Radio History

Upgrade all your microphones

Photo by Ed Colver

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CIRCLE 06 ON FREE INFO CARD

World Radio History

Bonnie Raitt's "Sneakin' Up You"

EQ speaks to Grammy Award-winning engineer Ed Cherney about mixing the song from Bonnie Raitt's *Longing In Their Hearts*

EQ: This recording is very quiet, but it is also very warm sounding. Is it an analog or a digital recording?
Ed Cherney: Analog. I use 3M 996 tape at 30 ips, +5 over 250 nanoWebers with no noise reduction, so it's pretty quiet. I try to get the level right up to the edge of tape compression — unless I'm looking for a specific effect.

Do you use automation?
I do — GML automation. I mixed the song at Record Plant in their Neve One room on a VRP. It pretty much is my preferred sound for mixing.

How do you build a mix?
I wish there were some hard and fast rules. Sometimes I might build a mix around the vocal, or sometimes I might build it around a guitar lick. The way I built that song was around the rhythm track. Between the drums, bass, organ, and rhythm guitar I tried to find the pocket and make it as deep as I could.

When you mix, do you use specific monitors?
I have two sets of monitors that I carry around. I have a pair of Genelec 1031A's and a pair of Mastering Lab speakers, which are modified Tannoys. I use them for both mixing and tracking. Typically I use the Genelecs to balance the music. I mix fairly quietly at about 70–75 dB. I find that the musical balances tend to hold up when I mix like that. I don't use the big room monitors that much, but I'll use the Mastering Lab Tannoys to shape the low end and hunt for buzzes and noises.

Do you carry a power amplifier for the Tannoys?
I have an Auder amp that I have used for the last three years and that I used on Bonnie's record, but I just bought a modified Yamaha P2201. It's been recapped to make the low end a little quicker. Mastering Lab does the mod, and that particular amp seems to match up really well with the Mastering Lab speakers. I work in a lot of different studios and I try to get some consistency between them. The way I do that is by carrying around the speakers and power amp. I'm real familiar with what they sound like so no matter where I am working I can know what is going on.

Is there any outboard gear that you have a preference for?
For reverb I still use the old Eventide SP2016's. I carry two of those around. There is a stereo room program that works really well for vocals and guitar and a small room that I use when I need a short, bright decay.

I also have a Desper Products Spatializer [*which Cherney endorses —Ed.*], which I use a lot and I am getting great results with. It's basically a 3D audio processor. My particular unit has 16 inputs and 2 outputs, and I can use it to get beyond the speaker boundaries. It's quasi-3D audio coming out of two speakers. The way I use it is not necessarily to get a 3D sound, but to get more depth from the speakers. I can do things like take the lead vocal and pull it a little more forward from the mix. If I have something panned on the outside, I can really hold it on the outside. I also use it to get my reverb to be outside the speaker boundaries.

And for each of those particular sounds you might use a send to a separate input on the unit?
Exactly. It has joysticks for each input that allow you to move the sound through about 350 degrees. You can almost get sounds behind your head. You can certainly get them outside the normal area. When I did Bonnie's record I had just gotten it and was experimenting with the unit. [See *EQ* March '94 for more details.]

Are there any triggered samples on the drum kit?
No. I try not to use samples unless I really have to. A lot of the drummers I work with, such as Ricky Fataar (who played on "Love Sneakin' Up On You"), play with great feel and as soon as you throw

Photo by Paul Morse/LGI

WORTH THE RAITT: Don Was, Bonnie Raitt, and Ed Cherney celebrate their Grammy win.

World Radio History

UNTIL OMAR, FRANK AND JIMMY TOLD US ABOUT OUR SERVO AMPS, WE HAD NO IDEA HOW GREAT THEY SOUNDED IN THE STUDIO.

THE SAMSON MARKETING GUYS GET HIPPED TO THE NEW SERVO 500.

Just when we were sitting around trying to figure out why our Servo amps were selling so well, the phone rang.

"Omar Hakim is on line one," our receptionist cooed. "Shall I put him through?"

"If you don't, you're toast," we responded. "He's only the hippest drummer-composer-producer in the western hemisphere!

"Omar, my man, what's up?"

Omar Hakim

"Uh...guys, just wanted to let you know how impressed I am with the Servo 500. It's really transparent, with lots of detail in the midrange and top end. And there's always plenty of headroom."

While we were recovering from Omar's comments, the intercom kicked in again. "Frank Aversa on line two."

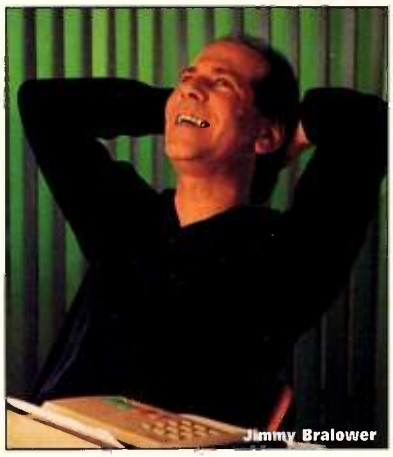
"What's the deal?" we wondered. "Frank's one of the hottest producers in the biz — he's done everything from the Spin Doctors to Burger King and Budweiser."

Frank Aversa

"I need another Servo 500 fellas," Frank said. "I already have seven, but I can't get enough of these. They sound so musical. Reminiscent of a tube amp, really smooth."

At that point, it was beginning to smell like a setup. "All right, which one of those engineering geniuses is pulling our chain now?" Just then, Sparky the marketing assistant flew into the room.

"Jimmy Bralower just faxed us about the Servo 500! Check it out: 'It really made my system come to life. I never realized my monitors could sound this good.'"


Jimmy Bralower

"Get outta here," we shot back, "this is too much. Jimmy's worked with people like Winwood, Clapton, and Cyndi Lauper — he even co-wrote Celine Dion's hit single, 'Misled'!"

SOUNDS GOOD, BUT WILL ANYBODY BELIEVE IT?

At this point, Sparky piped up, "Hey, I've got a *way* cool idea. Why don't we use these guys in an endorsement ad for Servo? What better way to tell people how great these amps sound."

"Never work, Sparko. Nobody will believe you can *hear* the difference in a power amp — unless your name is Fido," we laughed.

"Your loss, guys," he said on his way out the door. "Doesn't matter to me anymore. I just got a great offer from this new dinosaur theme park in Tasmania."

SAMSON AUDIO

If you want *our* side of the story about the Servo 500, Servo 240 and Servo 150 power amps and the growing Samson Audio line, please call us at (516) 364-2244, fax (516) 364-3888 or write to us at: Samson Technologies Corp., P.O. Box 9031, Syosset, NY 11791-9031 © 1995 SAMSON

CIRCLE 49 ON FREE INFO CARD

World Radio History

a sample in there, you ruin it. It's not necessarily just straight time that they are playing, so if you get a couple of milliseconds off either way you are messing with their feel. But there are some other games I play to try to get some crunch into the drums without using samples. For example, instead of gating the snare drum as part of the kit, I'll mult the snare drum, put a little EQ and compression on it, leave it ungated, and send it to one channel. Then I'll take the mult, compress it a lot, gate it down, and then heavily EQ it with an API 560 graphic equalizer. I put this sound into the mix (through another channel) and use the EQ to fill in frequencies that are not necessarily there on the first snare sound. I'll even send the reverb from the gated snare so I can get reverb without it being triggered off of the hihat or cymbals that leaked into the snare mic. I'm getting more impact out of the drums, but it doesn't sound like I'm working so hard. You still hear the whole kit and the open room, but I get the impact from the processed sound.

Do you mix from a gut perspective — that you want to make it move people? Absolutely. It's about music and balance more than getting the perfect reverb sound. If you can get the feeling and emotion across, then that transcends the technicalities. When you can get the emotional content going people are not so concerned with what the snare drum sounds like. It has got to come from the heart, and for me mixing is typically an emotional exercise. I find it emotionally draining because you have to put a piece of yourself inside the mix. You can't sit there looking for the perfect snare drum sound — you are looking for the perfect feel of that song so it talks to people. This is when the mix is done and you have to be able to recognize that. If you have the time and money, you can play around with it forever and go past the moment where that "Indefinable Thing" happens. Sometimes if you put just a little more tweaking in, you may start diminishing the emotional content. Experience teaches you how to recognize when you are going past the mix, and hopefully you stop. That is a joke I use, particularly with Don Was. I get the song down on the ground with my knee on its chest and my hands around its throat. Yeah, it's turning blue, there's the death rattle! Yeah it's dead! I'm done with this. Our work is done here today! —*Steve La Cerra*

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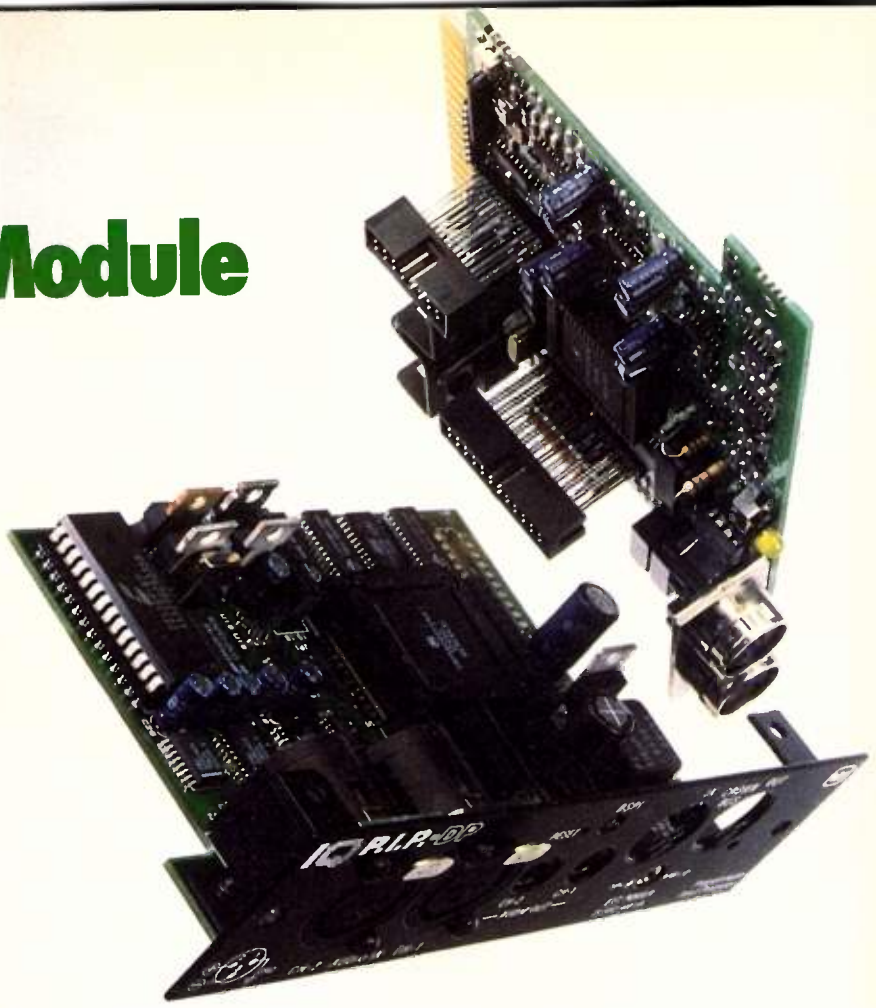
World Radio History

Crown DP Module

If you thought your amp just provided power, think again



The Crown DP (Digital Processor) is the latest in a series of computer-control modules that Crown has built for its IQ system. Known as "PIP" (Programmable Input Processor) modules, these control devices plug into a card slot on the rear panel of any Crown Macro-Tech, Com-Tech, or Macro Reference amplifier. All of these amplifiers will operate normally without a PIP module installed, but their full flexibility really cannot be appreciated until a PIP is used to interface the unit with the Crown IQ system.

The concept of the IQ system is to allow monitoring and set up of power amplifier functions through use of a personal computer (both Macintosh- and PC-based systems are supported). The PIP modules allow various processing functions (such as equalization or crossover) to happen at the amplifier instead of via an external processor unit. Crown's IQ Turbo software (currently at version 1.3) is used to control the modules and the combination of the DP module and IQ Turbo allows an amazing amount of control over the system. With IQ Turbo, software controls can be created to lay out a "view" of the amplifier controls and security parameters can be specified to deny access to unauthorized inquisitive types.

The DP ($995) is capable of virtually any kind of digital processing that can be imagined. Limiting, delay (for time alignment purposes), graphic, or parametric equalization and crossover functions can all be executed by the DP. The really cool thing is that all this stuff is now onboard the amplifier. The DP is "trained" by IQ Turbo to perform a specific set of functions and then the computer can be disconnected from the system. The DP also contains Crown's Smart Amp function, which is a software extension of IQ Turbo. This makes the DP intelligent enough to operate on its own even under failure conditions. For example, the DP can be trained so that if the impedance seen at the output of the power amplifier drops to a certain level, the amplifier will not deliver its full output (thus protecting the amp from damage). Or, in a more basic application, the maximum output power of a Macro-Tech amp could be limited when driving a small speaker in a particular system.

Since the DP lives in a power amplifier that is driving a specific speaker (or pair of speakers), the associated processing for that speaker is contained within its power amplifier. Now you can optimize processing functions for a specific loudspeaker much more easily and without carrying around a lot of extra rack-mount gear. Even for the club sound-reinforcement operator, the IQ/DP combination makes sense. If you have to carry the amplifiers for FOH speakers and monitors anyway, why not plug in a DP? Leave the rack with the limiters, crossovers, and equalizers at home.

All functions of the DP can be monitored on screen through IQ Turbo, but, more importantly, the parameters can be adjusted in real time. IQ Turbo interactively displays information on the screen regarding output levels, equalizer adjustments, crossover parameters, and delay times. You can have on-screen sliders and buttons to adjust any of these characteristics or you can use the display just to check status of the amplifier. The DP's delay function can be used for time alignment of an amp/speaker cluster, and since there is now a time-alignment option for each amp/speaker combination, accuracy in time alignment is much greater. Different crossover characteristics (Linkwitz vs. Butterworth) could be created and then A/B'd to determine which type sounds best in a given situation. Once the system is trained, the computer can be put away until changes are necessary.

The DP module provides signal processing directly at the amplifier. Crown refers to this as "distributed signal processing." The great thing about distributed signal processing is that a problem in the audio system is isolated to one signal location. In conventional multispeaker systems, a failure in a crossover or equalizer might take out multiple loudspeaker enclosures, but in the IQ system, the problem would not reach system-wide. Between the Smart Amp and the powerful DSP functions built into the DP, Crown has indeed created an intelligent amplifier. *—Steve La Cerra*

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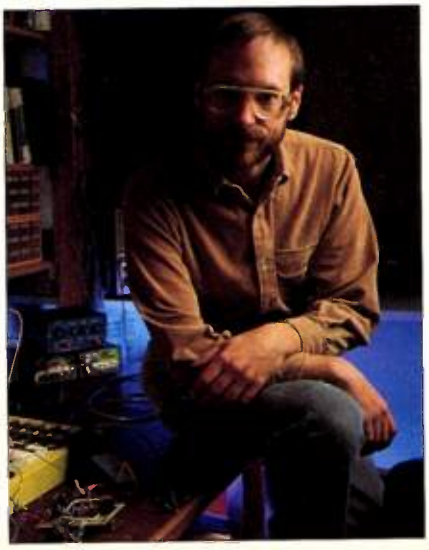
CIRCLE 11 ON FREE INFO CARD

World Radio History

In the Nick of QuickTime 95



Windows 95 may be giving Apple a run for its money with studio users, but don't count the Mac out yet

BY CRAIG ANDERTON

A funny thing happened on the way to Apple being overrun by PC clones: multimedia. Last Christmas season, the Mac got the reputation of being the "multimedia computer" (i.e., it has a CD-ROM drive and sound capabilities) that actually worked, as confirmed by the lower rate of Mac CD-ROM returns vs. Windows-based systems. In fact, in 1994 Apple sold more multimedia computers (2.4 million) than any other manufacturer, and DataQuest gives them a 22.9 percent marketshare worldwide for this niche.

In an attempt to maintain this momentum, Apple is adding several enhancements to QuickTime (QT for short), the backbone of Apple's multimedia efforts. This extension to the Mac's operating system has grown from a producer of shaky, postage-stamp-sized images to a decent, cross-platform way to present multimedia productions on a computer. Now, recent changes may push QT into the lead as a multimedia presentation engine for musicians.

APPLE, CALL HOME (PAGE)

To promote QT (both Mac and Windows versions), Apple has launched QuickTime On-Line, a World Wide Web server (http://quicktime.apple.com) for downloading music video clips, developer information, interviews with musicians, new programs and program updates, products that support QT, tips and techniques, hype on new interactive titles, and so on. It also carries the Internet music magazine, *Addicted to Noise*, and the IUMA (Internet Underground Music Archives) — an "indie" organization that specializes in clips and info about unsigned and underground bands).

Apple will also sell information over QT On-Line (let's hope First Virtual's system of credit card payment authorization is as secure as they think it is). For example, you can download QuickTime 2.0 for $9.95.

If you want to play back QuickTime VR (Virtual Reality) movies (this technology allows the viewer to have a 360-degree viewpoint in a given scene, as well as interact with objects — pick them up, move them, etc.), there's now MoviePlayer 2.0. This application can also do "drag-and-drop" QT movie editing for both video tracks and music clips. You can download MoviePlayer for $14.95, or bundled with QT 2.0 for $19.95. And if you want to test drive QT VR, no problem: QT VR movies providing virtual "tours" of CBGB's in New York and House of Blues in LA are now available online.

APPLE JUMPS ON ENHANCED CDS

Apple, like Microsoft, is going after the Enhanced CD market. This is the technology that puts CD-ROM and standard audio on the same compact disk, so you can either listen to it or stick it in your computer and see graphics like liner notes, pictures of the band, video clips, etc. There is one item of particular interest to developers: the QuickTime Music Toolkit, which facilitates combining lyrics, video, graphics, etc., into a QuickTime movie playable on both Mac and Windows platforms. Apple has also launched an Interactive Music Track (membership fee: $300 per year; for an application, call 408-974-4697) that provides product and service directories, quarterly mailings and updates, CD-ROM production tools, and the like.

QUICKTIME MEETS OMS

Perhaps stung by Microsoft's embrace of OMS in Windows 95 (see the February 1995 MI Insider), Apple is now going to build support for OMS (Open MIDI System, originated by Opcode) into QuickTime.

This is a big deal; both the Windows and Mac platforms will now have a common core for dealing with MIDI. This kind of standardization, which is what MIDI was all about in the first place, should make life much easier for software developers, who can now "hook" their software into both the Windows and Mac platforms with far less effort since OMS takes care of the drudge work. This should also take care of the Mac serial port MIDI problems once and for all. But there's more to this story...

In the bad old days of music software, different programs used different MIDI drivers (ways of communicating with the computer's serial ports) and generally couldn't talk to each other. If a manufacturer designed a "suite" of programs (sequencer, editor/librarian, MIDI processor, etc.) they needed a common OS to be able to communicate; on the Atari, this led to several incompatible operating systems implemented by different manufacturers, and the resulting confusion has been credited as one of the factors contributing to the Atari ST's decline.

Apple's MIDI Manager was an

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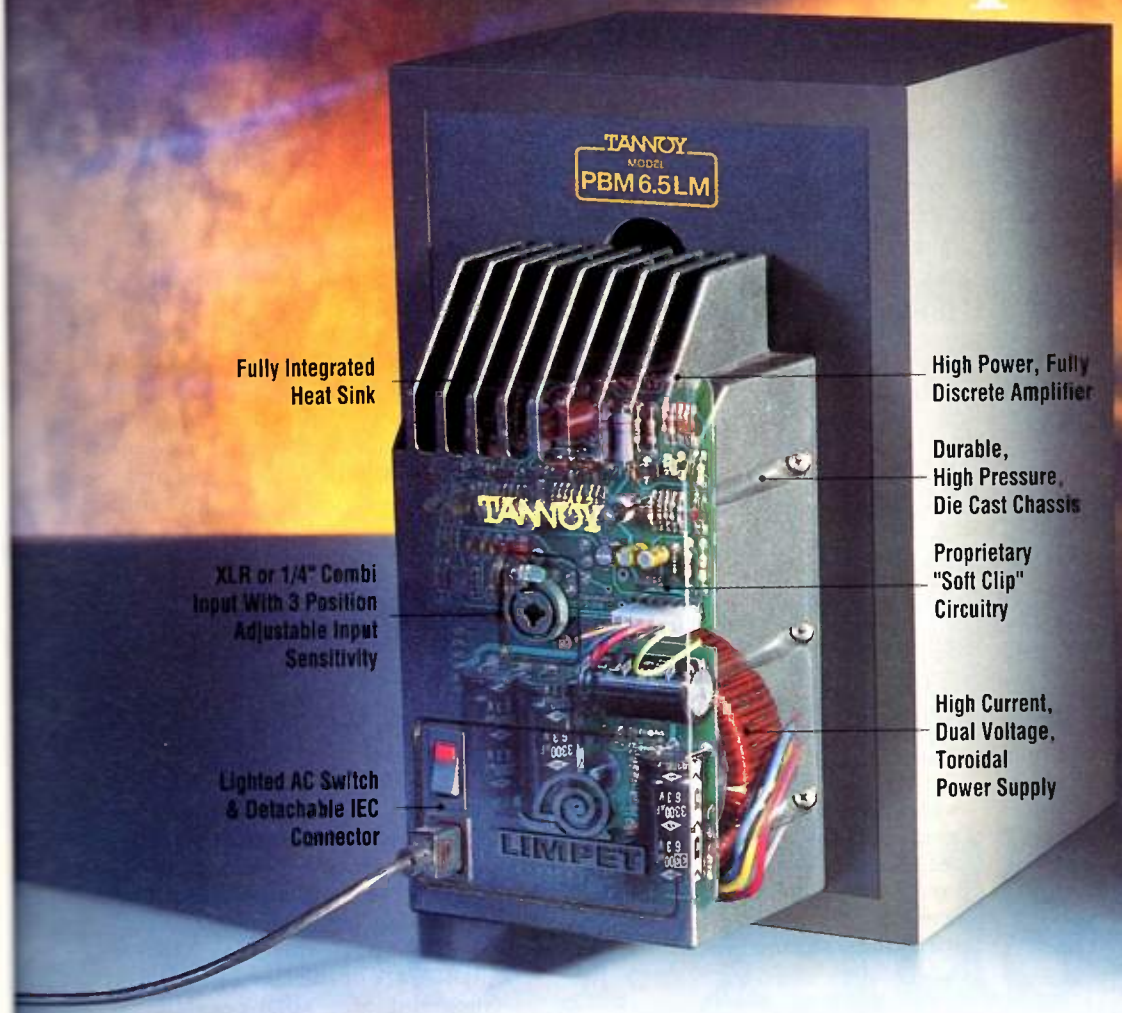

■ Every once in a while a product comes along which not only meets the ever increasing demands of the market, but one whose smooth commercial styling, ergonomics, durability and outstanding performance demands respect. Introducing MR. LIMPET. ■ The LIMPET is a unique, compact design that combines a very high current toroidal power supply, fully discrete amplification stages, and ultra wide (10 Hz to 80 kHz) bandwidth capabilities in a very affordable system. ■ Built using a one piece high pressure die-cast metal housing, the LIMPET is not only very rugged electrically and mechanically, its internal construction takes advantage of the industry's most advanced assembly techniques. ■ The LIMPET amplification system can be used with a wide range of TANNOY professional reference monitor systems, and provides the user with a number of improvements in both the performance of the loudspeaker system, and its flexibility. ■ Each single channel LIMPET system delivers an enhanced stereo image because the channels are fully separated - no power supply sagging due to inter-channel coupling, no crosstalk, no interference. Almost any kind of input level and connector can be used, since the LIMPET offers a balanced or unbalanced "combi" connector that can utilize either 1/4" or 3 pin jacks. ■ The ultra-low noise input section can accommodate either 0.775, 1.0, or 1.5 volt drive levels with no performance sacrifice. ■ The LIMPET's universal power supply, equipped with an industry standard IEC connector easily deals with almost any voltage, making the LIMPET a true global traveler. Finally, you can take your monitors wherever your work takes you, and not have to worry about cumbersome and troublesome adaptors, power converters, or strange electrical systems. ■ In addition, the unique and proprietary soft-clip circuitry and the significant reserves in the power supply ensure that no damage will occur to the drive units while providing the headroom needed for even the most demanding requirements. ■ The LIMPET is ideal for professional recording, broadcast/post production facilities, remote and live recording reinforcement applications, and finally gives the private/home recording studio truly reference quality performance unequaled at twice the price.

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attempt to provide a common OS for MIDI applications, and was one of the first (preSystem 7, even) Inter-Application Communications routines. But for a variety of reasons, including the Beatles' lawsuit against Apple, MIDI Manager never matured and now pretty much just takes up space on hard drives.

Opcode then came up with the Opcode MIDI System so that its software products could communicate. This allowed tricks like having its Vision sequencer import patch names directly from its Galaxy Editor/Librarian, and cleaned up the Mac's timing with newer machines (some newer Macs cannot run MIDI reliably unless OMS is installed).

So what will this mean in the years ahead? Several things.

• OMS has grown from being an Opcode-against-the-world kinda thing to an industry standard. Steinberg is responsible for much of the timing services work in the new version, and OMS itself is now supported by over 100 manufacturers. It's heartening to see the industry, as it did with MIDI, work to improve and maintain an existing standard rather than going off on proprietary tangents.

• Software should become more reliable if OMS itself remains stable in the years ahead. With low-level services taken care of in a standardized way, software developers can concentrate on the higher level bells and whistles that differentiate sequencers from one another.

• This could be a boon for those who create standard MIDI files, or need to do presentations involving MIDI sound modules. QuickTime is an ideal vehicle for combining audio, video, animation, and MIDI files that drive external sound modules. With both Windows 95 and the Mac OS striving to make Standard MIDI Files a viable consumer music playback medium, the market for prerecorded sequences might really take off.

• As digital audio recording becomes more and more the audio multitrack recording format of choice, it will be easier to bundle MIDI into digital audio-oriented programs.

• Apple can counter Windows 95's wooing of the consumer market with QuickTime's built-in synthesis ("sound fonts") and a unified approach to MIDI that crosses amateur/professional boundaries.

What does this mean to FreeMIDI, Mark of the Unicorn's (MOTU) competing Mac MIDI operating system? MOTU fans will still use it, but the handwriting is on the wall: a product will first have to be OMS compatible, then it can decide whether to be FreeMIDI compatible as well.

In theory, OMS joins QuickTime late this year — not too long after Windows 95 is slated to make its debut. Fortunately, whichever computer platform dominates in the long run, it's reassuring to know that in either case musicians won't be left out in the cold. EQ

Craig Anderton doesn't just live in cyberspace, he gigs there. Check out "Craig Anderton's Sound, Studio, and Stage" on America Online via keyword SSS.

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ALESIS STUDIO ELECTRONICS

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Send in the Clowns

How I keep the jokes rolling onto tape

BY BROOKS ARTHUR

The difference between recording comedy and recording music is that when recording live comedy shows (there are usually six), you edit together bits and pieces of the good material and then come out with a finished live album. When I first began recording live comedy, I edited the material with razor blades (remember them?) and spliced the edits together with splicing tape. Today I use editing software such as Digidesign's Pro Tools to get the job done, but I still keep those blades around. It's difficult to perform overdubs in the making of a live comedy album, because there is a lot of leakage from the audience to deal with. In a studio recording, the artist comes in, cuts a vocal track — sometimes several of them — and you can use the strongest one, or bounce all of the tracks together. This can't be done in recording live comedy, and it takes a lot of editing to achieve a good final product.

MAKE 'EM LAUGH

The ambient sound that comes from the show's audience plays an important factor in live comedy albums. Just think of how empty things would sound without the applause and laughter. I like to record audiences with Sennheiser shotgun mics because they pick up very well. Also, being from the old school, I like to have as many tube mics (which are making a retro comeback these days) in the house audience as possible. Neumann U47's and U87's are favorite house mics of mine, and, depending on the venue, I can have up to 12 mics placed in a circle around the audience. This doesn't mean that I'm going to use all 12 tracks of audience; sometimes I bounce them down into 8 tracks. The typical track anatomy in live comedy recording is to have 8 tracks of audience, 5 tracks of comedian, a couple of tracks for the ceiling, and then your garden variety of "emergency microphone" tracks. You have to be prepared for those ringing cash registers, and for the bartender who is blending cafe lattes!

In order to avoid getting caught in a recording bind, I like to record bone-dry. No effects, flat, end of story. I will add my polish and luster at the end of the project during mixdown. If you record with effects, then in the event of a heckler it just makes the situation more difficult to mend, and you run the risk of not recapturing the sound.

"BRING ON THE BABES!"

When you listen to a comedy album, it is very rare to hear any heckling. You know, the rude guy in the audience who shouts, "Hey, bring on the babes!" Just because you don't hear the heckle on the album doesn't mean that it did not happen — it just means that the engineer had the chops to work around it. Sometimes if the heckle is funny and adds to the performance, then I will leave it in. The beauty about recording a live comedy show is that you can edit between the skits of the different shows and come out with a great live album. For example, if the heckle is something that I don't want on the final version, then at the beginning of the heckle I can edit in the same skit from a different performance.

It takes a creative engineer to edit around these heckles and still come out with quality material. Comedians' performances vary from night to night, and it sometimes takes two days worth of editing to work in or out these heckles. One technique that I use is to take a loop of laughter or ambient sound

Photo by Bonnie Schiffman

LIVE FROM THE STUDIO — IT'S SATURDAY NIGHT: Rob Schneider, David Spade, Arthur, and Sandler

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from the show's audience and diffuse the situation by muscling out the heckler with this loop. To do this, I will leave the comedian's mic on and bring down all the audience faders in hopes that the heckle doesn't leak in to the artist's mic. Then at this point I can edit in the loop to replace the tracks that I've brought down.

Heckling is one reason why I like to mic comedians with multiple microphones. In some situations I mic the artist with four or five microphones and have two tracks in stereo left and right. I like to use a clip-on mic such as the Vega dynex 1 lavalier mic as a back-up because it's so close that it picks up all artist with hardly any leakage. By utilizing multiple microphones for the comedian, you are reducing your chances of picking up any leakage because there are several tracks of vocals to work with. In the situation where a joke does not go over well with the audience, I will keep the joke, and during mixdown fly in a prerecorded laughter sequence from the show's audience. You will never hear the difference on the album between shows.

ROCKING ROBIN

Everybody asks me, "What's it like to work with Robin Williams?" Robin is one of the most dynamic, and phonetic comedians to ever perform on stage. He runs around a lot and will do unexpected things — like bang on his chest during a joke to get a laugh. He's a very physical performer. To mic Robin Williams, I use two wireless Vega dynex 1 lavalier mics placed on the left and right sides of his chest. This way if he bangs on one of the mics, I've still got a track of the other one to spare.

Wireless microphones are my saving grace. So in rented remote trucks with our own power generator, I record the shows onto two 24-track machines and to DAT for backup. The exception to this was Pauly Shore for whom I recorded directly onto DAT due to the small size of the venue. I use splitters inside the venue so that the microphones supply identical information to the PA, to the audience, and to myself in the truck. While recording live I try to mix as well, and I will perform some of the editing using the splicing method on the multitrack tape, and then transfer the remaining material to hard disk for further editing.

Though I've had no practical jokes played on me, recording these comedians has provided me with memories of some of the funniest moments that I've ever experienced. EQ

Producer/engineer Brooks Arthur's most recent work is the Grammy-nominated Adam Sandler comedy album, They're All Gonna' Laugh at You *[Warner Brothers Records]. Arthur has produced Grammy Award-winning albums before:* Reality...What a Concept *and* A Night at the Met *for Robin Williams, and* Between the Lines *for Janis Ian. In 1979, Arthur began his career in recording comedy albums, and in addition to Williams and Sandler, he has also recorded Jackie Mason and Pauly Shore.*

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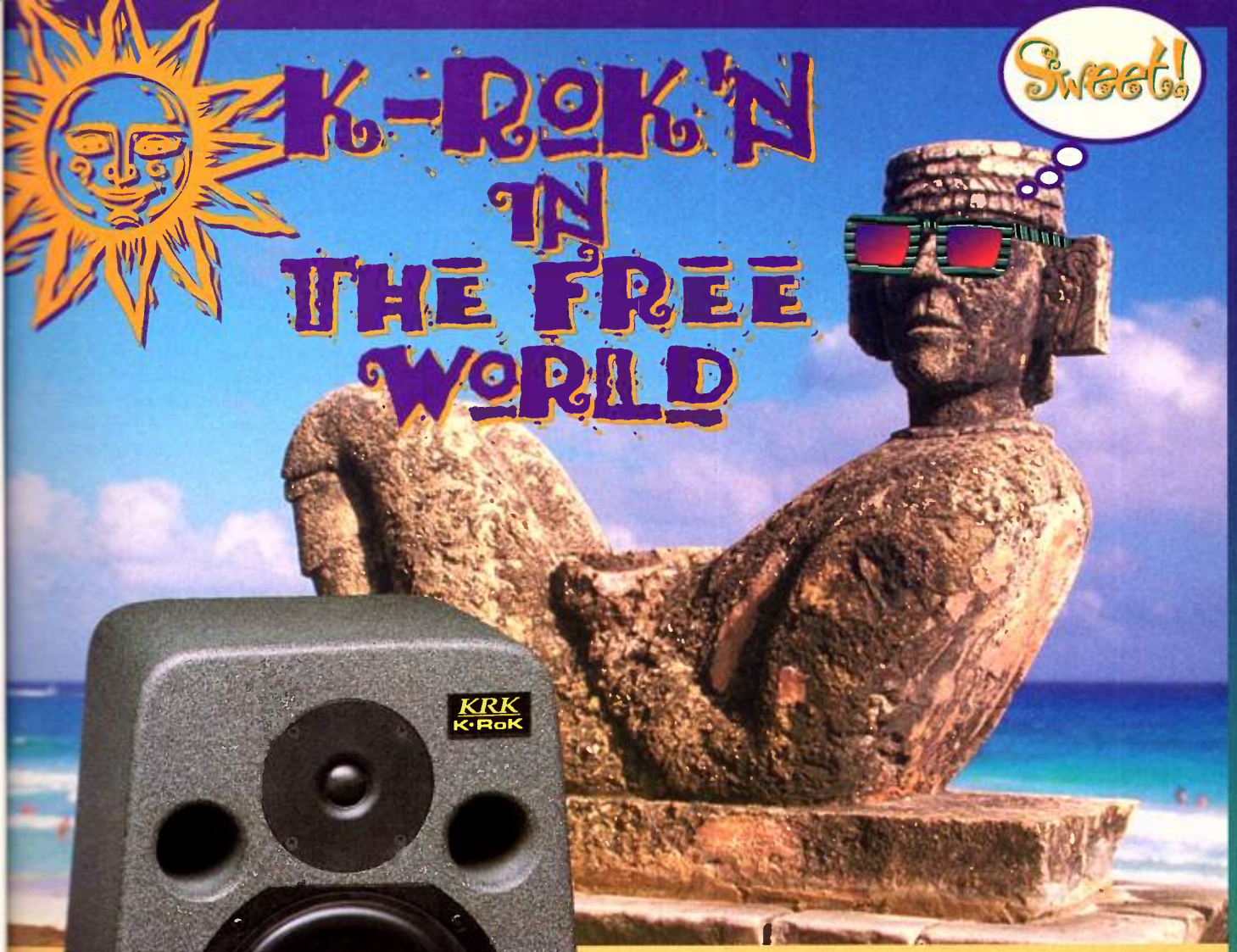

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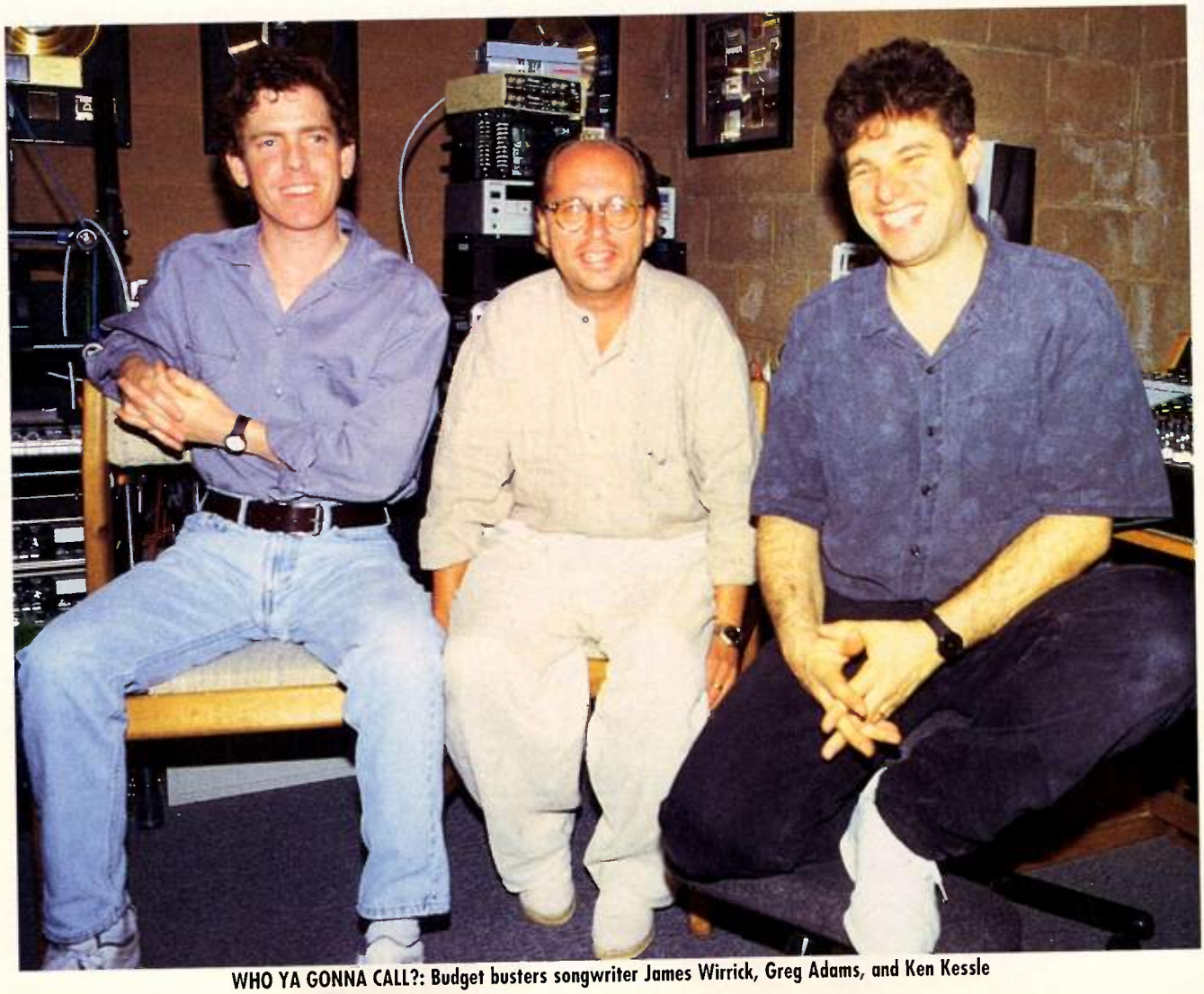
Budget Busters

Working on a budget doesn't mean sacrificing quality. Here's how to get that big-studio sound in your own room.

BY MAUREEN DRONEY

Most of the time engineer/producer Ken Kessie (En Vogue, Tony Toni Tone, Celine Dion, Bel Biv Devoe) works on big consoles in big control rooms for artists with big budgets. But, as he says, "Sometimes less is more!" and one of his recent projects was done in a different way. For this one, Kessie collaborated on a mostly instrumental album with arranger and trumpet player Greg Adams of Tower of Power fame. Long recognized as the creative force behind the Tower of Power horn section (the group that has for 20 years asked and answered the musical question "What Is Hip?") Adams is now embarking on a solo career. For this project Kessie coproduced, programmed, recorded, and mixed, along with cowriting six of the songs. But the album was slated for a small budget, and Kessie knew from the get that a large part of the funds would go to pay expensive, double-scale musicians. Thus the challenge: world-class sound on a project studio budget. Here's how they did it.

According to Kessie, the first step in any limited funds project is to plan; then plan and plan again. He had long discussions with Adams, debating on how each track was to be approached. Would they be live, or sequenced? How many live musicians, how many sequenced parts? How many tracks



WHO YA GONNA CALL?: Budget busters songwriter James Wirrick, Greg Adams, and Ken Kessle

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were required for the crucial horn sections? How many soloists, and what about the live string section? Says Kessie, "When I had enough information, I worked out a budget, a recording plan, and a schedule. The budget went to the record company, the schedule went to all the musicians, and the recording plan went like this:

"Because I wanted to mix in an expensive, automated studio, I had to record for cheap. Being a songwriter, I have my own project studio. It's equipped with Mackie boards and a combination of project studio gear and the professional outboard gear that I keep in a portable rack that travels between all the studios that I work in. As I already owned one Alesis 8-track, the obvious answer to the recording format question was more ADATs. A couple of phone calls later, I figured that a two week rental of two more ADATs was much cheaper than a purchase, so that's how I went. To save money, I decided not to rent a BRC [ADAT Big Remote Control], and instead I put those dollars into renting some high-quality API (560) equalizers.

"I also installed Monster Cable products between my instruments and the ADATs. I'm always very conscious of the signal path. In fact, every instrument went directly into the ADATs without using the console bus outs unless I needed to mix multiple sounds together. I firmly believe one of the keys to great sound is short signal path. It's a simple but important concept. Whenever possible, go directly from your sound source to your multitrack machine. If you can bypass the dozens of connections, components, switches, and patch cords in the typical recording chain you have a fighting chance of keeping some life in your recordings. Religiously remove anything that is not absolutely necessary between your instrument and the recording tape!"

Of course, not everything went directly to tape, and some instruments needed added gain, compression, EQ, or gating. When straight gain was needed, Kessie used a Neve 1073 mic/line EQ unit. For compression, he had a choice of three units: a vintage dbx 160, a UREI LA3A (modified by Ken for additional high end), or a more modern dbx 160X. For EQ, he used the Neve module or the rented pair of API graphics. He comments, "The Neve was great on sounds that needed more guts or power, while the APIs are very smooth and retain all of the character of the original sound." Gating was handled by some Valley People Dynamites. Admitting that they are not the fastest gates available, Kessie told us he finds useful their added feature of gain control, which allows him to set perfect levels while cutting out any unwanted noise or crosstalk. Claims Kessie, "If you can print with no noise to digital tape, your stuff stays quiet forever."

Always treat your demos as masters and sync them properly. I know you've all heard this before, but it's true!

All the songs but one began as sequences on a Macintosh IIcx with Performer software. SMPTE was laid on track 8 of ADAT #3. While the ADATs don't need SMPTE to lock up, Kessie knew he would need it for any 24-track slave reels, and for final mixing with SSL console automation. The Aphex Studio Clock was used as a SMPTE-to-MIDI converter, and there were no problems with code at any time in the project. SMPTE was printed to the ADAT at –15 (on the ADAT meters), but Kessie suggests you experiment to see what works best on your own system.

Drums were recorded first, coming from his custom Akai S-1000 samples or from his favorite drum machine, the Boss DR 660. "Don't let the Boss name fool you," Kessie says. "This machine hits hard, grooves well and is small and light. It fits into one of my caveats, 'More sounds for less pounds!' " Bass drum, snare, and toms were laid as hot as possible without going into the red on the ADAT meters. Later, he found that those sounds transferred perfectly to the analog multitrack, politely hitting "0

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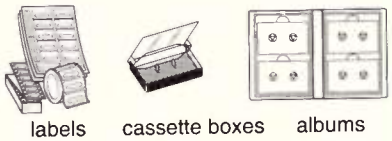

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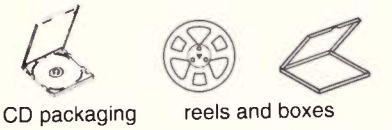

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WORKHORSES: Kessie's ADAT/Mackie project studio combination did a lot of the work on Adams's album.

VU" on the Studer meters. Other percussion sounds, (hats, shakers, tambourines, etc.) went to the ADAT at about –15. Accustomed to cutting highly transient percussion instruments at those kind of low levels on analog 24-tracks, at transfer time Kessie discovered that these sounds had been recorded too low, showing up at –15 to –20 on the analog machine meters. In the future he plans to record his ADAT percussion at about –8.

Synth basses were next. Continues Kessie, "Almost all of the bass tracks were recorded through the Neve Preamp/EQ, which tended to make them both fat and present. Slight boosts at 100 Hz and 1.6 kHz usually did the trick. When I wanted the basses to punch more, I would use a dbx 160, with a 3:1 ratio. When I wanted more growl, a dbx 160X would remove a little attack and add fullness. I also laid the basses as hot as possible, and it was here that I made my biggest mistake of the project. Because bass signals have very little transient or peak energy (compared to drums, etc.), when my bass sounds were transferred to the 24-track analog

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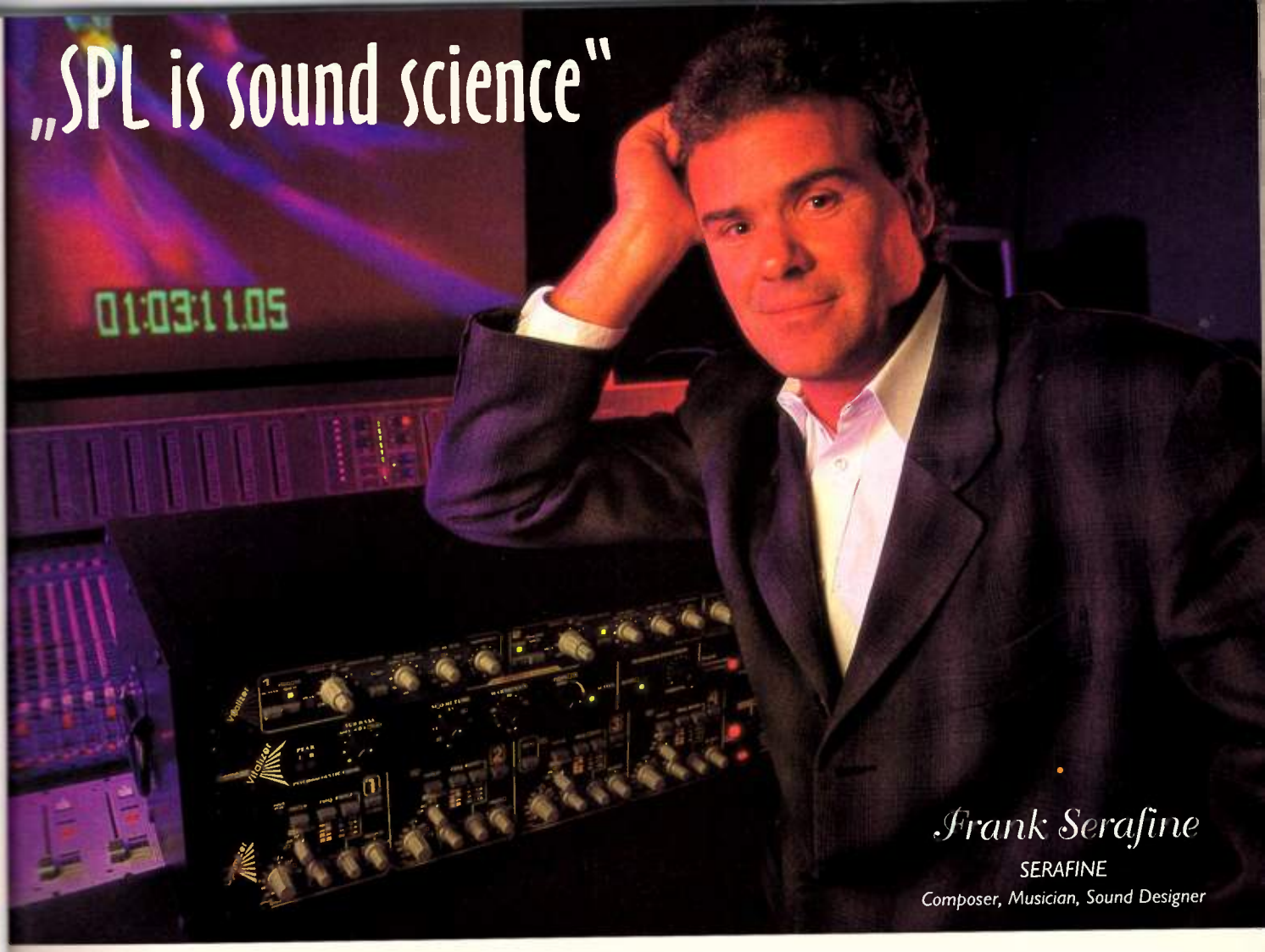

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World Radio History

they were slamming, with levels running off the scale. I suggest recording the bass with about 5 dB of headroom on the ADAT meters. Then, if you ever transfer to analog you'll be OK."

Single keyboards went straight to tape, while MIDI stacks were mixed through the Mackie 1604. Keyboards needing EQ were touched up using the API graphics. Keyboard parts were laid with about 3–5 dB of digital headroom to avoid overloading the D-to-A converters of the ADAT with the complex overtones.

According to Kessie, the real fun was horns, almost all of which were recorded in his basement studio. "I used the Audio-Technica 4033, a Mackie mic preamp, no EQ, and a UREI LA3A for some soft compression. Muted trumpets used a Shure Beta 57 in the same chain. On three of the songs, we decided to use the horns from the original demos and wanted to transfer them to the master takes. However, we found that even though the masters were recorded at exactly the same tempos as the demos, there was noticeable drift within as little as 2 bars of music. By monitoring the drums from both the masters and the demos at the same time I could hear distinct phase shifting when the tapes were in sync. For this part we rented a BRC, and by constantly changing the offsets I flew the horns across one phrase at a time. Another lesson learned: always treat your demos as masters and sync them properly. I know you've all heard this before, but it's true! You never know when the demo will have some unbeatable performance that you will want to keep."

By now, 90 percent of the album was recorded. Due to lack of soundproofing, some things couldn't be recorded at the project studio and the three ADATs were taken to Sunset Sound in Hollywood and transferred straight across to 2-inch 24-track Studers. There they recorded the one live rhythm track. The one lead vocal track and Luis Conte's live percussion were recorded at Pacifique Studios in North Hollywood. Kessie chose 15 ips with Dolby SR for his analog format for a number of reasons: he saved money on tape and was able to contain the entire project on three reels of 2-inch tape; he preferred the fatter bottom end that 15 ips has over 30 ips; and he felt that Dolby SR would preserve the digital dynamic range and transparency of his basic tracks.

Having saved so much money on the recording side of the project, Kessie and Adams could afford to mix at Skip Saylor Recording, a world class SSL "mothership" studio. There they were happy to find that, because of the care taken in recording, many tracks required no additional EQ in the final mixes. Ken relates, "Much of the time was spent creating the perfect ambience for Greg's solo horn lines. I often used a combination of the t.c. electronic M5000, and the Boss SE-50 for reverb, with an Ensoniq DP-4 for pitch change." The mixes were printed to 1/2-inch with Dolby SR, and to Apogee-converted DAT at 44.1, with final mastering being done from the analog 1/2-inch. As is his custom, Kessie made alternate mixes with solo horns 1 dB louder and softer, finding it much easier to have them socked away "just in case" rather than doing a recall if a change is desired.

Concludes Kessie, "So now I know it works. The marriage of project digital multitracks and big-time commercial studios can work like a charm, and you don't need a big budget to sound like you had one. Good planning, good recording, and hopefully some good songs. See ya on the charts!" EQ

ROOM OF RACKS: Kessie's rack consists of many effects that added warmth to the recordings.

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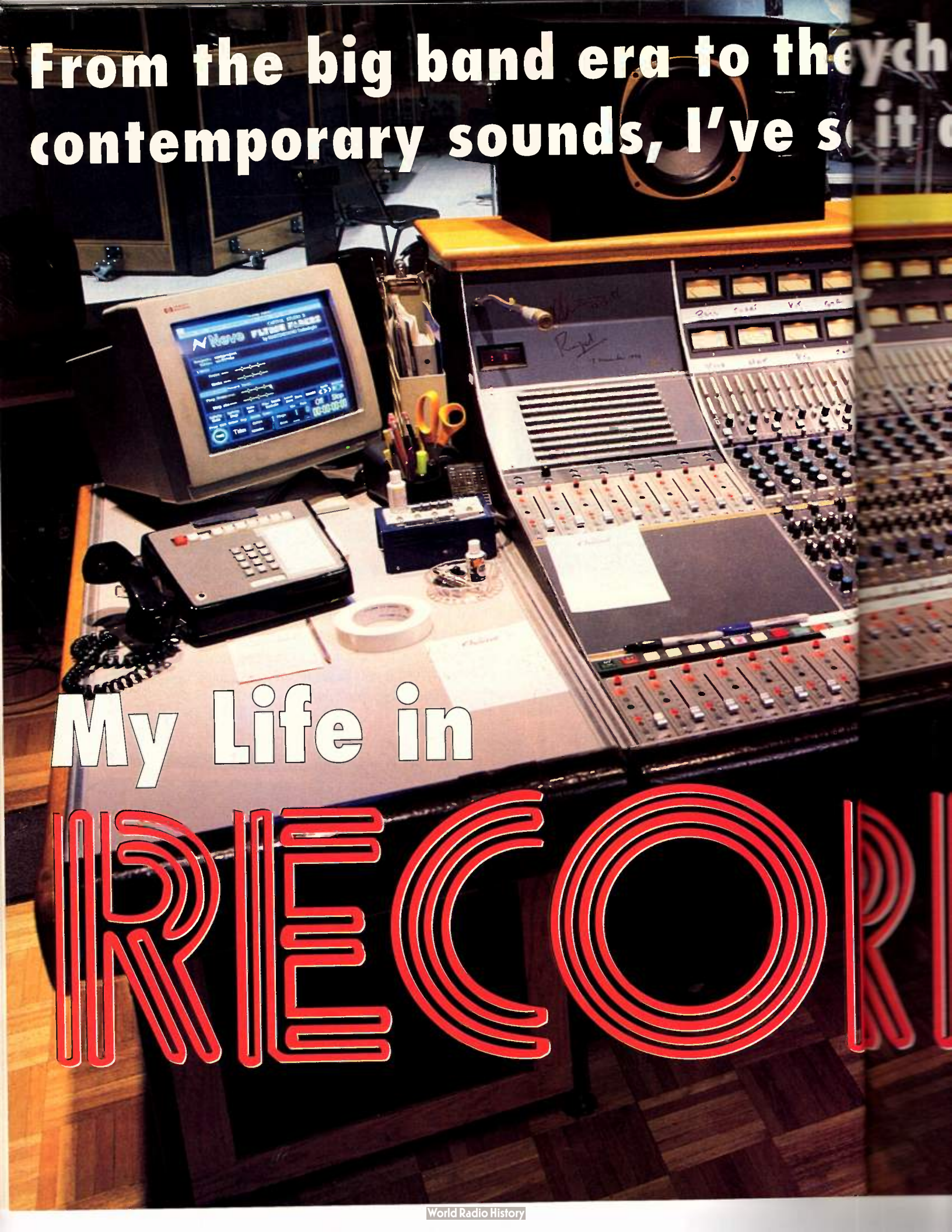

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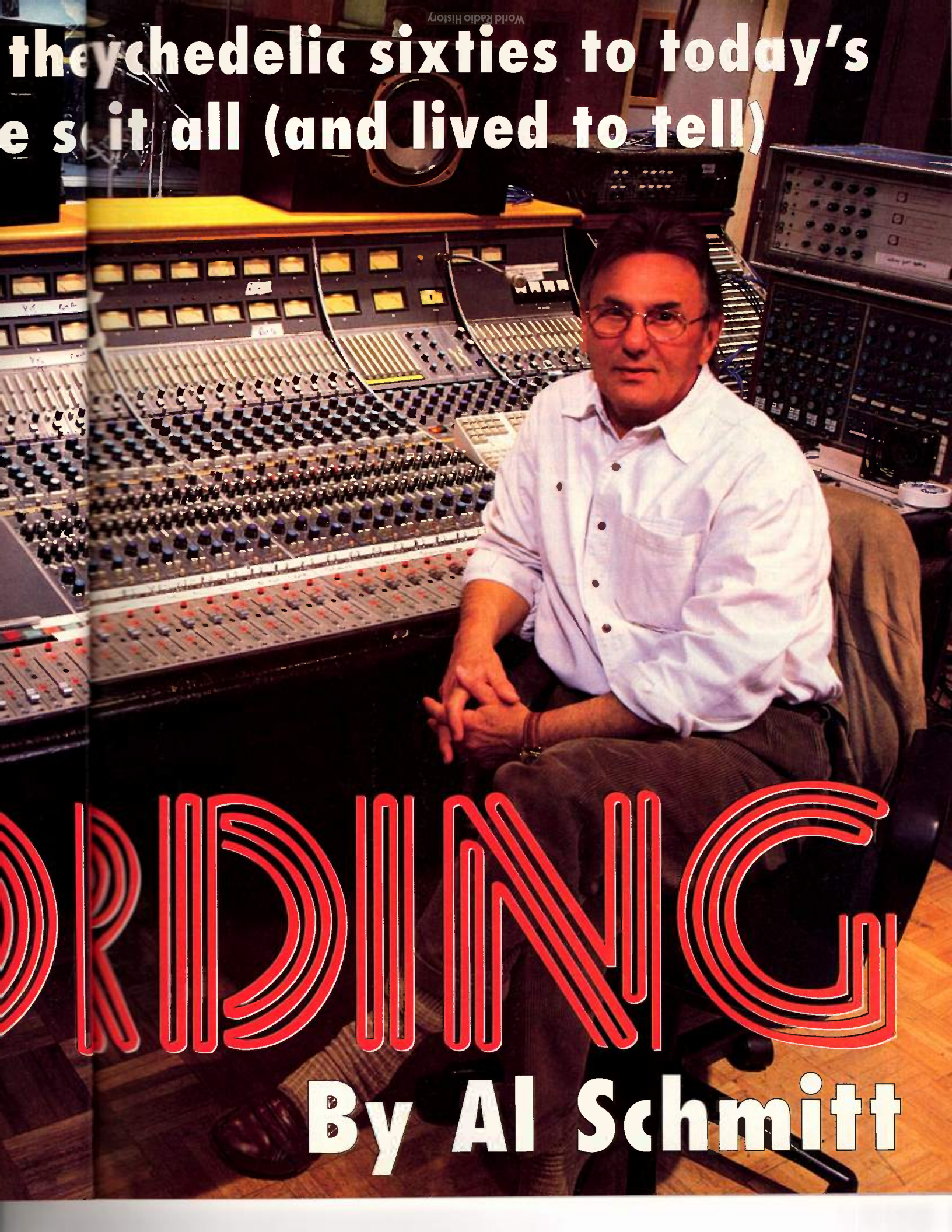

ORDING

By Al Schmitt

MY LIFE IN RECORDING

I've been in recording studios since I was seven years old. I had an uncle who owned one of the first independent recording studios in New York City, and as a child I used to go over there all the time. He'd have me sit and clean patch cords while they were recording. Guys like [Jazz pianist] Art Tatum would come by and teach me little boogie-woogie licks on the piano. So as a kid I got to hang out with a lot of musicians — which was great. In those days the engineer would record with one mic and would move the musicians around to get a balance. This was even before tape machines. The musicians would have to take their shoes off because you could hear their feet stomping on the studio floor. I was always wide-eyed and awed by it all — I never thought I could get involved with it. The equipment was so delicate that I thought you had to be a Swiss watchmaker to deal with it.

THE FIRST RUN

When I got out of the service, my uncle called me and told me that he had a friend who owned a recording studio and was looking for someone to break in as an assistant. At this point I had no technical experience in audio — only what I had seen as a child. I wasn't sure that this was what I wanted to do for a living, but my dad and I talked it over and we decided I'd give it a try. If I didn't like it I could always go back to college and do something else. So I went to the studio, Apex Recording Studios on 57th street in Manhattan, and took a job as a runner. I'd make coffee, clean up — all that kind of stuff. The head engineer there was Tommy Dowd. Tommy had started there about nine or ten months before I did. My hours were from nine to six, but I remember on the first day they were doing a date and I stayed until midnight. Everyday I'd stay there from 9 a.m. to midnight. I got myself a notepad and I drew diagrams of the setups — which microphones were used, how the engineers set up and placed things, how they layed out things on the board, and so forth. Watching Tommy was an incredible experience and he taught me a lot about recording.

After about six weeks I was upgraded and allowed to do what they called "demo records." On Saturdays (and sometimes Sundays) people would come in and demo their songs. Usually it was just piano and voice. We would do it directly to disk and they would have the disk when we were done. There were a couple of cutting lathes and turntables in the control room. We also had a wire recorder and a tape machine called a Brush Sound Mirror — this was just before we got our Ampex 300. Three months into my career I was working on a Saturday and we had a bunch of demos booked.

I did two or three of those and then at two o'clock was something marked "Demo/Mercer Records." At around 1:30 these guys started coming in — musicians with horns and all this stuff, and I was starting to freak. There was no one there at the studio. So I said to these guys, "Well there is a mistake here — I am not qualified to do this." I tried to get Tommy and my boss on the phone but it was Saturday so I couldn't reach anyone. To make a long story short it was a big band and it was Duke Ellington's band. So I went to my book, looked at the set up diagrams, and I set everybody up. This date was for Mercer Records, but Duke Ellington was signed to Columbia at the time so he was not allowed to play piano on the session (Billy Strahorn played piano). Duke sat next to me and I kept apologizing and saying "I've never done anything like this before. I'm not qualified. I'm in way over my head." Duke kept patting me on the leg saying, "Don't worry son, we're going to get through this." We did two sides and it came out OK. It certainly wasn't the best record I ever cut, but it came out all right. That was my first record. I got thrown in, and if I had time to think about it I might have had a coronary. But it came on me quickly like that and I didn't have a chance to run away and hide. I had to do it and I did it. I think I was 19 years old at the time.

We did a lot of work at Apex for a

Photo courtesy of the Michael Ochs Archives.

THE GREAT MANCINI: Of all the people Schmitt has worked with, composer/pianist Henry Mancini stands out from the rest, being, as Schmitt puts it "a gentleman."

World Radio History

Photos by Ed Colver

guy by the name of Bobby Shad, who had a label called Sittin' In. And the idea was that it was sitting in with James Brown or Lightning Hopkins or whoever. He did a lot of what were known as "race records" in those days — R&B records. Bobby liked me, so one day I was the only guy available and I wound up doing a session for him. Then he started using me all the time. Bobby produced for Mercury and later on he had another label called Mainstream.

HITTING THE ATLANTIC

Tommy (Dowd) and I did a lot of dates for Atlantic Records, which, at the time, consisted of Ahmet Ertegun and Herb Abrahmson. They were kind of a fledgling label. I remember coming in and doing two records with The Clovers; "Don't You Know I Love You

AL SCHMITT IN THE '90S

While Al Schmitt is certainly well known for the projects he has done in the past, the man is definitely not letting up. When *EQ* spoke to Al in early April of this year, he had just finished mixing an album with Marilyn Scott. In the past year he engineered albums for David Sanborn, Dr. John (says Schmitt, "It was Dr. John with a big band and it reminded me of the early recordings I made for Ray Charles"), and Quincy Jones. His up-and-coming projects include producing the next Diane Schuur album and engineering for John and Bonnie Raitt, as well as a special project that is still in the discussion stages.

EQ asked Al if he thinks he will slow down and here is what he had to say: "I'll keep working until somebody says to me, 'Hey it's time to go home.' I'm having way too much fun and I love doing it. I'm a work addict and it's not only making the records, but it's also that all my friends are in the business. I love being in the studio with my friends. Musicians are my favorite people. When the phone doesn't ring anymore, that is when I'll stop doing music. When nobody calls me, that's when I'll stop." —*Steve La Cerra*

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So" and "Skylark." We did them in about 45 minutes and it was a big hit record for Atlantic. It was probably my first hit record. I would hang around when Tommy was doing dates because he was cutting a lot of the big artists and making a lot of hits like "If I Knew You Were Coming I'd Have Baked A Cake" by Eileen Barton for National Records. We also did a lot of jazz and bebop records, which was great because that was what I grew up on. All of a sudden I was working with all my idols like Dizzy Gillespie and Charlie Parker. It was really amazing. They were recording for Atlantic, Prestige, and Sittin' In, so I started building a relationship with these people.

About two years into my career, Apex folded up and I started working for a place called Nola Recording. This lasted about a year until I got a call from someone at a studio called Fulton Recording Studios. Tommy Dowd was working there as well as at Atlantic in their studio. I went for an interview and I got the job. So I worked over there with an engineer by the name of Bob Dougherty who was another major influence on my career. He did all the big MGM dates. We had a pretty large studio, so we were doing a lot of orchestra dates and I learned how to record French horns, woodwinds, and the instruments of the orchestra. Bob and Tommy did most of those dates and then I started getting into it. I also did a lot of jazz things there like the Modern Jazz Quartet and Chris Conner. In the meantime, I was also doing dates with Gerry Mulligan/Chet Baker and Bobby Brookmeyer/Jim Hall for Dick Bock at World Pacific Jazz. My reputation was building, and I was keeping busy.

We were all on staff salaries in those days, working three or four sessions a day. I was doing Tito Puente, Tito Rodriguez, Machito, and a lot of stuff for Tico Records. I was recording all kinds of music and it was just a fabulous experience because I was not set in a mold. I learned how to do everything from a marching band to religious music. I was totally in love with what I did. Everyday when I was on the subway going to that studio I was thanking God. I couldn't believe they were paying me to do all this fun stuff! It was nerve-racking at times and a lot of work, but just the fact that I was working everyday with people that were my idols was a major thrill.

GO WEST YOUNG MAN

After being at Fulton for a while Dick Bock called me from California and said, "Al, I got you a job in a studio out here that is the best studio in California: Radio Recorders." I worked at Radio Recorders doing all kinds of hits. Bones Howe and I did the Henry Mancini *Peter Gunn* album, and I did a bunch of records for Connie Francis and Jesse Belvin. RCA did not have their own studio so they did a lot of work at Radio Recorders. I worked a lot with Dave Pell and Thorne Nogar. Thorne was the guy who was doing all the Elvis Presley records and I learned a lot from him. He was great and also a big influence. Bones and I were young guys, people liked us, and we were getting great sounds. We had a lot of fun.

Then, in 1960, RCA decided to open up their own studio in California, and since I was doing almost all the dates for Mancini and other RCA artists, I was the first engineer they hired. RCA was on the corner of Sunset and Vine — it used to be the NBC Building. We took over two studios and made them into recording studios. They were probably two of the

SCHMITT TALKS HARDWARE

I was always aware of the progression to better recording equipment. Around the time I graduated to producing they started bringing in the old Neve boards, and they sounded great. Most of the boards I worked on were either custom-made or Neve boards with good preamps. I listen to some of the records I made 30 years ago and they sound as good or better than some of the things I'm doing today. It's careful mic selection and good tape machines. Sometimes I will do what Bruce Swedien does — record the rhythm section on analog tape and then bounce it over to digital for the overdubs. In general I prefer analog tape. If it's something that's got a lot of dynamic range I might use analog tape with Dolby SR. When I mix down I use half-inch 3M 996 tape, +5 at 30 ips.

When I was working at RCA in the '60s I had everything I wanted. If there was a new mic out and I said I wanted to try it, I had four of them the next day. RCA was just fabulous and I was always one of these guys that wanted to try the new stuff that was coming out. I think that what really changed recording was when we started getting into multitrack. I remember when we got to 8-track — we were all standing around going, "What are we going to do with all these tracks?" Then when it came to 16-track we were all thinking, "Oh this is ridiculous. Who is ever going to use 16 tracks? What would you use them for?" Now I'll go ahead and lock up two 48-track machines!

Some of that old equipment we still use today, like the Fairchild limiters and the tube microphones. I still use AKG C-12's and Telefunkens all the time. I use mostly tube microphones on my dates. The thing about the old tube mics is that you had to pair them up. When I was at RCA I had all these mics and I knew which mics sounded alike and which ones sounded different. I'd have maybe five tube Neumann U47's, and two would sound a little brighter from another pair and those would be different from the fifth one. I had them all numbered and knew which ones worked well on which instruments. I used a lot of Neumann M49's and M50's in those days. I knew which ones to use to achieve my sound. My equalization came from my technique of where to put the mics and which ones to use. EQ had to be patched in, and when I started we had one equalizer. You had to equalize everything — if you used it, you couldn't EQ individual microphones. So if I put up a mic and it wasn't bright enough I would change it for a brighter microphone. That is how I changed my EQ.

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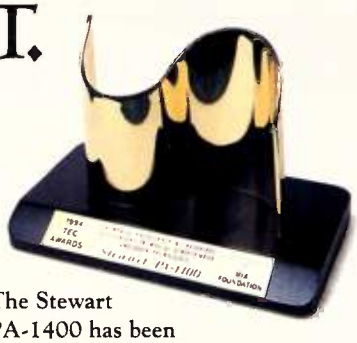

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best studios I have ever worked in. All the great Mancini stuff was done there, including *Hatari, More Music From Peter Gunn* and *Mr. Lucky*. I had done some work in the smaller room with Elvis on *GI Blues* when he got out of the service. At this time we were starting to record in stereo as well as mono. I was also doing albums with Ray Charles and Betty Carter. Around 1962, I did *Hatari* and that was when I won my first Grammy. [*Scmitt has won six more Grammys since then. —Ed.*]

BURNING THE MIDNIGHT OIL

At that time, I was so busy I couldn't do any more work. I was the main guy at RCA and I was working from nine in the morning until midnight, six days a week. People I didn't even know were calling, saying they wanted to book the studio, but they had to have me. There was one guy that I didn't know from Adam and he insisted the only way he would book the studio was if I could do the dates. I wanted to get a little time off and let some of the other guys do some work. But he insisted and insisted so finally I said I would do it. Dave Hassinger (my assistant in those days) and I got a hearing aid and I put the hearing aid on. This guy came walking in and started talking to me and I made believe I couldn't hear him. Then finally I turned and hit the volume on the hearing aid. In those days they were big, cumbersome things. So I said, "OK, now it's working," and this guy turned snow white. I thought he was going to run out of the room and I finally had to take the thing off and tell him we were only kidding. I wound up doing the session.

I think it was a blessing to the engineers that were recording back then to record everything at once. Whatever you put up is what the record sounded like. When we were doing mono and 2-tracks you learned to balance things quickly. We would do four songs in three hours. You had to learn the arrangements and had to be able to follow charts. You had to be musical. You had to know when the vocalist was going to get loud so you could hand-limit and tuck it back. You also had to learn how to keep everything on meter so things weren't pinning all over the place. I get some tapes that I'm asked to mix nowadays and when I put them up I can't believe the levels. We had to get it right the first time and without distortion. Most of the time we'd get a run-through. Usually on the first run-through I would stand next to the conductor in the studio and listen. Then on the next run I'd go into the control room and get my balance, and by the third time through we were off and running making takes. You had to be on top of it.

A BIG PRODUCTION

I got to a point where I was working my tail off at RCA, and then I got an offer from Bill Putnam who owned Universal Studios (not the film studio) for a lot more money. I wanted to get into producing because a lot of the producers I was working with would come into the studio and use me and while I was making the records they

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would be on the phone. They were doing nothing and getting the credit for producing all these records and the engineers were doing all the work. It wasn't always the case — there were a lot of great producers — but in many cases it was true. I decided that was where the money was, so I told Steve Sholes (my boss at RCA) that I had an offer for another job and would leave unless I got promoted to the production staff at RCA. So I got promoted to the production staff — and took a big cut in pay! But I started making records and made a bunch of hits right off the bat. I was doing Jefferson Airplane, Eddie Fisher, Sam Cooke, and The Limelighters. I had a roster of eight or ten artists and most of those artists had three albums plus four or five singles a year, so I was jammed.

While I was a staff producer at RCA I was not allowed to touch the board. The union was so strong that for about five years of my career I did not do any engineering at all. What bothered me (and I had some really good engineers working with me at the time) was that by the time I told them what I wanted I could have reached over and done it myself. I used to get turned in all the time because the union guys would come in and see me reaching over and doing something. I was always being brought up on the carpet for meddling and getting in the way.

At one point I called my boss in New York and I told him it was too crazy. I was doing Eddie Fisher in the afternoon from 2 p.m. to 5 p.m. and Jefferson Airplane from 8 p.m. until 4 or 5 a.m. I'd go home to sleep a while and then I'd get up and come in to do paperwork and all this other stuff. I finally said I can't do it and I quit. RCA told Jefferson Airplane to find another producer, but there was no other producer at RCA that they wanted to work with. RCA said, "Fine you can use an outside producer," so the band called me. I made more money producing that album than I had in the prior three years before. So I thought I had made the right step.

That was my start as an independent producer and I was really nervous about getting enough work because I had a family to take care of. Jackson Brown and I became good friends so I produced *Late For the Sky* with him. It was very successful and I kept busy. Tommy LiPuma was a partner at Blue Thumb, and he asked me to mix an album he was working on. I said "Gee, Tommy I haven't sat at a board in five years. I don't think I can do that." So we made an agreement that if it wasn't working he'd let me know or I'd let him know and we'd just stop. It was Dave Mason's *Alone Together* and it came out fabulous. While I was mixing it I realized that this was why I was in the business in the first place. This was my love so I started doing more and more engineering. The money wasn't as good as producing, but it was my first love.

I wound up working with Tommy again on George Benson's *Breezin*, and that was my second Grammy. Then I mixed a few things on the *Aja* album with Steely Dan and won my third Grammy. My fourth Grammy came when I worked with Roger Nichols on Steely Dan's "FM." My fifth Grammy came when I did all the tracks on *Toto IV*. That was such a great record and we knew it was special from the first moment — those kids were such great players. When I did the "Unforgettable" record with Natalie Cole I won my sixth Grammy.

THE STAND OUTS

There are two artists that I worked with who particularly stand out as being really special. The first was Sam Cooke, who was brilliant. He knew exactly what he wanted to do in the studio. It was like fishing in a barrel. We had so much fun together in the studio. We

TALKING MIC TECHNIQUE

Probably the most important thing you can do when recording an orchestra is to stand in the studio next to the conductor during a run through. With a good conductor, you'll be able to hear what the arrangement is all about. I usually have the orchestra set up in the symphonic arrangement — first and second violins on the left, woodwinds and violas towards the center, French horns to the right of center, and low strings (celli and basses) on the right. You have to use high-quality mics. I like to put up a pair of Neumann M50 (tube condenser, cardioid pattern) mics about 15 or 20 feet over the conductor's head, spaced about four or five feet apart. These mics get recorded to separate tracks and most of the sound will come from this stereo room feed. Most of the time the orchestra is recorded all at once, but once in a while, we might overdub the brass or the strings to get a little less leakage. But that leakage makes the orchestra sound big, so a lot of times you want it in there.

In addition to the stereo feed, I spot-mic the different sections of the orchestra — but not too close. I'll put a couple of Neumann tube U47's on the basses, tube U67's (set to omni pattern) on the violins or KM-84's on the celli, and U67's on the trumpets and trombones. Sometimes I might use some old RCA 10001's on the trombones. Alan Sides has a great collection of hard-to-find mics that he lets me use.

I don't like to get too close to these instruments or I'll lose the leakage and that's what makes it sound natural. Also, if you get too close to the strings you get too much of the bow sound, so I like to keep the mics at least 10 or 12 feet away from the strings. Sometimes I will put a gobo behind the French horns to get more reflected sound and then use the Neumann M49's to mic them. For percussion, I'll use an AKG 452 or one of the Schoeps or B&K mics. The spot mics are all recorded onto separate tracks, but the stereo feed makes up most of the sound. I use the spot mics to accent certain instruments or maybe fill a hole in the sound from the room mics.

The secret to getting a good orchestra sound is using the best mics. My EQ comes from my mic selection, not EQ on the board, so if I need a different tone, I'll change the mic.

—Al Schmitt

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RECORDING

laughed and hung out and he was a friend as well as a brilliant talent. He sang like a bird. He had it all.

The other was Henry Mancini, who was a wonderful composer and always a gentleman. He had a great sense of humor and he always was appreciative of us. I remember sessions where the date was supposed to end at 11 p.m. and it was three minutes to 11. We already had the take, and Henry knew it, but he would say, "No, no we need one more." In those days if the session went one minute past the hour, all the musicians would get paid an extra half-hour overtime. So he would make it go until 11:02 or 11:03 and it was his way of saying, "Thanks guys." He was such a terrific, classy guy and he was fun to work with. You laughed, got quality stuff done, and had a great time all at once.

BUSY, BUSY, BUSY...

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continued on page 126

COOKING WITH SAM: Sam Cooke always knew exactly what he wanted to do in the studio.

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TUBE TECHNOLOGY

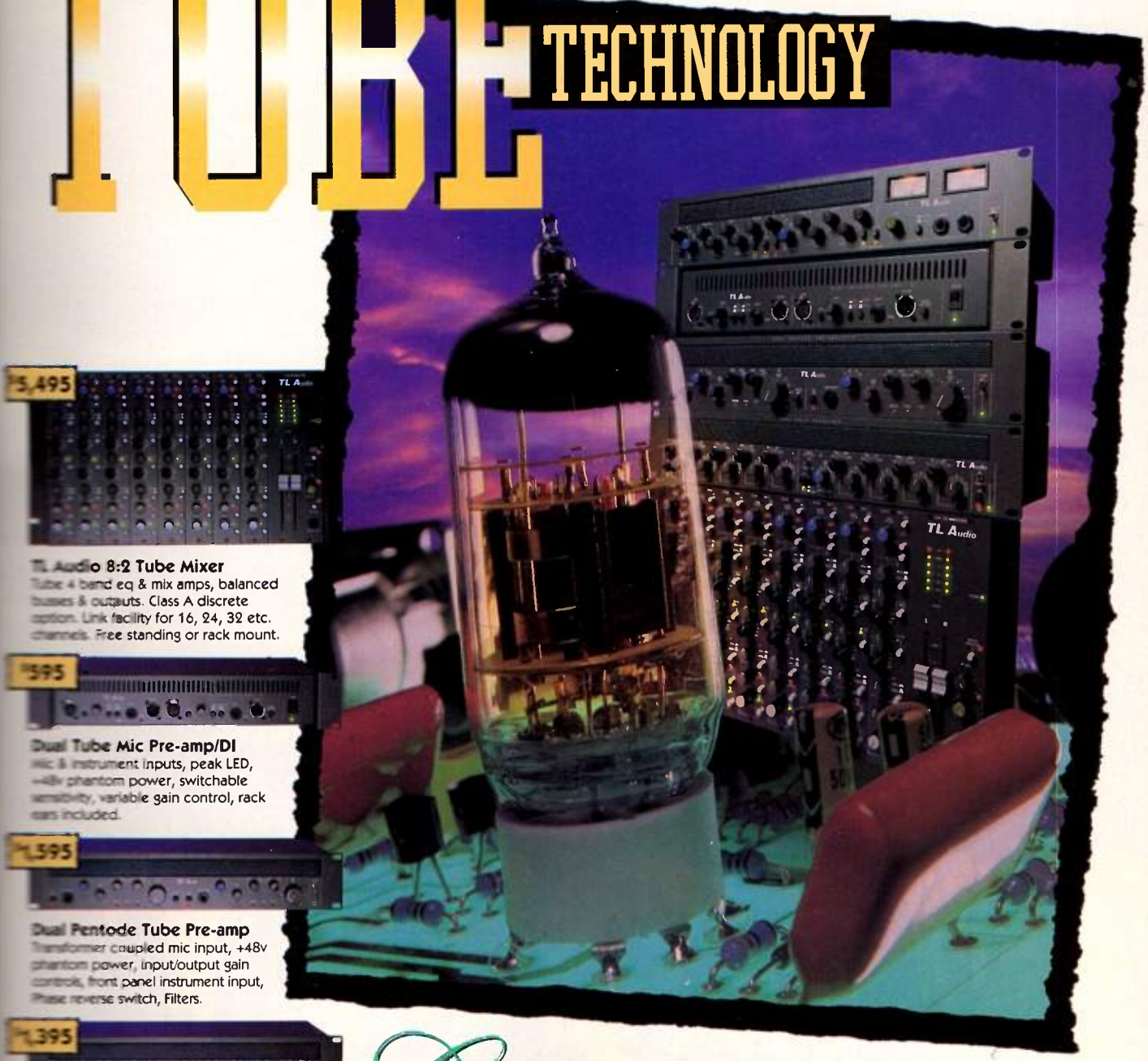

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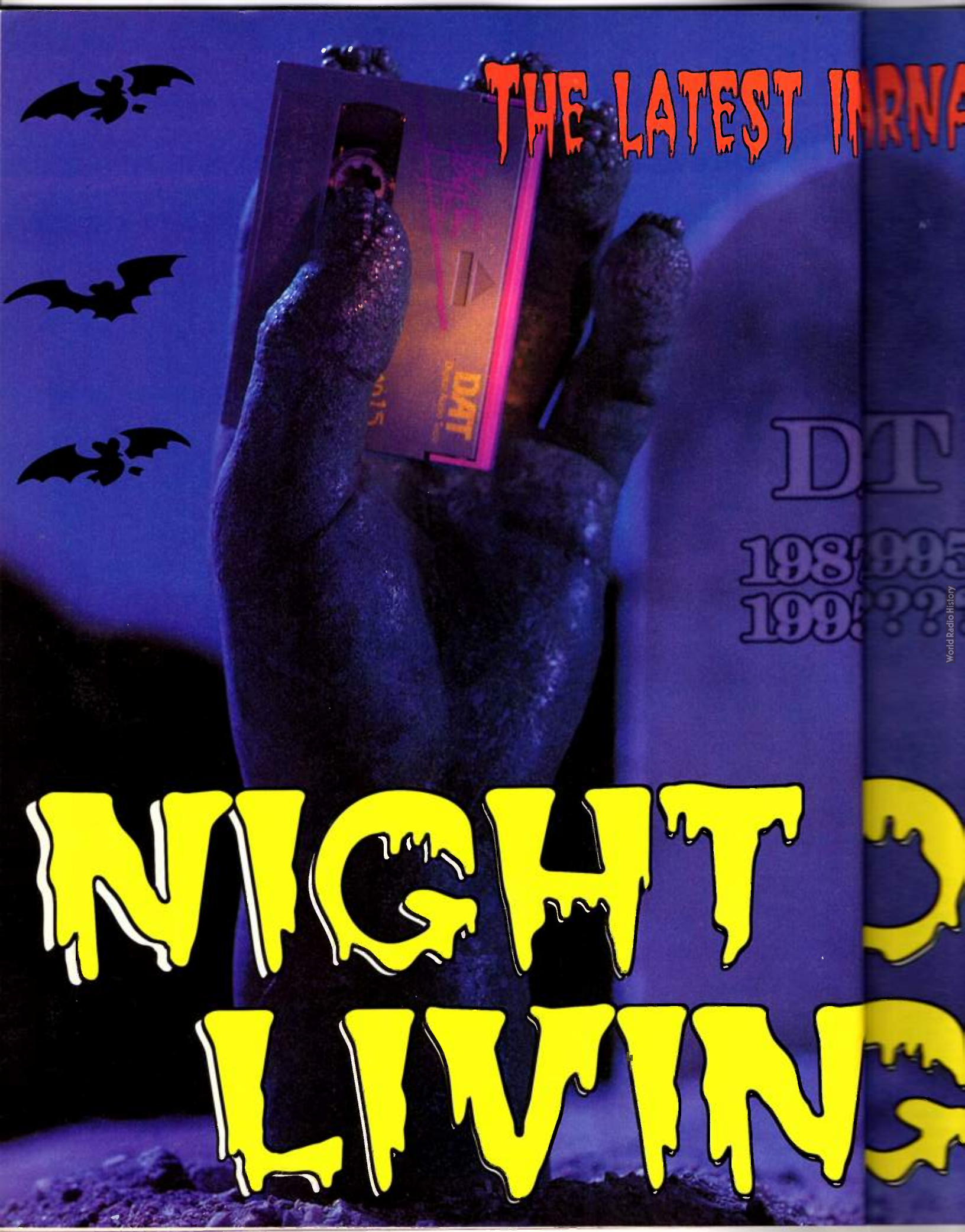
Photo courtesy of the Michael Ochs Archives.



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T INRNATION OF THE FORMAT THAT

WOULDN'T DIE

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OF THE

NG DAT

World Radio History

NIGHT OF THE LIVING DAT

DAT Won't Die

BY EDDIE CILETTI & CRAIG ANDERTON

DAT (Digital Audio Tape) has given the project studio the performance level of high-end analog gear (running high-end noise reduction) at a fraction of the cost. Although a good analog machine with Dolby SR exceeds DAT's dynamic range, it also exceeds the average project studio's budget. Granted, you can't get bitchin' analog saturation effects, nor splice with razor blades, but tube preamps can take care of the former, and bouncing DAT data over to a compatible hard disk recording system can provide better editing options than any razor blade ever could. DAT is now ubiquitous enough to be the format of choice for master tapes, and will continue to hold this position of dominance until recordable CDs become affordable enough for the real world.

DAT BASICS

A DAT recorder uses a rotating head system, much like a miniaturized VCR. Although DAT tape crawls along at a snail's pace, the rotating head design dramatically increases the effective tape speed. This provides the bandwidth necessary to record digital data.

The default DAT sampling rate is 48 kHz, but most pro DATs provide a 44.1 kHz sampling rate as well for compatibility with CDs. Professional DATs also have digital inputs and outputs (AES/EBU and/or S/PDIF). Because of DAT's consumer origins, DAT tape can be indexed with a great deal of precision; finding specific cuts or sections of tunes is easy.

While today DAT is firmly entrenched in professional audio, it went through a turbulent history to get there. Introduced in 1987 as the cassette's replacement, DAT's digital duplication abilities quickly ran into trouble with those who felt that "home taping is killing music." In fact, the RIAA (Recording Industry Association of America) threatened to sue any company selling a DAT recorder in the US consumer market.

The record companies then proposed a truly idiotic compromise: slash a steep notch in a CD's frequency response at 3.8 kHz, and include a chip in each DAT that, if it sensed a lack of energy in this band, would block recording. This outraged audiophiles, who could definitely hear the difference. Still, on March 25, 1987, the House Energy and Commerce Committee approved banning for one year the sale of any DATs without copycode chips.

Fortunately, the National Bureau of Standards found that the copycode system audibly degraded the sound, didn't work very reliably, and could be easily defeated. Unfortunately, even though copycode was repudiated, by this time DAT had been so delayed and surrounded by controversy that it was dead as a consumer medium — killed by an apathetic public and overly paranoid (many would say overly greedy) record industry.

PROJECT (STUDIO) DAT

In the studio, though, DAT found its niche. Eventually, consumer-style decks and shells mutated into pro-level gear, which continues to deliver unprecedented 2-track performance — and reasonable reliability — at a comparatively budget price.

In this feature, *EQ* looks at several new DAT machines with a particular eye toward ergonomics. Because of the nature of digital recording, DAT recorders don't exhibit the same number of variables as analog gear; the DAT mechanism has been refined to the point where models are fairly similar, and the sound quality pretty much depends on the A/D and D/A converters. Where decks do differ, though, is the feature set, responsiveness, and "feel." With that in mind, let's look at five hot DAT decks (products are listed in order of ascending list price).

Fostex D5

Fostex was one of the first companies to produce a studio-quality DAT machine, so the D5 comes with a pretty respectable lineage. Although the D5 is relatively basic, its classy "feel" belies the low cost, and there are some clever convenience features.

The D5 runs as you'd expect — fast forward, rewind, pause, record, etc. — with a twist: fast forward an unrecorded tape to the end, and the D5 automatically rewinds back to the beginning. This is ideal for those who precondition tapes by fast forwarding and rewinding them a few times. If material is already recorded on tape, and you fast forward beyond the last recorded section, the D5 indicates the error and rewinds back to the last recorded portion of tape.

The D5 is mechanically quiet (except in fast forward and rewind modes), which helps in an era of whirring hard disks and cooling fans. The DAT drawer has a solid feel and is especially fast at swallowing the DAT to get it ready for playback.

Although there's no shuttle/jog wheel, the FF and Rewind buttons are set up to provide something similar. If during play you hold the FF and Rewind buttons down for cue/review, the tape

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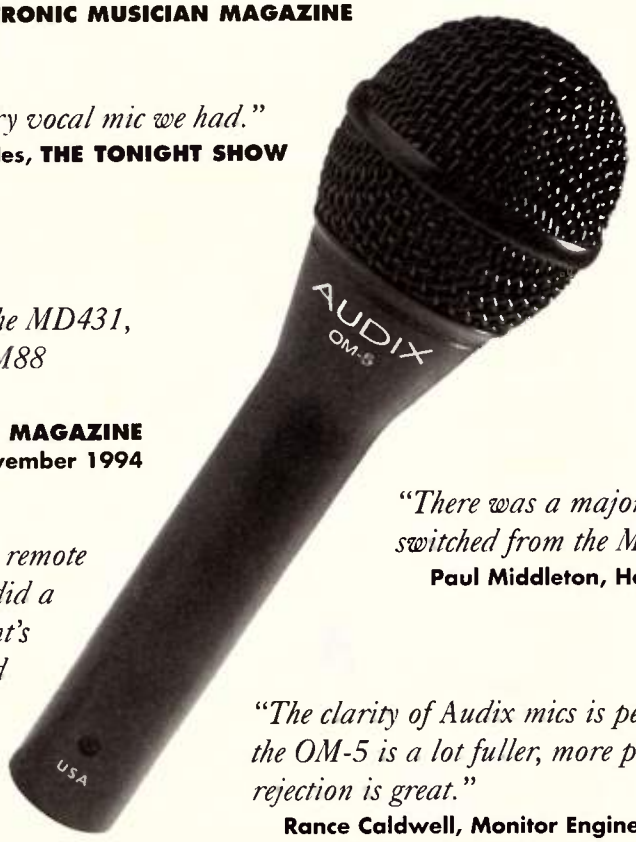

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FACTS ABOUT DAT

• The head drum on full-sized decks is 30 mm (1.18 inches) in diameter. The tape speed, 8.15 mm/sec (0.32 in/sec), is only about 20 percent that of the standard cassette (1.875 in/sec), but combined with the 2000 rpm head rotation, the effective speed is 3.13 meters per second, or 10.28 feet per second! (The tape is in contact with the drum for 90 of its 360 degrees.)

• The head drum on some portable decks is 15 mm (.59 inches). The rotational speed is the same as in standard DAT decks, but the tape is in contact with the drum for 180 degrees, and the effective speed is 1.566 meters per second or 5.13 feet per second.

• A 120-minute DAT tape (7200 seconds x .32 inches = 2304 inches) is 192 feet long. A 5-minute piece of tape is 8 feet long.

moves at 5X normal speed; press FF or Rewind during play then release, and the tape proceeds at 3X normal speed. If the tape is paused, pressing and holding FF or Rewind moves the tape at half normal speed. This really helps when zeroing in on a particular part of the tape.

When you want to hit a specific start point, the D5 can assemble a table of contents of the various index points; tell it to locate, and the D5 calculates where it needs to go (so it doesn't have to be reading the tape the whole time), then goes there pronto. This gives a maximum search speed of 300X real time.

The D5 also sports a somewhat cryptic, but nonetheless useful real-time error indicator. Press the error check button, and the display shows an error rate from 0–9 for each channel. This blocks out other counter functions, but is great for checking over a tape on playback.

The display shows the expected — total elapsed time, remaining time, program time, etc. — as well as time remaining to the next start point and elapsed time since the previous start point. Start numbers also allow for the usual functions: skip tunes, record start points manually, renumber start points, program the order of tunes, and so on. The latter works well for trying out different song orders.

While recording, a margin indicator flashes if 0 has been exceeded; there's also a record mute feature for recording silence. If you press mute while the recorder is paused, it starts recording silence.

The D5 allows for a 12-bit, 32 kHz "extended play" mode that doubles the recording time for a given length of tape at the expense of high-frequency response. The D5 can also record both A- and B-mode satellite broadcasts at 32 kHz, and for those into CD-R, the D5 can record Q codes from CDs recorded through the optical input.

The remote included with the D5 is compact, useful, and wireless — which is wonderful in terms of reducing clutter, but opens up the possibility of malfunction if other infrared sources are in the studio. If you're paranoid about this, there's a Wireless Off button. The remote is fairly nondirectional, although it needs to be in line of sight with the recorder.

The remote also provides a few functions that can't be done from the front panel. But you can't reset the flashing margin indicator remotely — a definite oversight.

Overall, this is a machine that feels and sounds more expensive than it is. Fostex gets a thumbs up for this one. —*CA*

EQ LAB REPORT

FOSTEX D5

MANUFACTURER: Fostex, 15431 Blackburn Ave., Norwalk, CA 90650. Tel: 310-921-1112.

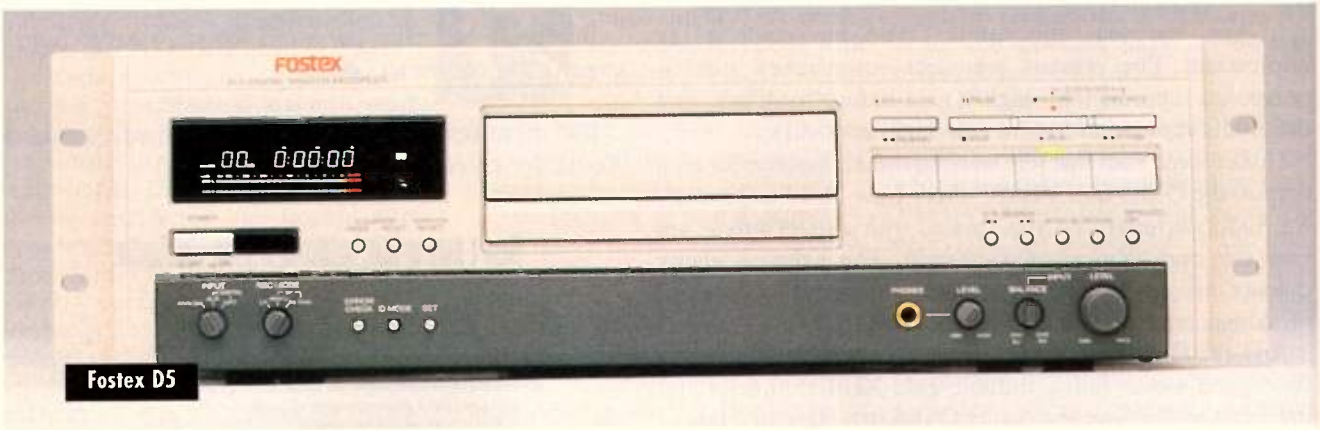
APPLICATIONS: Stereo recording for live or studio.

SUMMARY: Very solid feel and operation for the price.

STRENGTHS: Mechanically quiet; error indicator; wireless remote; real fast searches (after compiling a table of contents); coax and optical I/O; peak-hold metering; multiple cue/review speeds.

WEAKNESSES: No variable output level control; no unbalanced inputs; can't reset margin indicator from remote.

PRICE: $1495 **EQ FREE LIT. #: 126**



Fostex D5

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Bruce Schirmer
KGO Radio, San Francisco

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Tom Schizzano
Home & Studio Recording

World Radio History

TASCAM DA-30 Mk II

The original DA-30 helped break open the DAT market for project studios and boasted operation that wasn't much more complicated than a cassette deck. The Mk II version still lists for $1499 and is just as easy to use, but offers a number of additions (and a few minor deletions).

The most obvious change is a front panel concentric data/shuttle wheel. The data knob varies the parameter value in a selected field (for example, setting a Start or Skip ID number). The shuttle replaces the Cue and Review modes in the original DA-30 with more precise and controllable tape movement; rotate the wheel to move the tape forward or backward (you can still hear the audio while this happens), and alter the shuttle speed by how far you turn the dial. The maximum shuttle speed is considerably faster than what the DA-30 could do in cue/review modes. (Sampling fans will be pleased to know that the Mk II produces digital audio at the AES/EBU or coaxial output while shuttling, which can give some truly weird sound effects.)

There are many other, less obvious tweaks that are oriented mostly

EQ LAB REPORT

TASCAM DA-30 MKII

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

APPLICATIONS: Stereo recording for live or studio.

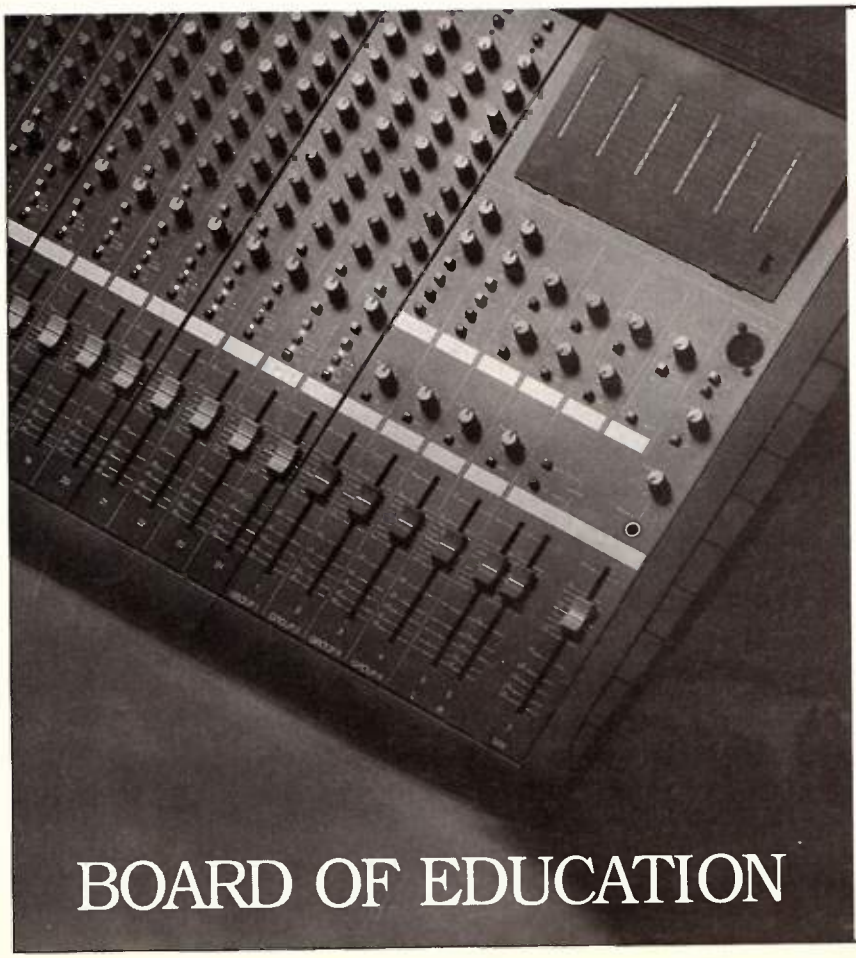
SUMMARY: The DA-30 Mk II adds several useful enhancements to the DA-30 while maintaining its predecessor's cost-effectiveness.

STRENGTHS: Shuttle wheel makes it easy to find specific points on tape; long play mode for extra recording time; fairly accessible head assembly; digital I/O; easy-to-read metering holds overload indications until reset.

WEAKNESSES: No variable output level control; remote is now optional at extra cost.

PRICE: $1499

EQ FREE LIT. #: 127



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NIGHT OF THE LIVING DAT

toward increasing convenience. These include:

• Ability to record at 32 kHz/12-bit to double the total recording time. As with other recorders that allow for this mode, frequency response tops out at about 14.5 kHz.

• Locate function — press the Memo button to store the current counter time (or enter a time with the data wheel), and press Locate to go to that point whenever you want. This is great for when you want to get to a specific part of a tune and don't want to bother to write an ID.

• A single, three-position switch to choose among analog balanced/unbalanced or digital input. This replaces the two switches found on the DA-30 and is more "idiot-proof."

• Standard/long record mode switch.

• A switch to disable the analog input level controls ("cal" mode) and set the Mk II to receive nominal +4 dB signals at the balanced inputs and –10 dB signals at the unbalanced inputs. Frankly, I'm picky enough about recording levels that this switch never budged from the "uncal" position (setting input levels isn't that much of a task, is it?).

• An Auto ID sensitivity level determines the signal level a signal must exceed before creating a new program ID.

• The DA-30 Mk II ignores incoming SCMS information (thank you!), but you can create tapes with SCMS and set the level of protection: 00 (unlimited copies), 10 (no copies allowed), or 11 (single copy only–no copies of a copy).

The Mk II doesn't give up much to hit the original's price point. You lose the variable output control and associated RCA phono jacks on the back, the two input controls are no longer ganged together, the not-exceptionally-useful Program Time function (which allowed you to read elapsed time for individual programs) has been eliminated, and the wonderful RC-30D remote control is now optional at extra cost (oh well). These are minor omissions, especially compared to what you get in return.

If you need SMPTE sync, error indication, and other features associated with an expensive four-head machine, there's always TASCAM's DA-60 DAT. But if you're looking for a deck that is painless to use, relatively inexpensive, and has excellent sound quality for the price, the DA-30 Mk II has much to recommend it. —*CA*

WHAT DOES "PROFESSIONAL" MEAN?

Four Motors: If price were no object, all "professional" decks would have four primary motors: cylinder, capstan, take-up, and supply. (Additional motors are required for loading purposes.) It is, of course, cheaper to use some combination of parts — gears, belts, clutches, and tires — so that the capstan motor can spin the reel tables instead. These items can wear, though, which translates to more time in the shop.

Error Indicator: An error-rate display is also most helpful, since being warned of a small problem will keep major problems at bay. The confidence head in the Sony and the HHB almost eliminates the need for such information, but this feature costs $$$. (Panasonic, HHB, and Fostex have error-rate indicators.)

World Radio History

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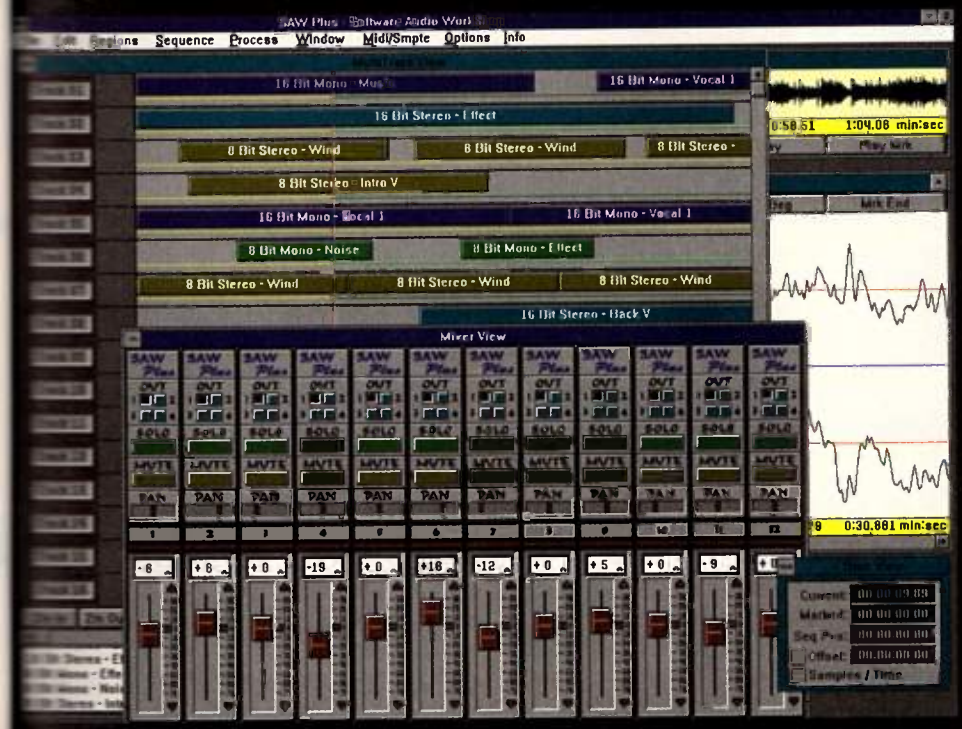

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NIGHT OF THE LIVING DAT

Panasonic SV-4100

The Panasonic SV-4100 offers several significant improvements over its highly successful predecessor, the SV-3700. For starters, the DIP switches have been removed from the rear panel (thank you!) — port selection and copy protection are now accessed, via software, from the front panel. However, what hasn't changed is that the SV-4100 includes a roster of professional-level features and is ideal for more upscale project studios.

Like the SV-3700, the Shuttle Search knob controls the tape speed in four steps and in both directions. This control, enhanced for the SV-4100, now has three speed ranges, each optimized for the task at hand: search can go at 3X, 5X, 9X, and 15X standard playback speed, shuttle at 1/2X, 1X, 2X, or 3X, and scrub at 1/16X, 1/8X, 1/2X, and 1X. The 1/16X speed is great for placing sample-accurate start IDs.

Engaging both the Quick Start and Pause/Standby/Rehearsal buttons puts the SV-4100 in Trim mode. Rather than attempt to move tape, this lets you scrub five seconds of audio from memory.

Once the IDs are in place, Quick Start cues the machine, which then enters standby/pause. Press Play for a wonderful surprise: instant audio. No DAT or video-based digital transport can compete with the quick access time of semiconductor memory. Combining the two is powerful indeed. However, I would like an optional audible prompt; it would be great to know when the SV-4100 is ready without having to look.

Though not quite as precise as Quick Start, the manual does manage to convey that the SV-4100 can communicate with another of its kind, so you can link two machines — a player and a recorder — via the remote connector for assemble editing.

Other back-panel improvements include:

• BNC connectors. Video Sync In and Word Sync In ports can resolve the machine to an external source; other equipment can slave to the 4100 via the Word Sync Out port.

• TOSLINK optical I/O for digital audio transfer.

• The 8-pin, nine-conductor DIN connector (Remote Transport Control) can access Play, FF, RW, Skip, Pause, Record, and Stop functions. Hardware hackers will love that it's a full-featured, 8-bit, parallel port.

• The GPI port is a 1/4-inch tip/ring/sleeve phone connector for remote control of Play/Pause. (The General Purpose Interface is common in video equipment. It requires con-

EQ LAB REPORT — PANASONIC SV-4100

MANUFACTURER: Panasonic Broadcast & TV Systems Company, One Panasonic Way, Secaucus, NJ 07094. Tel: 201-348-7000. Or 6550 Katella Ave., Cypress CA 90630. Tel: 714-373-7277

APPLICATIONS: Standard recording and playback, plus "Quick Start" feature well-suited to sound design and audio for video.

SUMMARY: DAT machine enhanced by the power of its software.

STRENGTHS: The memory buffer permits not only precise cueing, but also assemble editing when two SV-4100's are used; the thorough manual features a two-page, quick-reference pullout.

WEAKNESSES: The record Level and Balance controls were replaced by two, independent Left and Right controls; the manual language could be more precise.

PRICE: $2695 **EQ FREE LIT.#:** 128

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NIGHT OF THE LIVING DAT

Panasonic SV-4100

tact closure from a relay, switch, foot pedal, or an open-collector transistor circuit. For example, SMPTE or MIDI can trigger a relay to initiate precise starts.)

A special System Display Mode lets you select a variety of software options, including choice of digital I/O connectors, digital output format (choose S/PDIF or AES/EBU for any output connector), error rate display for the A & B heads, Serial Copy Management System (SCMS) options (indicates both SCMS record and playback status; choose unlimited copies, single copy allowed, or no copies allowed), digital attenuator (–14 dB to 0 dB), head wear in hours, "single play" mode (after normal playback, pauses at the next Start ID), and Blank Skip Mode (skip to next program after 2 seconds of silence or when level falls below –42 dB).

The SV-4100 is built around the same transport and A/D converters as the SV-3700. The dual-D/A converters have been combined into one chip, the Burr-Brown PCM 1702P. Balanced audio I/O is via XLR connectors. A switch sets the operating level to either –10 dBu or +4 dBu. Output level can now be attenuated from the front panel.

Other front-panel control features include expanded system interrogation and software control, external sync select switch, four locate points, and "Locate Last." "Time Input" allows precise locate entry from the Shuttle/Setting knob in conjunction with multifunction transport control buttons, while fade In and Out buttons make it easy to raise or lower both channels for noncritical purposes (unfortunately, there's zipper noise).

The SV-4100 is an SV-3700 with a real brain. The powerful software and the hardware interface have turned a passive record/playback device into an active tool capable of editing like a video machine, or taking cues from a sequencer or video editor.

The quick start feature, perfect for sound designers, is especially well-suited for live production. The ability to edit between two SV-4100's is a plus, but I have to wonder whether dedicated hardware can compete with software-based editors. The advantage is that no loading time is required.

If you can take advantage of the GPI, external sync, and quick start features, the SV-4100 will function similarly to that of a timecode machine for about a third of the price. —*EC*

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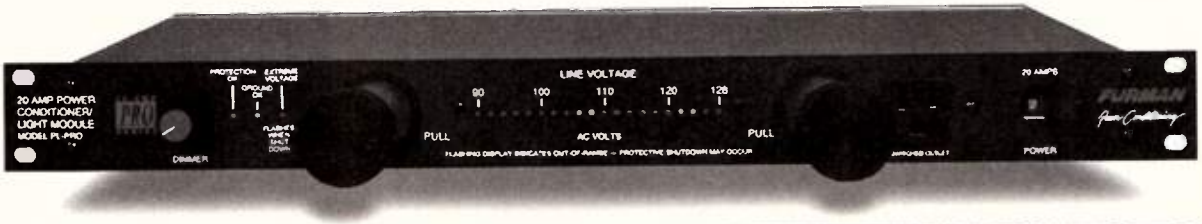

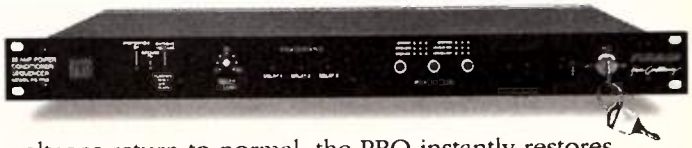

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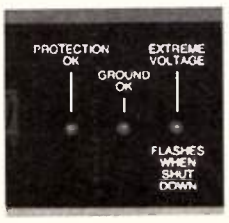

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CIRCLE 34 ON FREE INFO CARD

Sony PCM-2700A

The Sony PCM-2700A might be considered the flagship of Sony's project studio product line. Built on a robust copper-plated steel chassis, this four-head, four-motor professional DAT recorder will playback while recording to tape — and then some.

The price reflects the value added by the confidence head plus separate motors for take-up, supply, capstan, and head drum. (If the read-while-writing feature is not a prerequisite, the PCM-2600 [$1795] and DTC A-8 [$1345] will put four-motor reliability within your grasp.)

The impressively thick manual provides detailed information about both the machine and the format. The translation suffers a bit, but the honesty is commendable. For example, the PCM-2700 provides a fade up/down feature, but Sony warns that there will be some artifacts (zipper noise) due to the limited number of steps (64).

The PCM-2700A can record the year, month, and day (from its built-in clock) in the tape's subcode area. This area is also home to Start IDs, Program Numbers (PNOs), and, in the case of the PCM-7010/7030/7050, SMPTE/PRO-R timecode.

A time-stamped tape recorded on the 2700A will lose a portion of that information if Start IDs are modified by a machine without the time-stamping feature. Conversely, SMPTE info

EIGHT STEPS TO INSTANT DATIFICATION

1. Don't overclean the heads, but if errors show up (often producing a "tearing" sound), use a dry DAT cleaning cassette. Do not try to clean the heads as you would with an analog machine; cleaning DAT heads requires specialized knowledge and techniques.

2. Record your tapes at 44.1 kHz instead of 48 kHz. The difference in sound quality doesn't justify the sample-rate conversions you will need to go through further on down the line when transferring to CD.

3. The first and last couple of minutes of the tape are most prone to quality problems, so record a tone at the head of the tape. It's a great way to know that there's signal on the tape, and kills time while getting past the dropouts. This also provides enough space to buffer a master take during the first critical seconds when an unsuspecting tape is loaded into a cranky machine.

4. Fast forward and rewind a new DAT tape several times before using to evenly disperse the lubricant and unpack the tape.

5. Avoid using cue and review modes too much on machines without separate reel motors. Aging transports develop tension headaches that are likely to reveal themselves (as creased or eaten tapes) when in this mode. If you don't need to hear the audio, press stop first before going into rewind or fast forward to fully disengage the tape from the head. Also, avoid extended periods in Record/Pause mode. (Most machines drop out of this mode after 10 minutes or so.) Though the tape does not touch the heads, it can reduce the life of the head bearings.

6. Most pro decks have a software switch to disable SCMS. Do this as soon as you get the deck so you don't inadvertently make tapes with SCMS enabled.

7. Digital tape is still tape: avoid high temperature and high humidity conditions at all costs. Excessive moisture can even cause metal tapes to corrode.

8. Remove DAT tapes before powering down. If there's a problem on power-up, you may not be able to remove the tape without disassembling the machine.

World Radio History

MICRO SIZE • MINI PRICE • MAGNIFICENT REPUTATION

OUR MicroSeries 1202 12-channel mic/line mixer was designed to solve problems. Space problems. Budget problems. Input and submix problems. Impedance and level matching problems.

It was designed to provide anybody with $399[1] the same low noise and high headroom found on big professional consoles.

TODAY the MS1202 is at work in thousands of home studios, video post production facilities, corporate multimedia departments, radio stations and film location shoots. We even know several recording engineers who bring an MS1202 along with them on sessions. They use it for submixing effects and for its superior mic preamps — even when the session is being done on a mega expensive console.

In fact, the MS1202 is so successful that it's spawned a host of eager competitors. But only the original has received accolades not just from pro audio magazines, but from video, broadcast and even consumer audio reviewers. Only the MicroSeries 1202 is currently used in facilities as diverse as NASA, CBS Broadcasting, AT&T, Yanni's percussionist and Phillips Interactive Video[2].

CALL us toll-free for more information on the ultra-compact, 12-channel mic/line mixer that pros really use day in and day out.

[2] Mention in this ad denotes ownership and/or useage but not official endorsement.

"Overall winner in grading categories" *Keyboard Magazine Under-$600 Mixer Shoot-Out*

"In spite of the unit's diminutive size, it's easy to work all the controls. There's space around each knob for your fingers . . . all inputs and outputs are on the top, making it simple to interface with your system. From its military-issue steel contruction to top quality electronics, the little board is over-engineered. It offers stunning audio quality, tons of flexiblity, sturdy construction and a palatable price tag." *Videomaker Magazine*

"I can't say enough good things about the workhorse Mackie MicroSeries 1202. It is an absolutely essential audio tool in my daily work. I would be at a loss without it. The more I think about it, the MS1202 may just be one of the best audio bargains of all time." *Radio World Magazine*

"This little mixer has the same electronics as Mackie's incredibly popular CR-1604. The 1202 is billed as a 'low noise, high headroom mixer' and it certainly lives up to its word. The board has a very clear, clean, quiet sound. For home and studio recording applications, I can see the board becoming equally popular as a 'starter unit' and as an auxilliary mixer." *Recording Magazine*

"GRADE: A. One of the product wonders of the pro audio world, the MicroSeries 1202 mic/line mixer is priced so ridiculously low that audiophiles can make good use of it for home recording projects. I tried it with a CD player via the tape inputs and found its sound as clean as that of some audiophile stereo preamps costing twice the price." *Audio Magazine*

[1] Suggested retail price. Your mileage may vary. Price is slightly higher in Canada and outer reaches of the Spiral Nebulae.

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World Radio History

NIGHT OF THE LIVING DAT

Sony PCM-2700A

will be momentarily interrupted when Start IDs are recorded or repositioned by a nontimecode machine.

The Sony PCM-2700A has a rehearsal mode for precise ID placement. The FF and RW buttons trim the ID location, while the amount of trim is indicated in the Margin Window (itself a handy little feature).

Like the jukeboxes of old, tape movement is visible through the loading window. This visual feedback is almost necessary because the transport noise is so minimal. Except for the click of the pinch roller and brake solenoids, Sony's four-motor transport silently takes under 50 seconds to fast wind a T-120 tape.

Weighing in at 22 pounds, the PCM-2700A has two transformers to isolate the digital and the analog

CLEAN SLATE

The following chart offers a quick glance at maintenance-related features of the models reviewed here, as well as other models in these manufacturers' DAT lines.

MAKE	MODEL	PRIMARY MOTORS	ID TIME	HEAD ACCESS	ERROR RATE
Fostex	D-5	2	9	C	YES
Fostex	D-30	4	9	A	YES
Fostex	PD-2	4	9	A	YES
HHB	PDR-1000	4	9	C	YES
Panasonic	SV-3500	2	13	D	YES
Panasonic	SV-3200, 3700, 3900, 4100	2	13	C	YES
Sony	PCM-1000, 2500	4	9	C	LED
Sony	PCM-2300	2	9	C	NO
Sony	PCM-2700	4	9	C	NO
TASCAM	DA-30	2	9	B	NO
TASCAM	DA-30 MKII	2	NA	?	NO

Head Access Key:

A: Direct access through removable door designed for this purpose. (At the '93 AES, Fostex demonstrated an editing deck with this feature.)

B: One-step access: Remove the deck cover. (The DA-30's loading mechanism, for example, has enough of a "window" to allow head cleaning.)

C: After removing the cover, the loading mechanism must be removed. (In many cases the front panel must be separated from the chassis.)

D: After removing the cover, loading mechanism, and front panel, insufficient wiring slack requires that additional subassemblies be removed.

Warning To Users: Manufacturers strongly urge users not to attempt manual head cleaning. Improved access would, however, facilitate the service process "For Authorized Personnel" who charge by the hour.

World Radio History

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World Radio History

NIGHT OF THE LIVING DAT

EQ LAB REPORT

SONY PCM-2700A

MANUFACTURER: Sony Electronics Inc., 3 Paragon Drive, Montvale, NJ 07645.Tel: 800-635-SONY

APPLICATION: Duplication, mastering, live recording, safeties — wherever reliability at the eleventh hour is required. Confidence head cuts QC time in half because recording can be monitored in real time.

SUMMARY: Professional DAT machine.

STRENGTHS: Robust, reliable, four motor transport; confirmation of tape integrity while recording a big plus.

WEAKNESSES: The owner's manual language lacks precision.

PRICE: $3275 **EQ FREE LIT. #:** 129

power supplies. There's lots of heavy-gauge metal work (that also serves as heat sinks for the voltage regulators) and two large fiberglass/epoxy circuit boards shielded by more metal work. The audio ground on the circuit board is reinforced by copper bus bars. The high-quality, sealed stereo input control is made by Alps.

Just for fun, I put an oscilloscope on the RF envelope test point and found the waveform to be especially stable, clean, and noise-free. This is evidence that the plated chassis, independent supplies, and thorough shielding have won the war on noise.

The rear panel includes ultra miniature trim pots, protected under a small metal cover, for adjusting the input and output sensitivity. This feature allows the PCM-2700A to travel in consumer, professional, and broadcast circles.

While I am a big fan of rotating heads, I see my friends at mastering houses pulling their hair every time DAT copies are required. With the ability to read-while-writing, the PCM-2700A can cut this time consuming process in half. You too can QC while making copies, just like with those professional three-headed analog dinosaurs of yore.

The 8-pin DIN connector on the rear panel can be configured for remote stop/start from faders equipped with switches. There are also pins for Remote Tally, status indicator lamps, or LEDs for each state.

There are several "soft" convenience features. Display brightness

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Our tests indicate that the Apogee DAT has an archive life of over 30 years – the longest in the industry – thanks to proprietary passivated metal particles that, quite simply, won't rust away. The graded magnetic coating yields vanishingly small error rates, yet makes the tape more durable. Output levels are as much as 10% higher than other DAT tapes. The heat-resistant housing minimizes static electricity problems and significantly improves tape handling. The special hubs minimize end-of-tape damage. The Apogee DAT exceeds even the tough DDS (Digital Data Standard) criteria, which require less than one error in 360,000 flux transitions—five times better than required by the IEC60A audio standard.

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World Radio History

NIGHT OF THE LIVING DAT

START ID DIFFERENCES

When a friend claimed that the original TASCAM DA-30 can put start IDs closer together than an SV-3700, I decided to measure the time required to write a Start ID.

The TASCAM DA-30 requires nine seconds; the display on Panasonic's SV-3700 and SV-4100 goes solid for nine seconds, but then flashes for an additional four seconds. Observing the RF envelope (the signal on tape) confirmed that writing does require 13 seconds. (The Panasonic is capable of incredibly fast search speeds and so the additional time makes IDs easier to locate.)

Sony machines, from the PCM-2500 through the PCM-7030, also require nine seconds to write an ID, as does the HHB PortaDat. The HHB manual (the best written of all), recommends that Start IDs be spaced no closer than 18 seconds apart. This makes sense if IDs are to be repositioned without fear of accidentally erasing a neighbor.

has an adjustable three-step range. In addition to recordable fade in/out, playback fade-in from pause and fade-out from play could be useful where a fader is not convenient or programmable. Fade time extends from 0.2 seconds to 15 seconds in 0.2 second to 1 second intervals. There is zipper noise, but it's most obvious on sine waves and similarly pure tones — not when Elvis Costello is rockin'.

I saw something quite confusing while thumbing through the manual: the level display can also indicate elapsed time in linear form. That's cool, but it also serves a dual function. As an alternate indication of sample rate (fs), which at first seemed unnecessary, both "channels" of the two-channel display illuminate when the fs is 44.1 kHz. Only the lower or upper segments light when the fs is 48 kHz or 32 kHz, respectively. (It still seems unnecessary, but what the heck...)

The PCM-2700A is a professional machine from the ground up. If you need reliability at the eleventh hour or need to cut QC time in half, there is truly no bologna in this Sony. —*EC*

HHB PDR-1000

When a new product arrives for review, I immediately pop the cover for a look inside before passing audio or reading the manual. After unraveling the HHBPDR-1000 from its packaging, I took a moment to appreciate its artistry. The four-headed PortaDAT inspires confidence. What to look for in a portable? Let's start with reliable power...

The power supply/charger is not a wall wart. It has a detachable IEC AC input cable and a permanently attached DC output cable with a four-pin XLR connector. There's room for two, rechargeable, nickel-metal-hydride (NiMH) battery packs. One slot is capable of deep discharge. Battery life is about two hours. Life expectancy is about 300 charge/discharge cycles.

Quite often, I find that users rarely operate their portables via batteries. This shortens the battery life, since rechargeable batteries have "memory." Regular charge and discharge cycles will yield predictable performance. The standard power supply will not simultaneously charge batteries and run the machine (a four-slot charger is optional), which is a good sort of discipline.

The XLR inputs handle mic or line level signals. Each channel features independent control of attenuation (30 dB) and a high-pass filter (100 Hz). Each channel has independent phantom power, but shares the mic limiter. AES/EBU digital I/O also uses digital connectors. S/PDIF I/O, as well as the analog line outputs, use gold-plated RCA connectors. There is also a connector for a hard-wired remote (not supplied). The 1/4-inch headphone jack mutes the internal, monaural speaker.

To prevent accidents, all switches are recessed and well-organized. For example, the slide switches for analog audio are arranged in a vertical column to the right just above the I/O connectors. Their positive mechanical feel is enhanced by the easily visible chrome plating. Transport controls — Search, Fast wind, Play and Stop — are on top to the right. Power, Hold and Door Open switches are to the left.

The controls needed most are on the PortaDAT's face. Record and Pause are large red and amber buttons, respectively. After setting the concentric Record Level controls, a lock button keeps them in place. The case is sculpted so that level can be positively trimmed with one finger. Start IDs, Display Mode, Backlighting, Tape/Source, select and a retractable Headphone Monitor Level control are all located on the face. The LCD display is easy to read and indicates Headroom Margin, Battery Life, and Tape/Source status. No significant features are missing from the PDR-1000; there is even an onboard clock that can time-stamp the tape, much like a VCR.

A manually written Start ID puts the PortaDAT into Rehearsal Mode. The transport cycles over the area, muted, until the proposed Start ID passes. Press the FF and RW buttons to trim the ID location. Pressing the ID Write button a second time commits the Start ID to tape.

When the battery gets within three minutes of its usable life, a warning sounds in both the speaker and the headphone amplifier. Just before powering down, the tape is unthreaded and retracted.

During casual listening tests, the D/A converters delivered upper frequency information that was well defined and natural. A more formal test daisy-chained digital audio from a Panasonic SV-255 (an early portable)

World Radio History

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Scott Weber, Buena Vista Sound, Walt Disney Studios

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World Radio History

NIGHT OF THE LIVING DAT

HHB PDR-1000

EQ LAB REPORT

MANUFACTURER: HHB Communications Ltd. U.S. distributor: Independent Audio, 295 Forest Avenue, Suite 121, Portland, ME 04101-2000. Tel: 207-773-2424.

APPLICATIONS: Remote recording of music, sound effects and dialog.

SUMMARY: Thorough design leaves no stone unturned.

STRENGTHS: Confidence head; margin indicator; record level lock; AES/SPDIF/analog mic/line inputs; two-hour battery life

WEAKNESSES: No major weaknesses

PRICE: PDR-1000, $3995; PDR-1000 TC (Time Code), $6995; spare battery, $180

EQ FREE LIT.#: 130

through the HHB PortaDAT and into a Panasonic SV-4100. With a prerecorded tone, I adjusted the sensitivity on the mixer for equal output from all decks.

Comparing the three yielded mostly subtle differences at normal levels. The noise floor and low-level distortion of the PortaDAT's D/A converters were very good by any standards, and excellent for a portable. Passing this test means that, in the field, any anomalies heard will be attributable to something other than the D/A. (The test revealed the Panasonic SV-255 to be noisier, which was expected. The surprise was that the SV-4100 had a wee bit of low-level distortion.)

While experimenting with the low-level tests, I also happened to be recording on a very old DAT tape. My using the ability to monitor from tape happened to coincide with a particularly worn section. This simulated the mixed joy one might have to experience from such failure during a live performance, rather than after.

The PDR-1000 is manufactured in Japan. Both the design and the operator's manual are British. This manual is actually readable. It is thorough, precise, and clear. (I wonder how it translated into Spanish, German, and French.) The PDR-1000 is a powerful machine augmented by its documentation.

It seems that every possible detail was considered in the PDR-1000's design. It is easy to get caught up in the external amenities, from the power connector to the sculpted panel that keeps buttons and switches safe. Inside, the transport's simplicity and circuit-board layout will translate into long life. The confidence heads (and error rate indicator) will certainly inspire same. Vive là PDR! —*EC*

HHB PDR-1000

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The Big Wrap-Up

Not surprisingly, there's a definite correlation between price and performance. In the sole head-to-head pricing situation (Fostex D5 vs. TASCAM DA-30 Mk II), it's six of one, half a dozen of the other. For example, the Fostex wireless remote is convenient, but doesn't have as many features as TASCAM's wired remote. Fostex includes an all-important error indicator, but lacks the TASCAM's jog/shuttle wheel. For I/O, the DA-30 Mk II has an edge (the D5 has only balanced inputs/outputs); but overall, the D5 has more bells and whistles, recalling its roots as a consumer machine. Either one will do a fine job of recording master tapes.

If you can afford more, the Pana-

continued on page 127

JUST THE SPECS

FOSTEX D5

Inputs: Audio balanced XLR (pin 2 hot), digital AES/EBU XLR, optical S/PDIF
Outputs: Same as inputs, plus a headphone jack and associated level control
Controls: Input level and balance controls, +4/–10 analog in level switch
Sampling Rates: 44.1 kHz, 48 kHz, 32 kHz
A/D and D/A: Delta-Sigma (1-bit) conversion
Quantization: 16-bit linear, 12-bit nonlinear for long play mode
Other Connectors: Parallel control port
Frequency Response: ±1 dB, 20 Hz to 20 kHz (standard mode) or 14.5 kHz (long play mode)
Signal-to-Noise Ratio: Better than 90 dB
Standard Record Level: –12 dB

TASCAM DA-30 MK II

Inputs: Audio balanced XLR (pin 2 hot), audio unbalanced RCA, digital AES/EBU XLR, digital coax RCA (S/PDIF)
Outputs: Same as inputs, plus a headphone jack and associated level control
Controls: Independent left/right input level controls
Sampling Rates: 44.1 kHz, 48 kHz, 32 kHz
A/D: 64X oversampling, Delta-Sigma (1-bit) conversion
D/A: 8X oversampling, 18 bit
Other Connectors: Parallel control port, remote control jack
Frequency Response: ±0.5 dB, 20 Hz to 20 kHz (standard mode) or 14.5 kHz(long mode).
Signal-to-Noise Ratio: Better than 92 dB

PANASONIC SV-4100

Inputs: Audio balanced XLR (pin 2 Hot), digital AES/EBU XLR, digital coax RCA (S/PDIF), digital optical (Toslink), digital Word Sync and Video Sync on BNC connectors
Outputs: Same as inputs, plus a headphone jack and associated level control; Word Sync out on BNC connector
Controls: Independent left and right level controls
Sampling rates: 44.1 kHz, 48 kHz, 32 kHz
A/D: Crystal 64X oversampling, Delta-Sigma (1-bit) conversion
D/A: Burr-Brown, 18-bit converter
Other Connectors: Wired Parallel Remote (8 pin DIN) and GPI Play/Pause on 1/4-inch TRS
Freq Resp: 10 Hz to 20 kHz ±0.5 dB @ 44.1 kHz
Signal-to-Noise Ratio: More than 92 dB (DIN audio weighted)

SONY PCM-2700A

Inputs: Audio balanced XLR (pin 2 hot), digital AES/EBU XLR, digital coax RCA (S/PDIF). Sensitivity adjustable from rear panel (–12 dB to +8 dB)
Outputs: Same as inputs, plus a headphone jack and associated level control
Controls: Concentric left/right level control
Sampling Rates: 44.1 kHz, 48 kHz, 32 kHz
A/D: Crystal 64X oversampling, Delta-Sigma (1-bit) conversion
D/A: 8X oversampling, 18-bit interpolation digital filter. Sony 64X Delta-Sigma modulator
Other Connectors: Wired Remote (37-pin D sub connector), Play/Stop remote (8pin DIN)
Freq Resp: 20 Hz to 20 kHz ±0.5 dB @ 44.1 kHz
Signal-to-Noise Ratio: More than 90 dB (A-weighted)

HHB PDR-1000

Inputs: Audio balanced XLR (pin 2 Hot) mic and line. Digital AES/EBU XLR and digital coax RCA (S/PDIF)
Outputs: Same as inputs except audio unbalanced RCA only, plus a headphone jack with associated level control
Controls: Concentric left/right level control
Sampling Rates: 44.1 kHz, 48 kHz, 32 kHz
Other Connectors: Wired Remote Connector
Freq Resp: 20 Hz to 22 kHz ±3 dB @ 48 kHz Fs
Signal-to-noise Ratio: 90 dB

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Meet the Speaker Tweaks

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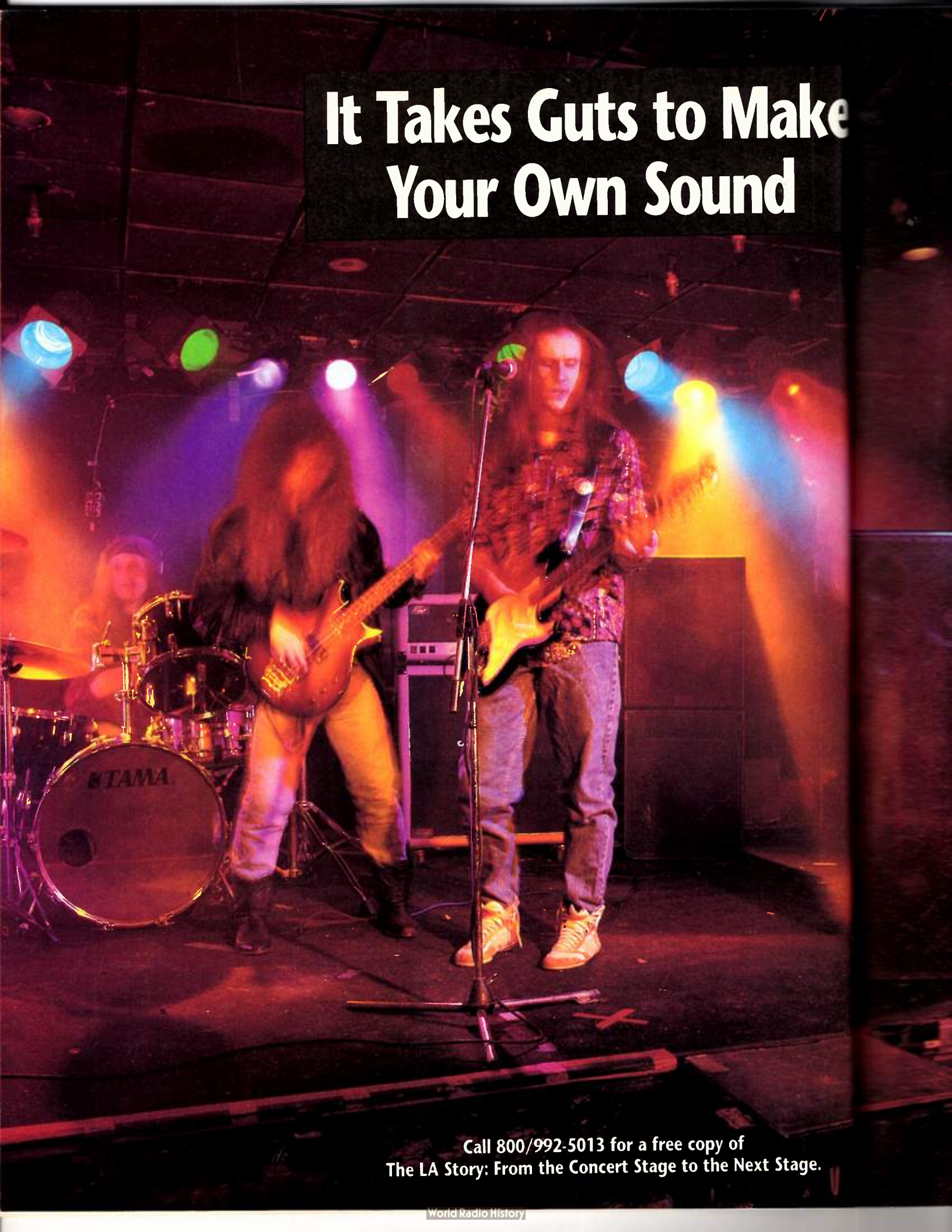

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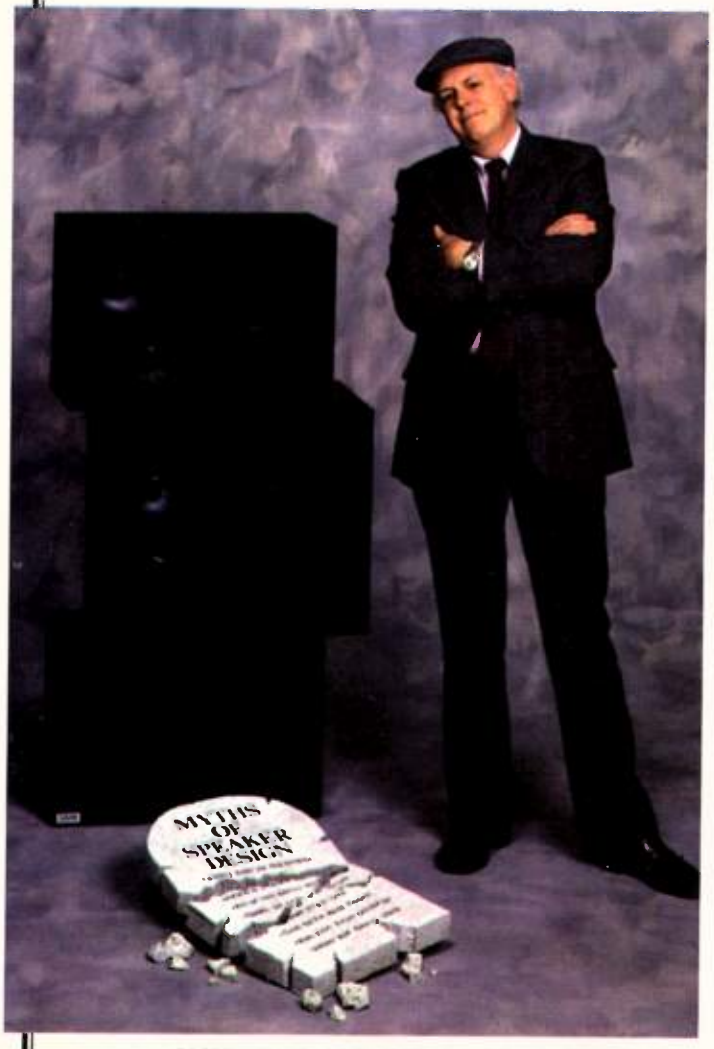

BREAKING THE RULES: EAW's Kenton Forsythe

PART TWO: MORE OF THE INSIGHTS BEHIND THE SPEAKERS YOU LOVE

BY STEVE LA CERRA

WELCOME TO *EQ*'S behind-the-scenes look at the gear you use. In part two of this series, we talk with three more speaker "tweaks" and find out the theories and thoughts that go into live-sound speaker design.

KENTON FORSYTHE/EAW

Kenton G. Forsythe is a cofounder and executive vice president of Eastern Acoustic Works (EAW). He became interested in professional audio while studying physics at Yale University, from which he is a graduate. Kenton began building loudspeakers for bands and formed several companies including dB Engineering, Forsythe Audio, and, 17 years ago, EAW. During his career (which has so far spanned two decades) Forsythe has pioneered a number of innovations in the loudspeaker field including foam-reinforced wood laminate horns with displacement plugs for lower distortion, integrated active electronics, complex computer-designed crossovers, and Virtual Array Technology.

When asked about his views on loudspeaker designs, Forsythe begins by relating what he feels are the three "unwritten rules" of sound reinforcement loudspeakers:

1. The speaker must make sound.
2. The speaker must continue making sound.
3. The speaker must make good sound.

Once the first two criteria have been met, then the third can be addressed. Forsythe explains there is a distinct difference between a sound-reinforcement loudspeaker and an instrument loudspeaker. "A sound-reinforcement loudspeaker is a reproducer of sound, not a producer of sound," says Forsythe. "The instrument speaker is a producer of sound and may have been designed to have a specific nonlinear response. This approach is legitimate for the instrument speaker, but not for a sound-reinforcement speaker — it must be a linear reproducer of the frequencies fed into it and not add coloration."

Forsythe views the loudspeaker as a tool for the sound-reinforcement engineer, and it is his job to design these tools to be as accurate and reliable as possible. "A transducer is a very inefficient device, converting only about 5 percent of amplifier power into audio. The rest of that energy is dissipated as heat, so we are designing drivers that will operate at higher temperatures without failing and that are more linear regardless of temperature." Forsythe notes that as temperature of the driver changes, so does linearity of the driver's performance, and this affects the sound of the loudspeaker.

"Manufacturers are constantly pushing the envelope in an effort to make their products more reliable, more accurate, and more linear. Work is being done with new materials like carbon fiber, but we have to be careful when using new materials. A new material really must improve upon an older material in order to justify its use. We need experience before putting a new material into a product so we will know how it is going to perform once it is out there in the field. If that material fails in use, what is the point of changing from the original?"

Regarding the introduction of EAW's LA Series, Forsythe explains that this is an example of design technology really helping the club sound engineer.

"The LA concept allows club listeners to be in the direct field of the PA system as opposed to the reverberant field. The coverage angle is wide and coverage is more consistent within that angle. The LA series attempts to produce studio-like sound in a smaller area — it is not meant for arenas. It is a tool for consistent sound quality at the club level. It can be moved in a van and operates at a sound pressure level conducive to the club environment. Musicians now have access to this technology in situations where they cannot afford to use or move arena systems."

DAVID CARLSON/ MARK IV AUDIO

David Carlson is a senior project engineer in charge of the Concert Sound loudspeaker product development group at the Mark IV Audio engineering R&D Center. Carlson is a graduate of Pennsylvania State University with degrees in both elec-

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EQ LIVE

Mark IV's David Carlson

trical engineering and acoustics. Prior to working for Mark IV Audio/Electro-Voice, Carlson worked for several East Coast sound contracting firms that specialized in permanent-installation and sound-reinforcement applications. He also spent several years working as an independent live sound FOH and monitor engineer.

David Carlson begins his view on the state of loudspeaker design by identifying the major focus of Electro-Voice's research efforts: "There was a point in time not too long ago when most professional sound-reinforcement loudspeakers could handle all the energy that power amplifiers could deliver, but that situation has changed. Larger amplifiers are pushing both the mechanical and thermal limits of those drivers. However, thermal engineering has long been a focus at Electro-Voice — we have done a great deal of work on sinking heat away from the voice coil and researching high-temperature materials and adhesives. So, at this point, we are more concerned with the mechanical properties of drivers. Drivers failing from open voice coils due to excessive heat are not so much of a concern at this time."

Carlson sees long-term fatigue and excessive physical excursion as the major enemies of drivers. "By powering a high-frequency driver hard enough, the pressure developed between the diaphragm and phase plug can be great enough to collapse the diaphragm. We can increase the strength of the diaphragm by making it thicker, but that also makes it slower and less responsive to transients. New materials, like titanium, have helped by providing a high strength-to-weight ratio. In a low-frequency driver, the spider and the surround are the weak links. Because drivers are mechanical devices, they will, after years of use, gradually fatigue from short-term, high-excursion movement (typical of transients). An important outcome of our focus on mechanical fatigue is the EVX "A" series woofers. A high order of mechanical refinement gives the new EVXs ten times greater resistance to long-term fatigue and as much as 5 dB more output than their predecessors."

When asked about important design developments, Carlson notes that Mark IV Audio's varied experience in loudspeaker design allows them to draw on technology from different levels. "The constant directivity horn was invented by Electro-Voice around 15 or 20 years ago for our permanent installation market. It provides a constant coverage

World Radio History

pattern with increasing frequency, and this technology is now used in the System 200. Our experience with the MT Series of concert-type loudspeakers has helped bring high power handling ability down to the Sx200. And the plastic box used in the Sx200 is molded with the horn integral to the cabinet, making it lightweight and low in cost. The technology comes from various sources, and we combine them to make a better speaker."

One of the trends that Carlson sees is that Electro-Voice, as well as other manufacturers, are building boxes that are more lightweight, provide higher output, and are more affordable. "Neodymium is a material that we are using more often here at Electro-Voice. Due to its light weight, it helps keep down the weight of drivers and cabinets. For example, our DH1A horn weighs about 25 pounds and the N/Dym 1 driver — which is essentially the same driver — weighs in at seven pounds. The N/Dym 1 is also double the cost but it is much cheaper to ship, and on a tour that can offset the initial investment."

DR. JOHN POST/KLIPSCH

Dr. John Post is a designer for Klipsch Professional in Hope, Arkansas. In 1987 he graduated with honors from the University of Arkansas with a Bachelor of Science in electrical engineering. In 1990 (while working as a research assistant at NASA/Langley), John earned a Masters of Science degree in aeronautics from the George Washington University Joint Institute for Advancement of Flight Science. Post was previously an assistant instructor at the University of Texas, Austin, from where he has earned a Doctorate in acoustics/electrical engineering.

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Klipsch Professional, Post is extremely well-versed in the principles of exponential horns and points out the importance of Paul Klipsch's first production loudspeaker: "In the late 1940s, Paul Klipsch introduced the first viable horn-loaded loudspeaker for the home (the Klipschorn), a milestone in loudspeaker design. The speaker was extremely efficient — an important characteristic considering the low power output of amplifiers in use at the time." Post proceeds to relate what he calls Klipsch's Law: "Efficiency is inversely proportional to distortion. It is the mechanical stress on a loudspeaker that creates distortion, so by increasing the efficiency of a speaker, we can reduce the physical strain and the amount of distortion the speaker produces. Horn-loaded designs tend to be very efficient so they are able to produce very high sound pressure levels more cleanly and more efficiently than other designs."

Post cites Klipsch's 600 Series and MCM Theater Series as systems that make the most of this design philosophy. "By using a folded horn in the MCM cabinet, we can physically make the cabinet four feet deep, but the horn unfolds to eight feet long. This provides high efficiency and low distortion down in the low-frequency region, while making the cabinet more manageable. Horn-loading the low frequencies allows us to achieve increased focus and a longer throw, which translates to a higher SPL at longer distances. Our MWM subwoofer array can maintain a beamwidth of around 100 degrees down to about 60 Hz, although at frequencies lower than that it does tend to behave more like a direct radiator." In a recent test Post performed on an eight cabinet MCM array, a 110 dB sound pressure level was measured over a distance of 200 feet, down to frequencies of 35 Hz.

In the quest for improved loudspeaker design, Post notes that there are tools, techniques and materials that Klipsch is using to achieve that end. "Our carpet covered MI Series is constructed from oriented strand board. This is a wood-composite material often used for roofs. It is lighter and less expensive than plywood, rigid, and very water resistant. The carpet better handles abrasion from road use. Also, computers have helped make our work a lot easier. For example, the computerized router made a fundamental change in production techniques — we no longer have to hand-cut baffles and we can maintain a tolerance of about 1/5000 of an inch. Computers offer the possibility of investigating alternative designs without prototyping. We can make small design changes without having to re-build a prototype and this saves time and money." EQ

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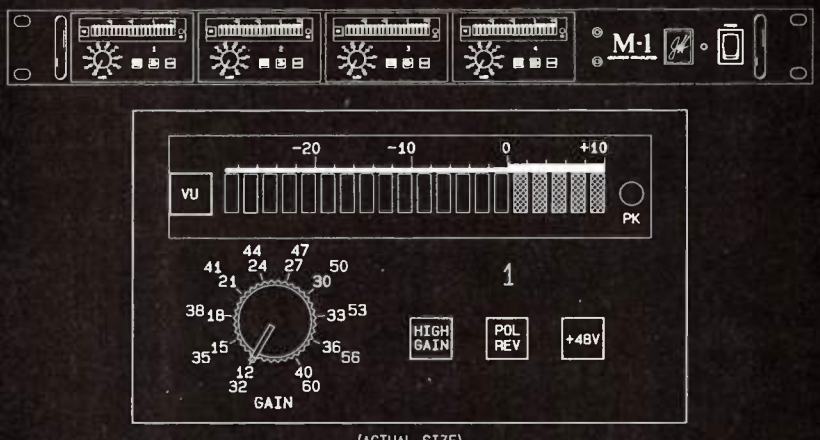

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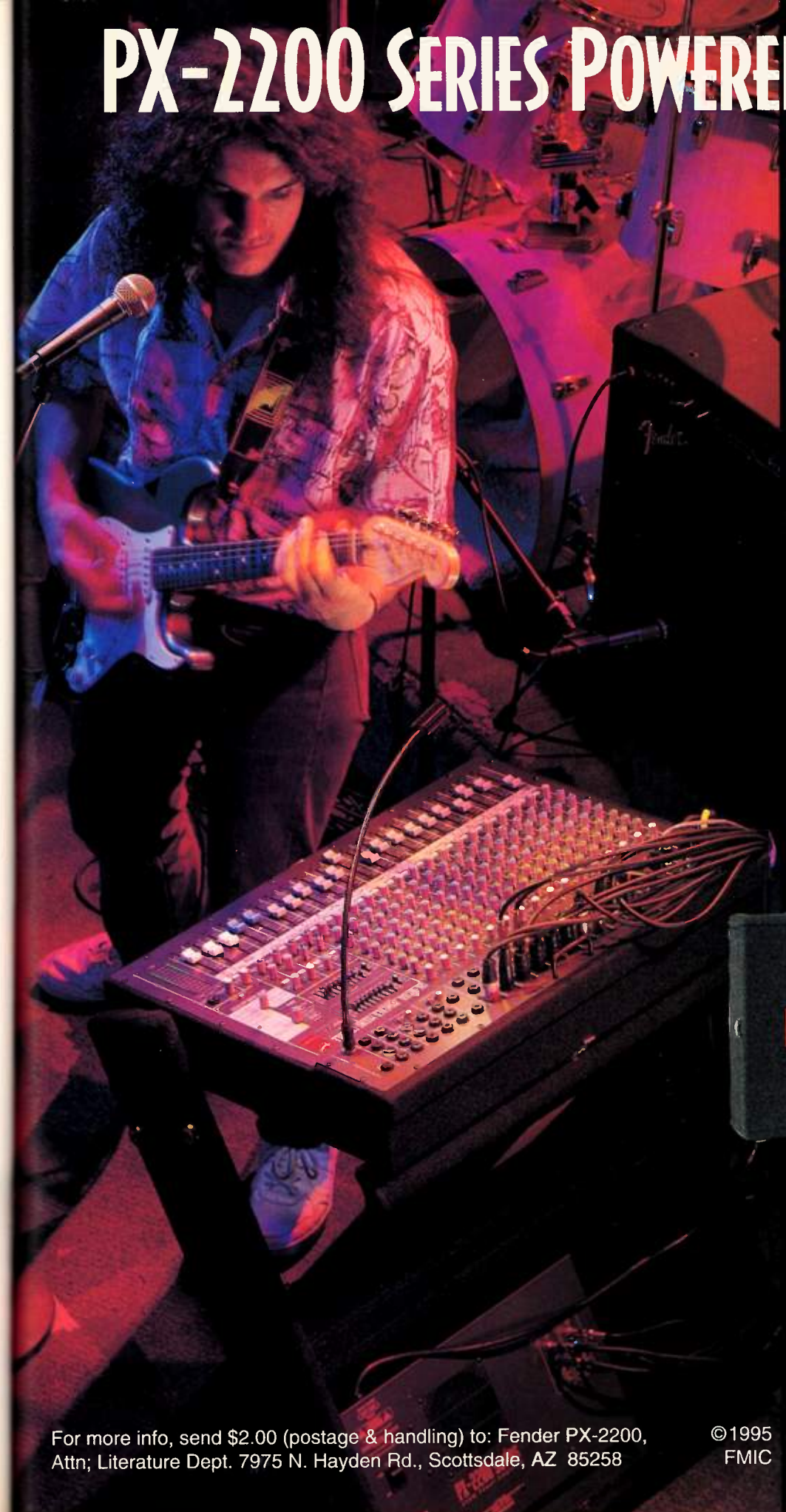

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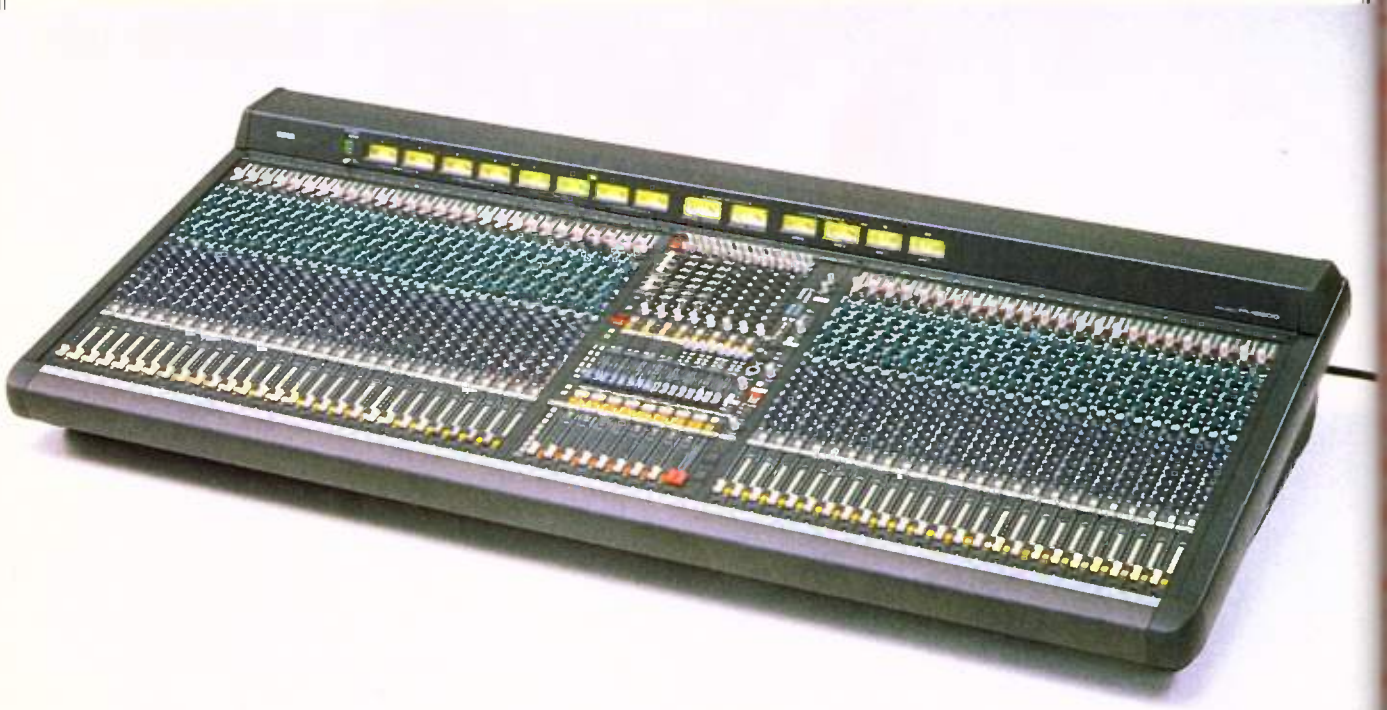
LIVE EFFECTS MIXING WITH MIDI



MIDI MACHINE: The Yamaha PM3500 console has a MIDI controller built into the board.

START TAKING CONTROL OF YOUR LIVE-SOUND SITUATIONS WITH SOME HELP FROM MIDI

BY DAVID (RUDY) TRUBITT

AS THE SAYING goes, there are no second-takes live. So, focusing on the on-stage action is critical to staying on top of your mix. However, the expectations of musicians and audiences are usually set by what they hear on records. Your singer wants a quarter-note echo in time with one tune, the drummer is looking for that "rock ballad" snare reverb on the next, and you're counting the buttons you'll have to push to make all it happen.

You've probably memorized favorite presets from the effects in your rack, but recalling several programs during a brief pause between songs means a lot of button-pushing. When time is short, many mixers just choose a few generic presets and use them all night, so they can concentrate on the rest of the mix.

With MIDI and a little advance planning, however, a single button can recall presets in, not just one, but all of your MIDI-capable effects simultaneously. Obviously, this makes it feasible to use completely different effect treatments for each song (or part of a song) without burying your nose in the FX rack.

To do this, you need only to set up your MIDI devices appropriately and learn the secrets of each unit's program change map. [Most *EQ* readers will be familiar with basic MIDI hook-ups. If you're not, check out *EQ*'s recent MIDI issue (Oct. '94).]

THIS IS CONTROL...

The only piece of equipment you may need to buy is some sort of MIDI controller, a box that creates the MIDI commands we need. What should one look for in a MIDI Controller? Much of MIDI is irrelevant to us since we're controlling effects, not playing notes. A piano keyboard at the front of house will not be required!

MIDI controllers come in many forms, ranging from foot-pedals for musician's FX racks, to desktop fader boxes, to rack-mounted MIDI routers/processors. Any of these will probably work, since our MIDI messaging needs are pretty simple (more on this in a moment).

A number of manufacturers make MIDI controllers, including JLCooper, Lexicon, Peavey, Ross, and others, and many discontinued models can be found used. You'll also start seeing MIDI controllers built right into mixing consoles. For instance, Yamaha's new PM3500 has a MIDI controller keypad built into the board's mute scene recall system.

There is only one (well, maybe two) message your MIDI controller should be able to create: the essential program change, which causes an effect to switch between presets; and the optional continuous controller message, which allows real-time parameter adjustment for effect units supporting this feature (like the Lexicon MRC controller with LXP effects).

To find out if a particular device supports these two MIDI messages, or when trying to analyze any

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Lexicon MIDI Remote Control

capabilities of a MIDI device, start with the MIDI Implementation Chart in the unit's manual.

THE ESSENTIAL CHANGE

A MIDI program change message has the same result as manually recalling a preset from an effect unit's front panel — the device switches from one preset to another. MIDI identifies program changes with a number from 1 to 128 (actually 0 to 127 in digi-talk). Sending a "change to program 1" message to a MIDI effect will typically cause it switch to its lowest-numbered preset.

Of course, it's unlikely that the first dozen presets in each of your effects units will coincide with the effects you need in your band's set. To save you from having to jump from one program number to another, most MIDI effects have a feature called "Program Map." This allows you to assign a program number to call up any number preset. This way, program change message "1" could be mapped so as to recall program "37" on a particular unit.

STEPPING THROUGH THE SETS

Let's work though the details of setting up a MIDI system to step through effect presets song by song. We'll assume a simple MIDI controller capable of sending program change messages on one channel at a time, connected to two MIDI-controlled effect units.

Here's the first three songs of the set, with the name (and preset number) of the desired effects:

Song Effect 1/Effect 2
#1 Spunky rocker 120 ms. delay (12)/Chorus A (75)
#2 Lush ballad 2.3 sec reverb (4)/Chorus A (75)
#3 Techno Thrash Gated reverb (32)/Death Flange (110)

As you can see, the program numbers of the required effects are scattered all over the map. If we wanted to use a MIDI controller to step through the tunes, we're going to have a problem — the effect presets are not in any sort of sequence.

PATCH MAPPING

The trick is to come up with a way to recall these numbers in our desired order when sending an ascending list of program change messages from the controller. In other words, before the first song, we send program change #1, before the second song, program change #2, and so on. In each case, this results in all the effect units jumping to whatever preset numbers we've set in advance for that song.

To control multiple effects at once, it's easiest if each unit is set to OMNI, or to receive messages on the

MAPPING MADE EASY

Here's how to implement MIDI patch mapping with two familiar workhorses: the Yamaha SPX-90 and the Alesis Quadraverb. Since you or someone you know has either or both, try MIDI-ing them up. Once you've got that going, you'll probably be able to figure out how to make other units work, too.

Patch Map: Yamaha SPX-90

To create a patch map in the SPX-90:

- Check the MIDI receive channel. Hit the Utility button twice. You should see:

  MIDI CONTROL
  BANK:A ch= 1

  "ch" is the current MIDI receive channel.

- Hit the Utility button again. This brings up the patch map, shown below. Use the Arrow buttons to change the values displayed.

  MIDI PGM CHANGE
  PGM 5 = MEM 55

  In this example, sending the unit PROGRAM CHANGE 5 on CHANNEL 1 will cause it to load preset 55. Use the pair of Up/Down keys to change the PGM and MEM settings and create your map.

Patch Map: Alesis Quadraverb

To create a patch map in the Quadraverb:

All the relevant controls are accessed through the Quadraverb's MIDI button.

- MIDI CHANNEL sets the unit to receive on channel 1-16, or OMNI mode. Make sure this channel matches that of your master MIDI controller. Then, hit Page Up once.

- MIDI PROGRAM CHANGE is a three way toggle: OFF, ON and TABLE. When set to OFF, the unit will not respond to any program change messages. To enable program mapping, the TABLE option must be selected! Then, hit Page Up again.

- Here is the PROGRAM TABLE:

  PROGRAM TABLE
  000 = 00

MIDI program changes 0–127 are showed on in the three digits on the left, the QV's internal presets in the two digits on the right. Use the Page buttons to move the cursor between the two sides and the Value buttons to change settings.

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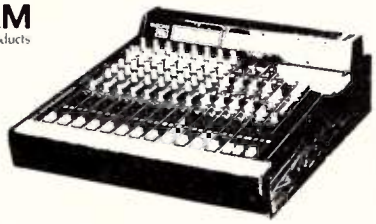

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EQ LIVE

same MIDI channel, so they all change at once. Then we'll need to create a program or patch map within each unit. Note that not all MIDI effects have patch-mapping capability, but it's very common.

Here's the patch map for the first three songs for each unit:

Patch	Effect 1	Patch	Effect 2
1	12	1	75
2	4	2	75
3	32	3	110

Note that the chorus effect in unit 2 (program 75) is used in two different songs. This isn't a problem — just map both incoming patch numbers to that preset. (Note that some MIDI devices start counting program numbers from "0," others from "1." If you find a one-digit discrepancy in your set up, simply add or subtract one from each entry in a device's patch map as needed.)

Once these maps are created within each unit, set them both to the same MIDI channel as your MIDI controller (and connect them via MIDI cables). Now, choosing program change 1, 2, or 3 from the controller will recall these three mapped configurations. Sending program change numbers that are not mapped (4, 5, 6, etc.) will cause both units to recall their 4th, 5th and 6th effect, whatever they may be.

While our simple example requires all effects units to be set to the same MIDI channel, this isn't always the best way to go. For instance, some sophisticated MIDI controllers have their own internal patch maps, where selecting one preset causes many different program change numbers to be sent on different MIDI channels (one such product is Digital

continued on page 126

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New Gear For Your Next Gig

LightSPEED's RFX 1600U

Light Hearted

LightSPEED Technologies has introduced another wireless microphone system, the RFX 1600U. This wireless system has 16 preprogrammed UHF frequencies ranging from 944 MHz to 952 MHz. The BP-944U belt-pack transmitter, the HM-900 handheld transmitter, and the RFX 1600U dual-tuner diversity receiver are frequency agile for quick frequency selection. The HM-900 handheld transmitter is available with several popular microphone capsules. Retail prices range from $1500 to $1800. To find out more, contact LightSPEED Technologies, 15812 SW Upper Boones Ferry Rd., Lake Oswego, OR 97035. Tel: 800-732-8999. Circle EQ free lit. #131.

M & M's

beyerdynamic has released a new line of five road-worthy microphones called the XS range. The line consists of the M 01, M 02, M 03, M 04, and M 05. The M 01 is ergonomically designed for those who prefer to have a solid hold on their mic. The rest of the group feature conical-shaped barrels that allow for easy multiposition handling. The M 01, M 03, and M 05 have on/off switches. To find out more, contact beyerdynamic, 56 Central Ave., Farmingdale, NY 11735. Tel: 516-293-3200. Circle EQ free lit. #132.

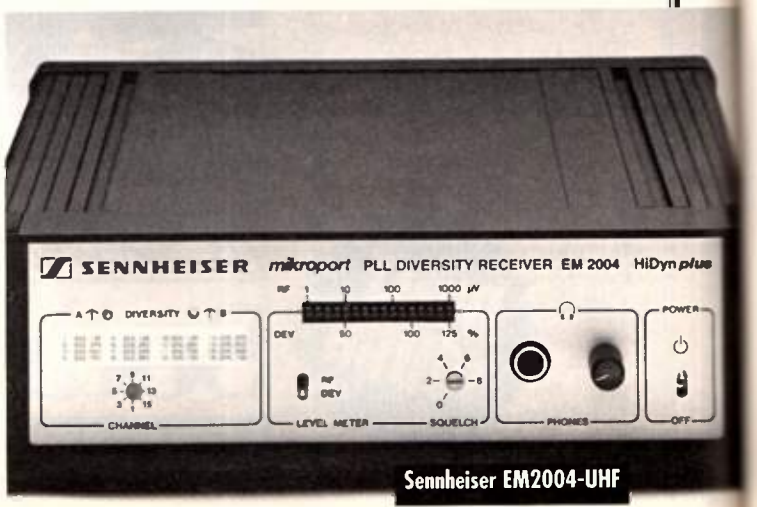
Topaz Mini

Mini Mix

If you are in the market for a mighty little mixer, check out the new Topaz Mini from Soundtracs. This mixer has been specifically designed to provide a mixing console for small bands and combos, small clubs, conferences, keyboard mixing, and stereo recording. The Topaz Mini provides four mono and four stereo inputs plus two stereo effects returns into a stereo output. Other features include headphone jack and phantom power. To hear more, contact Soundtracs, distributed by Samson Technologies, P.O. Box 9031, Syosset NY 11791-9031. Tel: 516-364-2244. Circle EQ free lit. #133.

Get in the Wireless Receiving Line

Sennheiser's latest UHF receiver, the EM2004-UHF, can be tuned to one of 16 preprogrammed channels. It provides a total bandwidth of up to 24 MHz. This allows the receiver to be used anywhere in the world. If Sennheiser's receiver encounters an occupied frequency, it can be switched to an interference-free channel. Matching transmitters include the SK50-UHF, SK250-UHF body packs, and the handheld SKM5000-UHF. Systems are available in frequencies ranging from 450 MHz to 800 MHz. The HiDyn Plus noise reduction system ensures quality audio with versatile dynamic range. PLL frequency synthesis ensures that the EM2004-UHF stays on frequency. For more details on the EM2004-UHF wireless receiver, contact Sennheiser, 6 Vista Drive, P.O. Box 9487, Old Lyme, CT 06371. Tel: 203-434-9190. Circle EQ free lit. #134.



Sennheiser EM2004-UHF

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C-ING IS BELIEVING

For sound reproduction in small- to medium-sized venues, Klipsch Professional has introduced two new C-Series speakers, the KP-2000-C full-range speaker and the KP-1000-C-SW-X subwoofer. The KP-2000-C utilizes a 12-inch woofer and 1.5-inch compression driver. The woofer features a die-cast aluminum frame and is mounted in a sealed enclosure, while the Ferro-Fluid cooled tweeter is coupled to a proprietary 60 x 40 degree Tractrix Wave horn. Also on the tweeter is a KLiP (Klipsch Limiter Protection), which is a circuit that momentarily reduces output by 10 dB if you are cranking in the danger zone. The KP-2000-C has been designed for nightclubs, DJs, performing artists, and other live-sound applications. Klipsch's KP-1000-C-SW-X subwoofer, aka the "stubby sub," sports a power handling of 400 watts and its 15-inch driver is housed in a ported enclosure. The frequency response is 40 Hz–400 Hz, and when the internal crossover is in use, "stubby stub" reaches down to 150 Hz. One really cool feature on this subwoofer is that it's got a built-in stand socket that allows the KP-2000-C or other system to be mounted directly above it. Use the optional KP-36-T tube as the stand, or your own pre-existing stand. Both of Klipsch's speakers have carrying handles and locking 1/4-inch Neutrik connectors on the rear. Fuse

Klipsch C-Series

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protection is additionally offered on both systems. For details, contact Klipsch Professional, 149 N. Industrial Park Rd., Hope, AK 71801. Tel: 615-689-2500. Circle EQ free lit. #135.

The Bands All Here

Need 15 bands of equalization? Peavey's got them in its Q 215 dual 15-band 2/3 octave graphic equalizer. Designed for use in house and club-band PA systems, or in project studios, the Q 215 has constant Q filters on standard ISO centers that ensure that frequency band level adjustments don't affect adjacent frequency band levels. Features such as stereo EQing of the main PA, dual-channel monitor equalization, and room or multi-instrument equalization provide flexibility in EQ control. For mono PA systems, the Q 215 allows one channel to be used for the main PA EQ while the other channel is used to EQ the monitors. Other features on the Q 215 are a maximum input/output level of +18 dB, a THD of .003 percent, a frequency response of 20 Hz–20 kHz, and an internal power supply that, fortunately, does not involve a wall wart.. Retail price is $215.99. For information, contact Peavey, 711 A St., Meridian, MS 39301. Tel: 601-483-5365. Circle EQ free lit. #136.

Crave the Wave

Martin Audio has launched the Wavefront 8 full-range touring system and the Wavefront 8S hybrid subbass system. The Wavefront 8 is a three-way touring sound-reinforcement system that uses its two 12-inch drivers to operate down to 80 Hz. The cabinet utilizes a 55-degree horizontal dispersion pattern and trapezoid design. Each Wavefront 8 enclosure houses a vertically splayed dual 12-inch driver horn-loaded low-mid section, a 6 1/2-inch treated cone driver loaded by a toroidal phase plug and horn. High frequencies are reproduced by a 1-inch exit compression driver on a constant Q HF horn with dispersion characteristics engineered to match the high-mid. The Wavefront 8 is fitted with a load-certified MAN flying point, which link between cabinets to provide the means of assembling an array. The Wavefront 8S is a trapezoid subbass enclosure designed for use with the Wavefront 8 full-range system in situations where low-frequency enhancement and extra headroom are required. It has a hybrid horn/reflex design with the two situated in two separate sections. The horn section is powered by a high-efficiency 15-inch driver and the reflex section is powered by an 18-inch device. For information, contact Martin Audio Limited, 19 Lincoln Rd., Cressex Business Park, High Wycombe, Bucks HP12 3RD, UK. Tel: +44 (0)1494-535312. Circle EQ free lit. #137.

Rack 'Em Up

Following in the footsteps of its big brother, the Bass Station analog synthesizer, Novation introduces the new Bass Station Rack. It provides that analog sound that many of us crave in this digital world. The Bass Station Rack has all of the same features found on the Bass Station, along with some new features. The Bass Station Rack has 100 memories (40 factory, 60 user), an Oscillator 1/2 Sync, which is used for creating growling guitar or plucked bass sounds, a CV/Gate in/out to MIDI converter, and an external audio input. The Bass Station Rack is housed in a 1U aluminum chassis, and can be used in live or studio applications. Retail price is $799.95. To slide into the bass, contact Music Industries Corp., 99 Tulip Ave., Floral Park, NY 11001. Tel: 516-352-4110. Circle EQ free lit. #138. EQ

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EQ LIVE

DOD R410 Series II PA Processor

Road Test

MANUFACTURER: DOD Electronics Corporation, 8760 South Sandy Parkway, Sandy, UT 84070. Tel: 801-566-8800.

APPLICATIONS: EQ and limiting for driving live-sound systems or inserting in a mixer channel.

SUMMARY: A low-cost, single-channel PA processor that offers practical features, a few compromises, and needs minimal rack space.

STRENGTHS: Compact; well-marked face panel; good notch filters; balanced connections with versatile Thru connection.

WEAKNESSES: Lacks ground-lift switch; no "hard-wire" bypass; minimum of controls.

PRICE: $279.95 **EQ FREE LIT. #:** 139

BY WADE MCGREGOR

IF YOU HAVE to carry your sound equipment into a new venue for every gig, the size of each piece becomes very important. With many sound systems, the basic requirements for processing the signal can be summed up as EQ and protection limiting. Sure, there are lots of other cool tools to enhance your sound, but these are the basics that will make the system sound good and prevent overload. DOD has managed to put together a very useful version of these two primary processes in a single-rack-unit box for the house mix rack or on-stage monitor system.

The DOD 410 Series II combines a 2/3-octave graphic equalizer, two-band notch filter, and limiter into a single-channel processor. With well-marked controls and simple, clear level indications of both input/output, and gain reduction (four LEDs each), the new 410 makes access to this processing very convenient.

EQ ON EQ

Although the EQ provides only fifteen 2/3-octave bands, rather than thirty 1/3-octave bands, it is quite sufficient for many live-sound applications. When voicing a system (EQing by ear) to suit a particular performance, the 2/3-octave EQ is enough to allow control over each important area of the musical spectrum while also speeding up the process. The 410 offers ±12 dB of gain on each band. Users should remember that when using bands this wide it is best to keep EQ within 3 to 5 dB of flat because of the radical changes in response that deep cuts can make (see fig. 1). The 410's short-throw sliders (20 mm) make it a little tricky to accurately set smaller changes in EQ.

Two variable-frequency notch filters provide up to 24 dB of cut in overlapping bands, variable between 40 Hz and 20 kHz. This offers the user an excellent tool for controlling feedback, removing a noticeable resonance, or narrow-band noise (e.g., 60 Hz hum) from the sound system. Frequencies are selected with a rotary control for each notch, and are augmented by a (frequency) X10 switch to extend the range of each control. These notches are narrow enough down to –18 dB to finely tune in on problem frequencies (see fig. 1), but are wide enough to prevent deep notches from losing their effect if the source shifts frequency slightly.

LIMITER POSSIBILITIES

The limiter can be switched between slow or fast attack/release and has an adjustable threshold from –0 dB to +22 dB. Four LEDs display gain reduction from 1 dB to 10 dB. The limiter sounds good if not driven to excess, but lacks the controls required for making a wide range of sources sound good with more extreme amounts of compression. The slow attack is suitable for catching vocalists that tend to bark into

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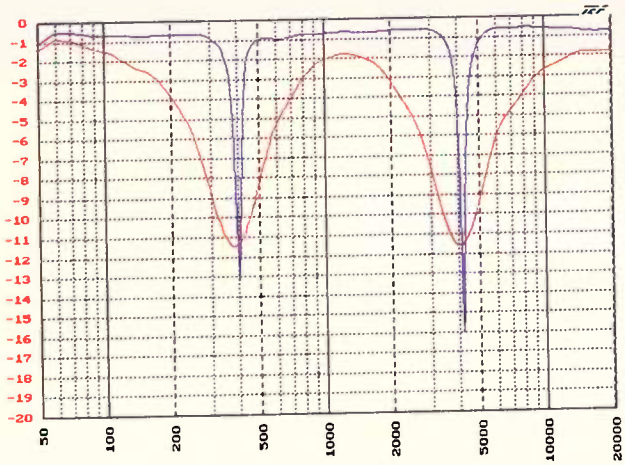

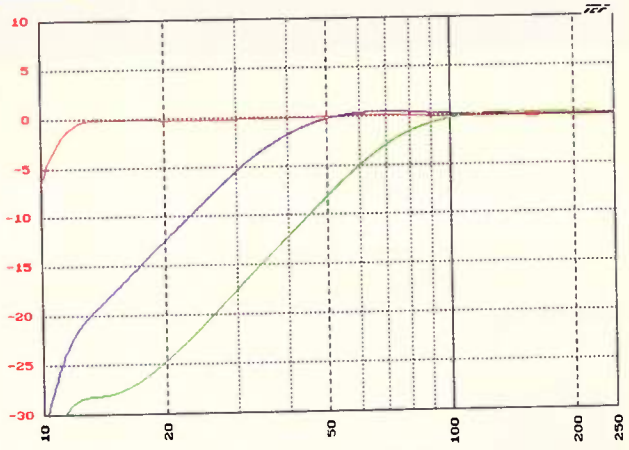

FIGURE 1: Comparison of DOD 410 series II equalization: 2/3-octave Graphic Filters (red) and Notch Filters (blue) set to −12 dB at 400 Hz and 4 kHz. FIGURE 2: High-pass filters set to 40 Hz (blue) and 80 Hz (green) and bypassed (red).

the microphone (an unexpected painful shout), while the fast attack is suitable at higher threshold values for providing simple amplifier overload protection.

All of the aforementioned processing is engaged by a single EQ/Limit switch (with green LED indicator), while the high-pass filter is separately engaged by a Low Cut switch (with a red LED indicator). The high-pass filter can be switched between 40 Hz or 80 Hz turnover frequencies (see fig. 2). These are well chosen frequencies that serve users of speech-only (80 Hz) sound systems or systems without lots of subwoofers (40 Hz). The high-pass filter can also be used creatively by momentarily switching it into circuit (the switch is quiet in operation) whenever the sound has become overloaded with bass.

GET BACK

An unusual feature of the 410 is on the back panel. Along with balanced XLR and 1/4-inch phone jacks for input and output from the unit, there is a third pair marked BAL THRU OUTPUT. This is a balanced parallel connection of the input signal for daisy-chaining multiple 410 units or other processors for specialized applications. This is an extremely handy feature if you must provide a recording output from your console or are feeding a second sound system that requires different EQ and processing from the main system. This output is not affected even by loss of power in the 410.

The unit uses a standard IEC-type power cable connector but does not have a switch for disconnecting audio ground from the AC ground. (The audio and AC grounds are separated internally by a 10-ohm resistor.) This offers some potential for ground loops, and in some situations may require the user to break the ground connection within their balanced audio cables (at the output connector only).

The DOD 410 series II is an excellent way to reduce the cost and size of your sound-reinforcement system's processing while still retaining control over the important aspects of tone and level. Although the 410 is obviously well suited to both FOH and stage-monitor mixing applications, it would also be an excellent processor for patching into a vocal channel or subgroup. The DOD 410 series II processor is packed with useful features that are amazingly easy to use. EQ

World Radio History

Ensoniq KT-88 Keyboard

EQ LAB REPORT

MANUFACTURER: Ensoniq Corporation, 155 Great Valley Parkway, P.O. Box 3035, Malvern, PA 19355-0735. Tel: 610-647-3930.

APPLICATIONS: MIDI keyboard for studio and stage.

SUMMARY: A well-rounded, professional, 88-note weighted MIDI keyboard.

STRENGTHS: Logical and friendly operation, ready to play out of the box with full programmability.

WEAKNESSES: The only audio output is one set of stereo outputs.

PRICE: $2695 **EQ FREE LIT. #:** 140

IN RECENT YEARS, electronic keyboards have routinely become more complex. Ensoniq, however, has put extra work into making its new KT-88 friendly as possible. Ensoniq's KT-88 is a sample-based MIDI keyboard featuring an 88-note weighted keyboard, 64-voice polyphony, on-board sequencer, General MIDI support, and effects with real-time control. Features such as the SoundFinder (which lets you find sounds by category), the 39 preset envelopes, and the very detailed, outstanding 250-page operation manual will encourage advanced users to customize and understand their keyboard. If, on the other hand, you are looking for something to plug-in-and-play, the KT-88 comes complete with 308 on-board sounds, General MIDI support, and a 25-page quick start manual. The KT-88 is powerful and easy to use, making it a good choice for both professional and novice keyboardists.

The KT-88 is ready to play out of the box, but it is also highly programmable. The foundation of the instrument is the 211 waves in ROM, many multisampled, that make up the raw-sound material. A KT-88 sound is made of up to three waves and an effects algorithm. Each voice has two filters and three ADDSR (Attack, Decay1, Decay2, Sustain, Release) envelopes. The two filters work in series and can combine for a total of 24 dB/oct rolloff. The cutoff frequency and filter type is independent for each filter, so it is possible to create a bandpass filter by making one a low pass and the other high pass. Modulators can dynamically adjust the cutoff frequency.

Effect processing is done by the Ensoniq signal processor (ESP) chip, the same one used in the Ensoniq DP/4 digital effects processor. All effects have dynamic MIDI-controllable parameters. Most are multieffects algorithms, such as parametric EQ-reverb or flanger-compressor-distortion-reverb, with a choice of 16 reverbs.

World Radio History

Up to eight sounds can be layered, split, and assigned to sequencer tracks in a "preset" or keyboard setup. Each sound can be sent dry, through all effects, or reverb only. Presets also form the foundation of sequences. The eight sounds in a preset are assigned to 8 tracks in a "sequence." A sequence can be recorded linearly, step, or real-time, or can be combined in "drum machine" pattern-style programming into a "song." Each 8-track sequence or song has an additional 8 tracks for overdubs, for a total of 16 tracks of sequencing. The sequencer is limited to 6500 events, but is expandable to 112,000 events with a PCMCIA RAM card. Quantizing is very basic, postrecord only, and destructive, and the clock resolution is only 96 ppqn. The sequencer is very easy to use, but, of course, doesn't have all the bells and whistles of a full-blown computer program.

Keyboard touch is very subjective and personal. I found the keyboard easy to play and adjust to. It's got a lighter touch than my Korg-T1, but heavier than a synthesizer. Fourteen keyboard velocity curves and four keyboard pressure settings are available to tailor the keyboard touch to your playing style.

The KT-88 would make a great master keyboard in any MIDI studio. The MIDI implementation is very good. Although it doesn't generate key pressure, it does generate channel pressure and can transmit splits and layers on up to eight simultaneous and independent MIDI channels. The KT-88 responds to the MIDI Bank Select, pan, and volume. Local control can be turned off for individual zones. If you want the KT-88 to do double duty as your master keyboard and a multitimbral sound module, keep in mind that it only has one set of stereo outputs and only one set of multieffects per setup.

For composers, the 64-voice polyphony will handle complex arrangements without running short of voices. If you do run out of voices, each sound has an adjustable priority, giving you control over which ones will be stolen first. There is a good cross section of sounds, including bass, drums, guitars, brass, orchestral, choirs, synthesizers, and keyboards... lots of keyboards, including, organs, acoustic pianos, electric pianos, harpsichord, clavinet, and synthesizer layers. I found nearly all the sounds

continued on page 120

ENSONIQ KT-88 SPECS

Transmits channel pressure, velocity on and off, 34 ROM Pitch-tables, 39 preset envelopes, 10 ROM presets

Connections: MIDI In, Out, Thru, Foot Switch (single or dual), CV Pedal

General MIDI: 128 GM sounds, Roland MT-32 emulation.

Modulators: LFO, noise1, noise2, env1, env2, env3, whl+pr, wheel, pitch, pedal, timbre, XCtrl, pressure, keyboard, velocity. Six ramp envelopes for modulating effect parameters only

LFO: Triangle, sine, sine/tri, positive only sine, positive only triangle, sawtooth, square

Glide: Trigger, minimode, legato

211 Waves divided into 14 classes: Keyboard, String, Brass+Horns, Wind+Reeds, Vocal, Bass, Drum, Cymbals, Percussion, Tuned-Percus, Soundeffect, Waveform, Inharmonic, Transwave

Storage Media: Ensoniq MC-512 card, $179.95 (PCMCIA SRAM card)

Storage: 4 banks of 80 sounds (internal, ROM, a:card, b:card); 4 banks of 70 Sequences/Presets, 30 Songs; 1 bank of 20 drum sounds; 128 General MIDI Sounds

Sequencer: Song Position, Song Select, Start, Stop, Continue

Tempo: 25 to 250 bpm

Effects: Dry/bypassed, dual parametric EQ-reverb, warm chamber, 8-voice chorus, eq-chorus-reverb, EQ-DDL-reverb, DDL-chorus-reverb, filter-chorus-reverb, flanger-reverb, phaser-reverb, rotary speaker-reverb, flange-compression-distortion-reverb, distortion/wah-chorus-reverb.

Reverbs: Early reflections, ambience 1, ambience 2, inverse room, warm room, small hall, dark plate, bright plate, medium hall, medium room, stone hall, warehouse, string hall, bright hall, long plate, canyon.

World Radio History

D3 IR-1 Microphone Switch

EQ LAB REPORT

MANUFACTURER: D3, Inc., 1012 Morse Avenue, Suite 19, Sunnyvale, CA 94089-1634. Tel. 800-701-7899.

APPLICATION: An automatic microphone switch for stage and studio.

SUMMARY: A reasonably priced alternative for noise gates and channel muting.

STRENGTHS: Triggers well at close range; a cost effective solution for some live applications; easy to install and use.

WEAKNESSES: Trigger accuracy diminishes at longer range settings; slightly affects frequency response of the microphone; switch can not be mounted on all types of mics.

PRICE: $165 **EQ FREE LIT. #:** 141

MOST OF US have used noise gates and channel muting to keep our mixes free from instrument leakage and extraneous noise. However, what do we do when we set up a live system that has no budget for gates (let alone multiple gates) or which won't have an in-house operator to mute channels or set and reset thresholds? Such is often the case with certain theaters, churches, conference centers, and board rooms. How do we prevent background noises from creeping into the mix? The IR-1 from D3 might be your answer.

The IR-1 is an automatic microphone switch designed to detect performers or speakers by means of an infrared beam and noiselessly turn a microphone on and off. The IR-1 case construction is textured black ABS UL94HB, measures 2.2 inches wide, 2.8 inches long, and 1.7 inches high, and weighs 3.5 ounces.

When I first turned on the IR-1, it was noisy when coming on line, and the reaction time of the opening and closing of the infrared switch seemed a bit radical. One of my first thoughts was that the internal battery might be low, so I replaced it. Success! Replacing the battery (the manufacturer claims 60 hours of use), which was easily purchased at a local discount department store for $6.99 (much less expensive alkaline batteries also work fine), cleared up the noise problem and the sensing became much more sensitive and accurate. Another of life's reminders to always carry fresh batteries in your trouble kit.

The IR-1 triggers well at a close range setting, but with a longer range trigger, 12 inches or more, its accuracy diminishes (there is a screw-type threshold-setting adjustment). I also found that the width of the infrared beam was at times triggered by motion from the sides. [D3 bases its infrared beam on a cardioid pattern, and so considers the side sensing a positive point because it permits two performers to use one mic — something D3 calls the "Lennon-McCartney mode." —HGL]

I put up a Sennheiser MD421 without the switch and it sounded the way you would expect: warm with a good middle response and a reasonable top end. With the IR-1 on the mic, the 421 sounded hollow and a little low-end light. The top end seemed to be unaffected. The switch also attenuates the signal by 1/2 dB or so. The manufacturer claims that their high-pass filter reduces stage rumble, stand noise, etc., but their 30 Hz high-pass filter could use a little refinement since the IR-1, when in line, does slightly affect the overall frequency responses of the microphone.

Although the IR-1 will work with many mics, the XLR connector configuration is not the standard mounting, but rather is mounted upside down. This inhibits the use of any mic with a keyed mic clip, (e.g., a Sennheiser MD421 or Electro-Voice RE20). The switch ends up under the mic, and after you trigger the on response, the sensor cannot discern the mic clip from a person and will not shut off. The IR-1 seems best suited for the generally more affordable smooth shaft mics, like a SM-58 or SM-57, that can be rotated in their clips. The IR-1 does pass 48-volt phantom power, but it would be more effective if it ran on phantom, not just passed it along (D3 does make a version that is AC powered).

Considering the availability of smaller, less expensive boards that have the capability to link Mac- or PC-driven software to give channel mute and fader automation at a reasonable price, I question the advantage and cost effectiveness of the IR-1 in a standard studio setting. In

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"...it is hard to think of anything one might want which HHB have not provided. It bristles with all the right features..." *Studio Sound*

"It seems that every possible detail was considered in the PDR 1000's design" *EQ*

"The PORTADAT is undoubtedly one of the finest portable DAT machines available". "At last you can buy a portable DAT recorder that has all the facilities required by a professional..." *Audio Media*

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CIRCLE 58 ON FREE INFO CARD

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The Demeter VTCL-2 Tube Compressor Limiter is finally here!

The two-channel (stereo or dual-mono) VTCL-2 is a unique design by James Demeter utilizing an all-tube audio path(no transformers, ICs, or Op-amps) and analog opto-isolators to drive the compressor. Featuring previously unheard-of versatility from a tube design, the VTCL-2 easily accomplishes every compression and limiting function with a minimum of noise and distortion and no signal degradation. Brickwall limiting, over-easy, hard-knee, peak-limiting, as well as signal 'squishing' and infinite sustain with live signals are easy for the VTCL-2. The VTCL-2 has the versatility and hi-fidelity sound quality to replace any compressor available new or used, at a reasonable price. Controls are provided for input and output gain, threshold, attack and decay speeds, stereo link or dual-mono operation, and bypass (buffered through tubes.)

Also provided for ease of interface are XLR, TT, 1/4" phone jacks on all inputs and outputs as well as pin selector switches on each.

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CIRCLE 71 ON FREE INFO CARD

fairness though, the IR-1 would empower studio performers by allowing them to turn off a hot mic by simply stepping back from it. Thus giving them the chance to find pitch or clear their throats without those sounds being printed to tape or the need to mute that channel. The IR-1 is better suited for live applications such as corporate podium speeches, small venues, churches, or theater performances where there is minimal outboard gear or little inclination to purchase any gates. It may also be useful in a broadcast or advertising studio application.

The concept of this product is great and it does work fairly well. With a fresh battery the IR-1 is a quiet microphone On/Off switch. Its forte seems to be in multiple live applications. The IR-1 may be an inexpensive solution to many live needs where mixers and gates are not available or affordable. —*Alex Perialas*

Alex Perialas is a recording engineer, producer, and vice-president of Pyramid Sound, Inc. in Ithaca, NY.

ENSONIQ KT-88

continued from page 117

usable in projects, especially soundtracks, without additional programming. Some of the pads make marvelous use of space and velocity. The Leslie effect on the organs is turned on and off via keyboard pressure, something I found very playable.

For live performances, the sleekly designed chassis is solidly constructed and the AC cord is removable. It's narrow and reasonably light for a full-sized weighted MIDI controller. The panel is easy to read and the transpose function has LEDs to show you when and by how much you've transposed. Individual sequencer tracks can transmit to either the onboard sounds, external devices, or both. In song mode, you can set patterns to loop until the footswitch is pressed. It does not have a separate click track output.

Overall, the KT-88 is a well-rounded professional keyboard.

—*Tona W. Ohama*

World Radio History

THE COMPLETE JINGLE COURSE JUST GOT BIGGER AND BETTER

THAT'S RIGHT-BIGGER AND BETTER

Now when you order you will receive absolutely **FREE** a video that shows you how to get production jobs on the phone any day you want. It was filmed at my first ever "Jingle Bootcamp" in Feb., where people just like you came to Las Vegas to learn how to do it hands on for 3 1/2 days. I videoed the whole thing Read on and find out more about this video and how to get into the Jingle business today.

Hi. My name is La-Dair Guzman and I've been creating and selling Jingles for 19 years. I started my Jingle career in motel rooms while I was on the road playing music six nights a week for 10 years. I made more money selling Jingles than playing in the clubs.

I'VE ALREADY MADE ALL THE MISTAKES

In the past 19 years I have sold Jingles one-on-one, through the mail, radio stations, ad agencies and on the phone. Which way is the best? Personally I enjoy the phone and mail the best. I can make more money faster, easier, that way. I have Jingles in 47 states, haven't met face-to-face with 99% of them.

WHY SHOULD YOU ORDER THIS COURSE?

Because I'm going to show you every secret.. The "real" world way the Jingle business works. You will know exactly how to make the money you want in the Jingle business. You will learn. . . . .

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How to "out compete" the big boys.
How to record a top quality Jingle for less than $50.00 and sell it for a $1000.00
How to make $100-$500 next weekend.
How to syndicate and make the big money
How to tell if the radio stations are helping or not.
How to travel anywhere in the country for FREE
How to use sound effects and character voices to make quick bucks in minuets.
And I mean this sincerely. . .Much Much More!

This is not just another "How To" book. This is a complete Jingle business course that can take you as far as you want. **PAGES JAM PACKED WITH EVERYTHING YOU NEED TO KNOW ABOUT THE JINGLE BUSINESS.** You will never be left with unanswered questions about what to do next.

YOU WILL NEVER BE ALONE UNTIL YOU WANT TO BE. Order this course you also receive FREE phone/mail consultation for one full year.

WHY AM I TEACHING YOU EVERYTHING?

Because there are 9.2 million business in this country. I'm like a knat on an elephant. The Jingle business is not controlled by anyone. There isn't an association. There isn't any industry magazine. Do you know why? Because the Jingle business is an **IDEA** business. And if you have the best idea, the client will buy from you, even if you have been in the Jingle business for 30 minutes. **NO ONE HAS A LOCK ON THE JINGLE BUSINESS.** If you are creative and can create musical and lyrical ideas you can be in business tomorrow. If you get the course, of course.

LEARN AT THE SPEED OF LIGHT

Most people look at their town and say, "here's my market." That isn't your market. The size of your town doesn't matter. I'll show you how to sell Jingles anywhere. I will teach you things that will save you at least five years of your time. Even simple things like. . .one sentence that can kill a Jingle sale. And most amateurs use it every time.

WHAT DO YOU GET AND HOW MUCH?

1. A 357 page manual (which also includes all of the paperwork and agreements I have used in the past 19 years.)

2. A **FREE** bonus book that can be worth thousands of extra dollars to you. It's called, **"HOW TO MAKE MONEY WITH YOUR MUSIC WITHOUT HAVING TO PLAY IN BARS."** It shows you over 20 different ways you can make money with your music. Things like. . .

Concert Promotions
Fund Raising Tapes
Custom On-Hold Production For Business Phones. (This is a musicians heaven. I know of one company who sells over 1000 On-Hold packages a week!)
Contests
Cassette Coupons
Club Consulting
Recording and Marketing Your Own Tapes or CD's
And, YES IT'S TRUE "A WHOLE LOT MORE"
I sold this book nationally for $40. it is yours FREE.

3. If you act on this offer within the next 30 days I will include a $59.00 video absolutely **FREE.** This video is of myself getting production jobs on the phone, totally unrehearsed. Filmed for the Jingle bootcamp you will hear both sides of the conversation and learn first hand how to get Jingle clients. Hear how to pin them down to a commitment of buying your production idea. This video was created at the request of my Jingle course subscribers as the one tool they most wanted. It's yours **FREE** if you order now.

4. A one year **FREE** subscription to the only newsletter in the world devoted to the Jingle business. **"The Guerrilla Jingle Producers Newsletter."** Every month you receive an eight page newsletter that gives you the latest information on how to sell, what is hot, new products you can create, and tricks of the trade. I am developing the largest syndication network of Jingles in the history of this business. What makes it work is the access I have to hundreds of independent Jingle producers who have bought the course. The newsletter is my monthly communication to this network of Jingle producers. Order now and become a part of our group. The regular subscription price is $127. but it's yours **FREE** if you order now.

5. One full year of either phone or mail consultation.

That's it. Everything you need to start your Jingle business today, for only $249. Separately everything would cost you $474. For this low, one time cost of $249. you can be in the Jingle business tomorrow. I use to sell Jingles made in my motel room 19 years ago for more than that. One Jingle sale or voice over concept and you will make a lot more than $249.

HERE IS "ONE" OF MY GUARANTEES TO YOU:

If, after studying and following my Jingle course and the step-by-step directions for 60 days, you are not satisfied, you can send it all back in resaleable condition for a full no questions asked refund..

IF YOU HAVE THE TALENT, THE ABILITY TO CREATE CATCHY TUNES, WHY NOT USE THIS TALENT TO CREATE JINGLES AND AND LIVE THE LIFE YOU REALLY WANT?

Here is a chance to make money and have the most fun you will ever have. Look at it this way. . .if you don't think you have enough talent to earn back your $249. investment in yourself. . .Please don't order the course.

CIRCLE 85 ON FREE INFO CARD

WRITING THIS AD WAS FRUSTRATING. . .My biggest concern is that I might not be answering all of your questions in this ad. So here is my phone number. **(702-898-7070)** Call me if I haven't made something clear to you. If you have a question I haven't addressed in this ad. Maybe you need some special arrangements to pay for the course. I remember a jeweler who paid for his Jingle with a diamond ring. I had a nightclub owner who paid me $2000.00 for his Jingle with quarters generated every week from his video games and pool tables. Don't be shy. I'm a musician and I'm tired of seeing musicians with even more talent than I have, frustrated that they can't make the money their talents deserve. This is the answer you've been looking for. Are you going to ignore it, or are you going to act on it?

WHAT OTHERS ARE SAYING

I've been a professional musician for almost twenty years including many sessions recording Jingles for others. Yet those in the business have always been reluctant to share their marketing strategies for fear of competition I suppose. Your course is a long awaited breath of fresh air! Simple concise creative thought in an industry clouded with hype. WHAT A CONCEPT! S. Diamond. . .Nevada

I just received my copy of "The Complete Jingle Course" and wanted to commend you for putting together such a through package. B. Cook. . .Texas

. . .everything was laid out so clear, and easy to understand. Four days after receiving your course I was at a radio station negotiating a deal. A big thank you. This was one of my best investment.
D. Mazor. . .Toronto, Canada

This ad keeps running because the product really works. The Jingle Course is now in eight countries. Well it get overcrowed? Not a chance. Because it is an idea oriented business. Businesses need to change ideas on a regular basis, names change, new owners, one location grows to three. It never ends. The beauty is, if you can create the ideas, once you know what's in this course you can compete with anyone. **BURN THIS INTO YOUR MIND. THE CLIENT ALWAYS BUYS THE BEST IDEA. NO ONE, I MEAN NO ONE HAS A MONOPOLY ON THE BEST IDEAS. IT'S THERE FOR YOU. . .TODAY.**

LET'S SEE YOU BEAT THIS OFFER

If you order "The Complete Jingle Production course" I'll give you this guarantee. One full year from the date of your order if you make 12 Jingle presentations (that's one a month) and you do not sell one Jingle package. Send me a cassette of the 12 Jingles, plus the names and addresses of the clients you made your presentation to. After verification that you did indeed make 12 legitimate presentations with no sales results. I WILL SELL A JINGLE PACKAGE FOR YOU! YOUR IDEA OR MINE IT DOESN'T MATTER. I will then send you a $249 refund and keep any profits above the $249 refund. Plus, I'll let you keep the whole course. **LET'S SEE ANYBODY BEAT THAT GUARANTEE! ! !**

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World Radio History

REVIEW SHORTS

Supreme Beats by Bashiri Johnson

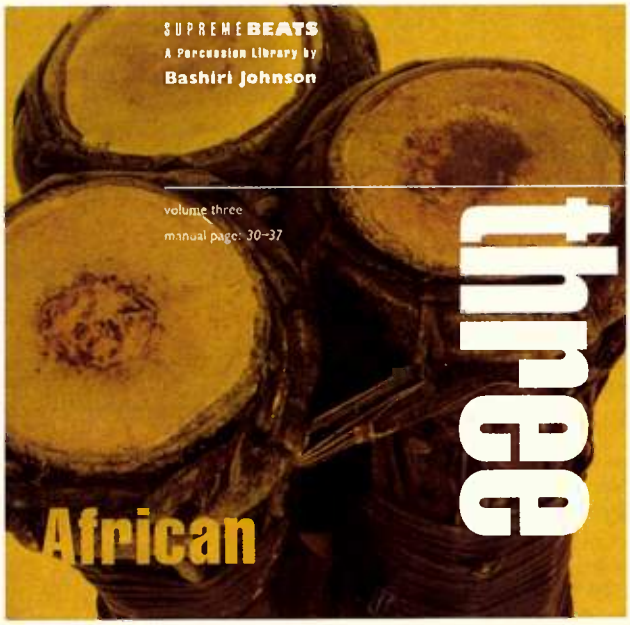
"There are enough useful loops and samples to satisfy just about every percussive need in modern music!"

Supreme Beats, from Grand Street Records and Filmworks, is a four-CD set of percussion samples and loops by Bashiri Johnson. Johnson is a world-class percussionist, whose inimitable style and groove can be heard on hundreds of platinum records as well as on Whitney Houston's last few tours. Bashiri has assembled an amazing collection of percussion loops and samples that fit nearly every style of contemporary music. In fact, each of the CDs is based on distinctly different styles and is available as a set. They are "Contemporary Volume 1," "Dance/Hip-Hop Volume 2," "African Volume 3," and "World-Volume 4."

I could fill an entire issue reviewing this material. There are enough useful loops and samples to satisfy just about every percussive need in modern music! I can't imagine how long it took Johnson to put this together. The accompanying booklet alone is 50 pages. Bashiri didn't just pick run-of-the mill sounds either. In addition to being very useful, many are very unique (Daro Bell, Africhua, Udu, and Bamboo sticks to name a few). Recording quality is as good as the selection, and many of the loops are played at three different tempos. For those of you presently owning sample libraries, these CDs will complement them well.

If you need great percussion loops or sounds for your music, my advice is to go out and buy this package. Your sampler will be grooving and shaking like you never thought possible.

—David Frangioni



For more information, contact Grand Street Record & Filmworks, 100 Grand Street, New York, NY 10013. Tel: 800-GSM-BEAT. Circle EQ free lit. #142.

Steve Stevens

"If you have a MIDI studio and don't play guitar, check this out."

On the *Steve Stevens Guitar* CD-ROM (SampleCell $199.95, CD-AUDIO $99.95), there are nearly 500 MB of samples including every note from the 44-note fretboard of a Ramirez 1976 Flamenco acoustic, picked and fingered. Also found are clean minor 9th chords on a Pensa Suhr Strat-style guitar with EMG pickups, as well as each note from the 46-note fretboard of a Jerry Jones electric Coral Sitar.

The complete unlooped samples are included, with looped versions of many, all keyboard-mapped and ready to play. You can adjust the amount of pick sound with the mod wheel. A 32 MB SampleCell is recommended (4 MB minimum required). If you have a MIDI-studio and don't play guitar, then check this out.

—Tona Ohama

For info, contact East-West Sound Warehouse, 345 North Maple Dr., Ste 277, Beverly Hills, CA 90210. Tel: 310-858-8797. Circle EQ free lit. #143.

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Sound Advice

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"This innovation truly provides a large improvement in a live mix for a very small price." Geoff Ganiford, FOH Eddie Money Band

"What a great idea. Sounds Great!" Eddie Money

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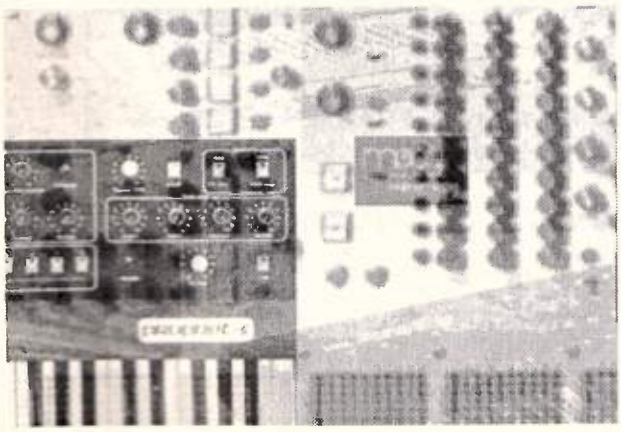

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CIRCLE 25 ON FREE INFO CARD

World Radio History

Life In The Nonlinear World

Tips for digital users who just love that analog sound

BY EDDIE CILETTI

The term "nonlinear" generally describes how workstations use hard disk technology to manipulate digital audio and video. In this article, though, it refers to an audio signal as it becomes distorted. Audio gear that produces desirable distortion has become quite popular in these digitally dominated times. Enthusiasts are actively collecting even obscure pieces of our sonic heritage — as if the secret to making great sounding gear had somehow been lost.

For digital users who love the sound of vinyl, tape, tubes, and transistors, here are some under-the-hood clues that will shed light on analog's beloved idiosyncrasies.

THE TOP FOUR PICKUPS

The signals generated by guitar pickups, microphone capsules, tape heads, and phono cartridges are really small. Amplifying these signals as accurately as possible, without noise, has been the goal of audio circuit designers throughout the ages. The proverbial wire-with-gain, or true, linear amplification, occurs when output equals input, only louder! (Pssst! I heard about this way cool modification that adds an eleventh position to any volume control...)

Digital recording technology and modern IC op amp-based consoles are good examples of this "linear" concept. A flat recording — however accurate — would be considered sterile by most audio hounds. We take for granted the ability to capture a sonic slice of time. But manipulating that slice — getting the sound we hear in our heads — is not always so easy. Standard tools such as EQ and compression are often not enough.

A ROSE BY ANY OTHER NAME

Saturation and soft clipping are euphemisms for precisely the distortion that gives certain vintage gear, analog tape, and the phonograph record their warmth. It's not that analog has more low-frequency response — digital beats analog hands down in the reproduction of low frequencies. Try recording a 40 Hz sine wave on a piece of analog tape and enjoy the modulation noise, harmonic overtones, and bias rocks — especially on the edge tracks. (Bias "rocks" literally do sound like rock hitting a plastic tarp. They can be caused by magnetized materials in the tape path, a well-traveled piece of tape, or distortion in the bias oscillator. Injecting 40 Hz through any piece of audio gear will exaggerate any problem, including scratchy switches, pots, and faders.)

Whether consciously or not, vintage enthusiasts are tastefully lopping off sonic transients and, in doing so, increasing both the apparent loudness and the ability to raise the recordable level. (Peak limiting will also have the same affect without as much distortion.) Both methods make better use of digital's Most Significant Bit (MSB). With 16 bits, slightly more than 96 dB of dynamic range is possible. The MSB is responsible for the loudest 6 dB, while the Least Significant Bit (LSB) is responsible for the softest 6 dB. (By comparison, a cassette recorded without noise reduction has slightly more than 48 dB of dynamic range. That's equivalent to digital's first 8 bits.)

WHAT'S THE DIFFERENCE?

For a visual understanding of the digital-versus-analog debate, check out fig. 1. The region between clean audio and hard clipping is enclosed in the shaded circle. Tubes, transistors, tape, and disc all behave similarly when operated within their linear range. Class "A" tube and transistor designs (such as those found in Pultecs and early Neve modules, respectively) have an extended "sweet area" of desirable distortion.

There is no gray area, however, when a linear device runs out of headroom. The result is always hard clipping — the nastiest type of distortion. Analog tape without noise reduction may be no match for digital's potential for 96 dB of dynamic range, but when a transient becomes a digital "over," watch out! There is no guard rail, no cushion, and certainly no margin for error like the airbag protection of analog tape.

MYLAR, IRON AND COPPER

Most vintage gear utilizes input and output transformers to balance the audio signal and thereby reject induced noise. When overdriven, they, too, can make a contribution to the sonic sculpture. Constructed of multiple turns of copper wire around a laminated iron core, transformer saturation can be very much a part of the vintage sound.

Analog tape is basically a transformer on wheels, uh, I mean reels. Magnetized iron oxide particles (another euphemism for rust) are glued to Mylar (DuPont's name for Polyester). The difference is that equalization is required to keep tape reasonably quiet without noise reduction. Boosting high frequencies during record and subtracting them upon playback does the trick for most applications, but therein lies the rub. Now, high frequencies hit the wall of saturation before low frequencies. This is great for drums and synths, but recording a tambourine (with a machine equipped with

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mechanical VU meters, for example) can be tricky. High-frequency transients are faster than the meter's response time, making the possibility of saturation even more likely. This sound, however, is not tasteful.

Many people know that faster tape speeds increase the usable high-frequency response while lowering the noise floor. But did you know that low frequencies saturate faster at 30 ips than at 15 ips? If you are still capturing in the analog domain, pay close attention to kick drum and bass levels.

IT AIN'T FINAL TILL IT'S ON VINYL

For those of you who carry on your love affair with vinyl, remember: Transferring your masterpiece to disk is full of hidden pitfalls. Out-of-phase, low-frequency information, (from a multimiked drum kit, for example) can cause the cutting stylus to lift off the acetate master. Summing only the low frequencies to mono solves the mechanical problem, but the "woof" from that floor tom will be severely diminished too.

Like tape, records have an EQ curve that includes about 18 dB of high-frequency emphasis. Combined with the high-frequency energy of metal and rap music, this extra treble requires six times the power of low-frequency information. Cutter heads must be helium cooled, or die! To further protect the head and ensure that the grooves are negotiable to the average stylus, high-frequency limiting is employed. If you like the sound of vinyl records, learn how to use a de-esser, especially when cutting vocals, or connect an equalizer to the sidechain input of your favorite stereo compressor/limiter.

THE WRAP

After potty training, our digital technology walks, talks, and may even be a doctor when it grows up. But what doesn't yet exist in a familiar and portable form are bits of software that can make digital gear emulate analog's idiosyncrasies. Two years ago, I reviewed Sony's DPS series of digital signal processors. One model contained an algorithm that simulated tape saturation.

Saturation and soft clipping characteristics may not have ever been an intended analog design feature, but they sure seem to be desirable artifacts among engineers and listeners alike. Look for upcoming reviews of analog's modern alternatives such as mic preamps from Rolls and Aphex, as well as RSP's Saturator. These products are specifically designed to tastefully remove transients. An opposite approach is taken by such companies as D.W. Fearn and Summit, whose gear is designed for maximum performance. Literally "in between" are the 8-channel peak limiters from Symetrix, Prosonus, and ART that use strictly modern techniques to level amplitude spikes and increase perceived levels. Oh yes, and a new company, Empirical Labs, has joined the fold. I'll be checking out its Distressor, too!

Reach Eddie Ciletti via E-mail. His address is: eddieaudio@aol.com.

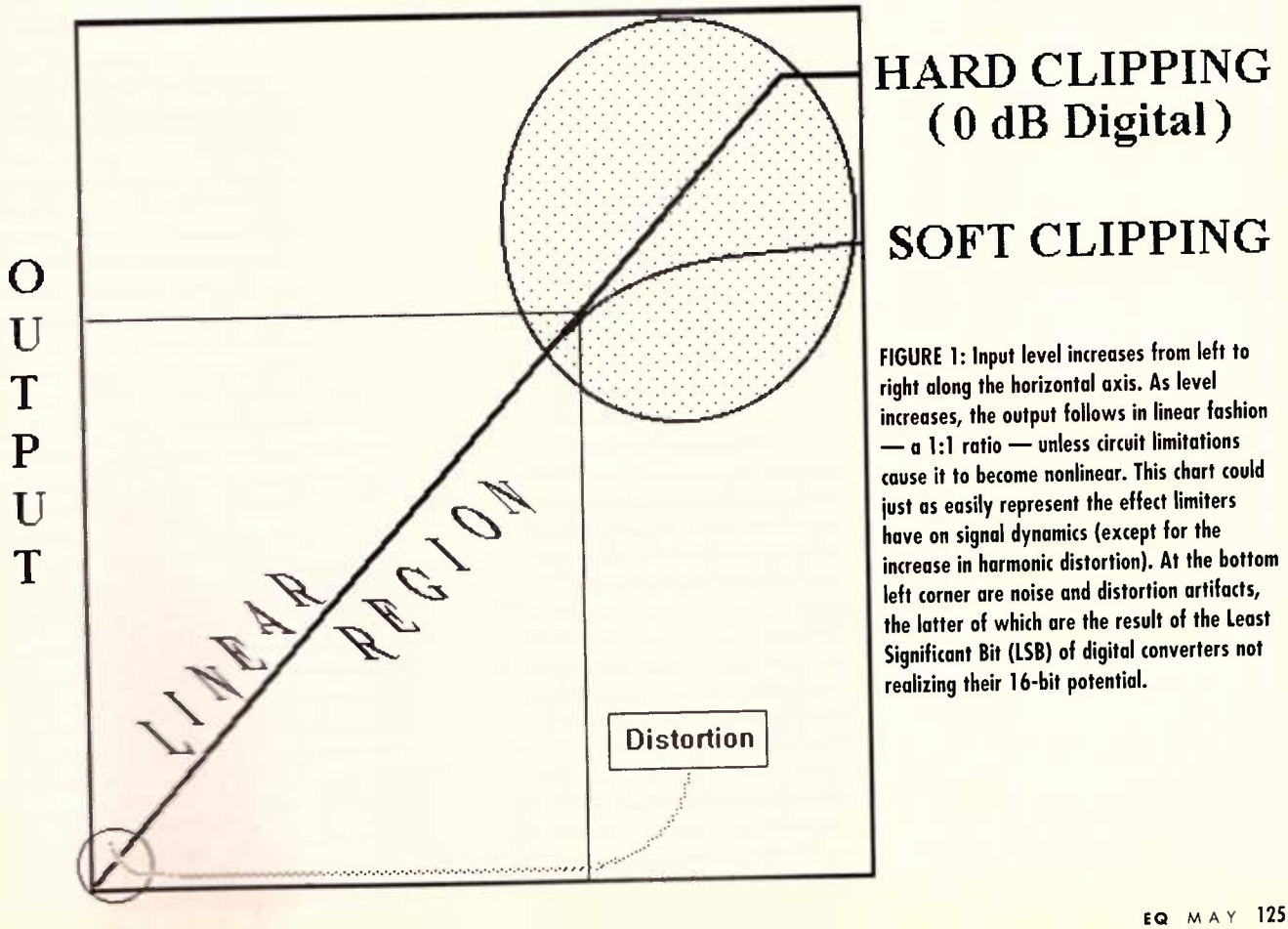

FIGURE 1: Input level increases from left to right along the horizontal axis. As level increases, the output follows in linear fashion — a 1:1 ratio — unless circuit limitations cause it to become nonlinear. This chart could just as easily represent the effect limiters have on signal dynamics (except for the increase in harmonic distortion). At the bottom left corner are noise and distortion artifacts, the latter of which are the result of the Least Significant Bit (LSB) of digital converters not realizing their 16-bit potential.

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AL SCHMITT

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about 46 weeks and the year before was similar. I've had very little time off. If I get two or three days off between projects I take off with my wife and just go somewhere to try to rest. It seems like one thing after another. Now I have a manager because I simply don't have time to make the deals. I still get the calls, but I turn them over to him and he makes the deals. I don't have to worry about working for a certain fee. But on the other end of it I'm one of these people who believes you have to give back, and if somebody is broke or it's somebody I like, I'll go in and help them out. I think that we need more of that in this business — especially for the people who are struggling. And I get people who call and say I'd love to have you, but I can't afford you, so I try to work something out. I'm not rich, but I'm happy God put me in this position. I love what I do, I do it everyday and they pay me for it. You can't beat that.

I still produce, but when I do I try not to engineer unless I am doing something with a group as a coproducer. I may mix the project myself, but I'll have an engineer do the recording. If I try to produce and engineer at the same time, the engineering distracts me from producing. I am so particular about the sounds and I concentrate on that aspect so much that I might start to forget about the music in terms of pitch and arrangements. During the mix, the music is down and I'm not distracted, so I can do that by myself.

Some people call me just to mix their records and I like that. That is kind of like putting the pieces of the puzzle together. I mix quickly — in most cases I'll mix two songs in a day. I really like to use GML automation on a Neve console or Flying Faders. I do a lot of stuff at Schnee Studio, Ocean Way, and Capitol Recording. When I'm in New York, I work at Hit Factory and Power Station.

Schnee has a custom board and I have my own gear as well. I have some of the Mastering Lab preamps from Doug Sax and Mastering Lab speakers that I take wherever I work. I also have some tube limiters and a t.c. electronic M5000 that I carry everywhere — I love that piece of equipment.

KEEPING THE FIRE BURNING

At one point in my career in the 60's I got involved in the drug scene when the acid groups were popular. There was a lot of grass and cocaine going around and, like a lot of other people, I got caught up in that. And that's when the burn out started to happen. I'm not so sure it was work. It was a lot of the drugs, staying up late, and not getting enough sleep. Once I woke up to the reality of what was happening and stopped doing it, my life became simpler, work became easier and more pleasurable, and I don't have that problem anymore. The only time I get burnt is if I go from project to project to project. I get a little tired and want some time off. But I can usually work it out to not schedule something for four or five days so my wife and I can just go away to an island somewhere and relax. A little R & R has to be built into the schedule. I have a lot of energy and I'm a workaholic, so sometimes it can get to be too much, especially if you are doing things that you are not too happy with. But for the most part I can be picky about my projects and I get a lot of respect from the artists. So it's at a high-quality level and there is already a good foundation. They respect me and I respect them. When I work with Tommy LiPuma, and even Dave Foster, I do what I want in the studio. I set up the way I want, I record the way I want, and they don't bother me. If it wasn't right, they would say something. These are top producers who hire me because I do what I do. They don't have to worry about it and that leaves them free to worry about the things they have to. If they are in there worrying about the creative end and then all of a sudden have to worry about why it doesn't sound right, it's more than enough burden on them and they wouldn't call me.

GETTING THE CALL BACK

I think the reason I get so many calls is that I'm easy to deal with in the studio. I don't have a major ego, I'm always willing to try something, and I listen. I get a lot of respect from the artists, and that works out well. When somebody hires me to engineer they not only get an engineer they get somebody that can produce records and will throw out a good idea once in a while.

My best advice for young engineers is that if you believe in something, really stick with it. If you have a passion for what you do, hang in there and stick with it. Don't let outside influences tell you to forget it. If you really believe in it, it will happen. And have good work ethics — be honest and put in a good day's work. Give your best all the time — it works for me. EQ

MIDI LIVE

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Music Corp's MX-8). In this case, you're better off setting each effects unit to its own MIDI channel and do all the mapping in the controller.

Once you start down the road with MIDI control, you'll be able to do more with less effort. Beyond effects control, there are MIDI-controlled stage lighting systems or MIDI-controlled VCAs that, with an appropriate MIDI sequencer, could let you automate the mix of a timecode-referenced production.

With MIDI and a little advance planning, a single button can recall presets in, not just one, but all of your MIDI-capable effects simultaneously. Obviously, this makes it feasible to use completely different effect treatments for each song without burying your nose in the FX rack.

Finally, the whole subject of "computer-controlled" or "networked-audio" systems has been a hot topic of late. While these systems differ from MIDI substantially, the concepts involved are very similar. Learning to use MIDI now will put you one step ahead of the game, whatever the future holds. [For more on MIDI controllers and live mixing via MIDI see "MIDI Maximus" by Wade McGregor in *EQ's* October '92 issue (pg. 93).]

Rudy Trubitt is a freelance audio engineer and writer. He is also the author of The Compact Mackie Mixer Book, published by Hal Leonard. This article is based on a presentation Rudy gave at this year's Live Sound Workshop, held in January in Orange, CA.

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NIGHT OF THE DAT

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sonic and Sony models offer correspondingly more features. The Sony allows for read-while-write, a "confidence" feature that lets you know whether a tape has been properly recorded. This alone will be essential for some applications, particularly live recording. The Panasonic's RAM buffer, however, might give it the edge for applications where fast cueing is vital.

For a portable DAT, the HHB PDR-1000 — which also lets you monitor while recording — is wonderful. (The price was dropped while we were compiling this article. We're sure there was no connection...). Other "portables" might be available for about an eighth of the price, but these will barely survive a trip in your backpack without airbag protection. For portable work, you'd be hard-pressed to find anything better than the PDR-1000.

The bottom line is this: whichever DAT you get, you'll end up with tapes that sound as good as today's digital audio technology will allow for at a given price point.

(Note: The Great DAT Debate doesn't have to end here. User feedback is now easier than ever. On America Online, feel free to drop by Craig Anderton's Sound, Stage and Studio, a meeting place for the readers and writers of *EQ*. Use keyword SSS, and go to Voice of the People.) EQ

DAT TAPE MANUFACTURERS

Following is a listing of DAT tape manufacturers and their brands of DAT tape (if we missed you, don't hesitate to write). Together they offer a varying number of tape lengths from 10 to 180 minutes (some offer custom lengths), with different housings, shells, hubs, and inserts for documentation. Prices are competitive, ranging from approximately $4 to $19 for the assorted lengths. An informal survey of U.S. recording studios and mastering houses showed that there is perhaps a greater difference in marketing and packaging than in the quality of DAT tape itself, which seems generally to be consistent. Interestingly, these same professionals (commercial and project rooms) seemed to feel that error rates among tape types varied not so much among brands as among boxes of tapes within brands. So, we suggest you try different brands and stick with the tape that delivers the most consistency. Feel free to contact these manufacturers with questions, complaints and compliments. –HGL

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401 Broadway, M/S 22-02
Redwood City, CA 94063
Tel: 415-367-2879
Brands: 467, DDS (data DAT)

Apogee Electronics
3145 Donald Douglas Loop South
Santa Monica, CA 90405
Tel: 310-915-1000
Brands: Masterdat

BASF
35 Crosby Drive
Bedford, MA 01730
Tel: 617-271-4000
Brands: DAT

Denon Electronics
222 New Road
Parsippany, NJ 07054
Tel: 310-404-0200/201-575-7810
Brands: Denon

DIC Digital
500 Frank W. Burr Blvd.
Teaneck, NJ 07666
Brands: MQ, HQ Series

FUJI
555 Taxter Road
Elmsford, NY 10523
Tel: 914-789-8490
Brands: DAT

Greencorp USA, Inc.
1015 West Newport Center Dr, Ste 105
Deerfield Beach, FL 33442
Tel: 305-429-9225/800-972-0707
Brands: Greencorp

HHB Communications
US Distributor: Independent Audio
295 Forest Ave., Ste 121
Portland, ME 04101
Tel: 207-773-2424
Brands: HHB Digital Tape

JVC
41 Slater Drive
Elmwood Park, NJ 07407
Tel: 201-794-3900
Brands: R-XD

Loran Cassettes & Audio Products
2715 Pennsylvania Ave W.
Warren, PA 16365
Tel: 800-633-0455/814-726-4010
Brands: Pro DAT

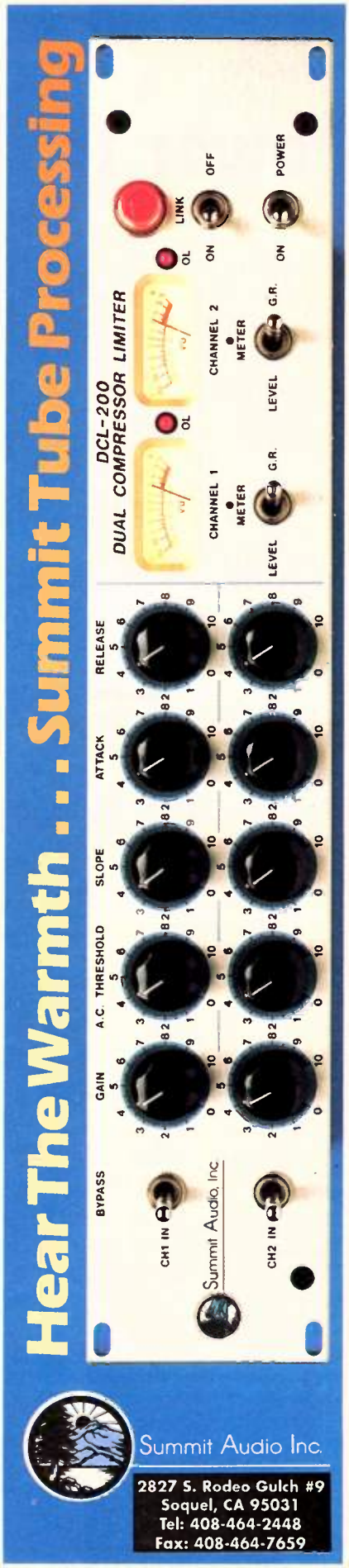
Maxell Corporation of America
22-08 Route 208
Fair Lawn, NJ 07410
Tel: 800- 533-2836
Brands: DM Professional DAT

Panasonic
One Panasonic Way
Secaucus, NJ 07094
Tel: 201-348-7000
Brands: Panasonic

Sony Electronics
3 Paragon Drive
Montvale, NJ 07645
Tel: 201- 930-1000
Brands: DT-RN

TDK Electronics Corp.
12 Harbor Park Drive
Port Washington, NY 11050
Tel: 516-625-0100
Brands: DA-R DAT

3M
3M Center, Building 223-5N-01
St. Paul, MN 55144
Tel: 612-736-5019
Brands: Pro DAT



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Power To The Studios

How to make sure you're getting the most — and best — juice that you can

BY MARTIN POLON

A story illustrates the perils of studio construction without adequate AC power support for the studio: The project studio had been under construction for over six months. The owners had poured every penny they had saved plus countless hundreds of hours into the building of their facility. Nothing was left to chance. There would be no neighbor problems. The acoustical treatment of the former chicken farm was superb. There was no sound leakage to the street, as they were in a mostly residential neighborhood. Each piece of equipment was fired up separately as it was installed. The first time all of the equipment in the studio was turned on together, everything worked fine.

The first session, however, was less than successful. With everything running, there was not enough peak AC current for the power amplifiers to provide the kind of monitoring punch that was desired. There was an intermittent buzz sound somewhere in the recording chain, and there was induced noise in the mixing chain.

The problem was that the existing AC wiring was not heavy enough. Neither was the utility company pole transformer. There was a conductor on the high-voltage lead feeding the pole transformer that had lost it's insulation and was rubbing against the porcelain insulator. The overall waveform of the AC feeding the circuit was variable and produced numerous power spikes, as well as low-voltage situations.

The amount of money that is spent on even the smallest personal studio is a substantial amount, yet the care given to treating the AC supply for that studio is almost always somewhere between 0 and 10 to the –3. Even larger project studios and mainstream facilities make the mistake of dealing with every possible variable in recorded sound quality but ignoring their AC power supply. And make no mistake about it, treating the AC supply as an element with the same importance as, for example, studio acoustical treatment, can make a big difference in both reliability and perceived sound quality.

The following steps are necessary to assure any studio of a reliable AC power supply that will not degrade recorded audio.

1. Power Service: Every studio installation of any size should be wired to its own electrical service, with a circuit breaker panel unique to the studio. Sharing AC with any other category of usage is a recording accident waiting to happen.

2. Power Source: The complete cooperation of your local power utility is an absolute necessity. The power company can provide new and more efficient pole or distribution transformers and larger wiring to the studio's drop. A good rule of thumb for studio planning is to specify AC power service equal to twice the estimated load. That allows for peak usage, future expansion, and unplanned power drains.

The downside of all of this is that, if a studio operates in contravention of local zoning, as some do, it is not as easy to enlist the help of the utility for fear of drawing the attention of municipal or county inspectors. [*It's a fact, though, that each and every* EQ *reader scrupulously adheres to all local zoning requirements. —HGL*]

3. Supply Testing and Filtering: The ultimate test of the completed AC supply, as provided by the utility, is the use of a dedicated AC analysis unit with a liquid crystal display (LCD). Such a unit will indicate the true condition of the power feed and reveal the presence of load variations, noise, spikes, etc. If there are significant needs present, the power utility can be asked to apply capacitors and inductors to the studio's incoming service to smooth the feed.

4. Isolation and Constant Voltage Transformers: One of the best ways to clean up the AC is to use a high-wattage transformer that will isolate and regulate the secondary output of such a transformer. AC power-line noise is eliminated by the complete isolation between the primary and secondary windings. Voltage regulation is provided by the use of an autoformer winding that swings to maintain a constant voltage. These devices are not cheap, and one could be required for each studio or area of functionality — but they are worth every penny spent.

5. Line Treatment: This offers a different way to produce the same kind of isolated and regulated output, as above. The difference is that regulation, noise reduction, and spike protection are all performed in the electronic domain via complex circuitry.

6. AC Grounding: The process of installing the incoming AC service and the wiring of each working space requiring AC must include proper grounding of each outlet box as well as the incoming service.

7. Wiring Correctness and Size: The AC wiring within the studio should conform exactly to national electrical code and the wiring size should be one size larger than that required by code for the specified load.

It is difficult to convey how important correct and adequate AC supply is. Think of it as the foundation of a successful studio.

Martin Polon is the principal of Boston-based Polon Research International (PRI). PRI forecasts the electronic entertainment industry for the financial community.

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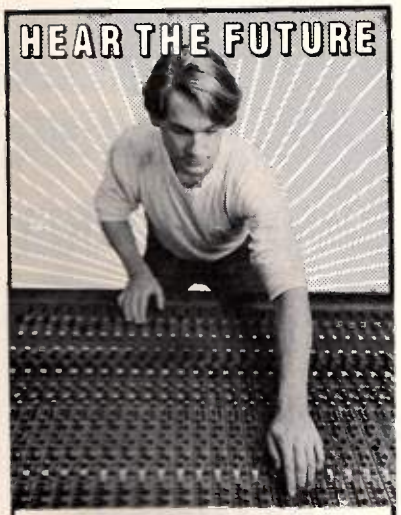

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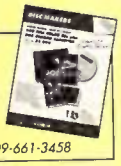

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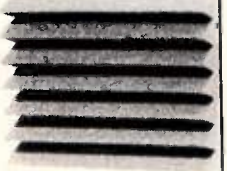

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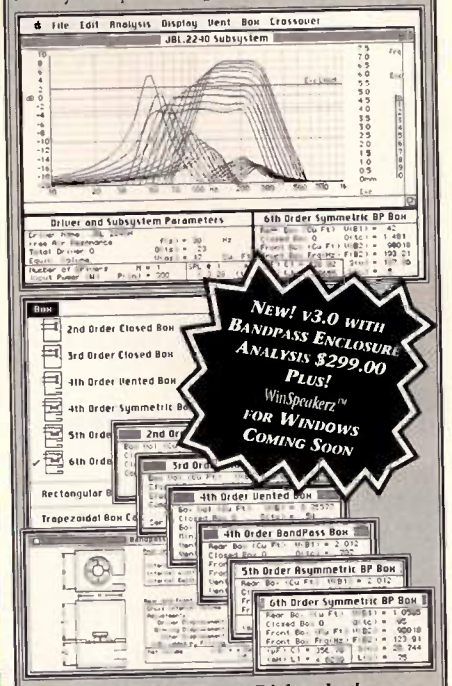

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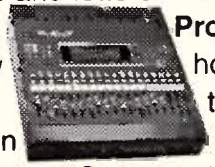

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ACROSS THE BOARD

continued from page 138

Well, I guess you can already tell that I lean toward the Sony/Philips version for a few reasons. (Mind you, it is really hard for me to turn my back on the version with more storage. "More" was my first utterance as a child.) The label problem I think is going to be a big one. No more picture CDs with the Toshiba version. Random access will be faster on the two-layer Sony version than with the two-sided Toshiba version. This will become more important in the CD-ROM versions of the new media. The Sony version will take less modification of machinery at the CD plants. I already have a sample of a Sony HDCD that was pressed by ODME (Optical Disc Manufacturing Equipment) in Europe. I just can't play it on anything yet.

A D8 WITH SONY

At the AES show in San Francisco last November, Sony showed the PCM-800, which was their entry into the digital 8-track market. The unit is compatible and very similar to the TASCAM DA-88. I got one of the new Sony PCM-800 decks about the middle of March and have been very impressed with the performance. When you look at the rear of the Sony PCM-800, the first thing you notice is XLR connectors for audio interface. The TASCAM requires a cable harness that connects to a pair of DB-25 connectors for +4 dB balanced audio. The TASCAM's digital out is a proprietary TDIF interface. A separate box that converts TDIF to AES is required to get digital audio in and out of the TASCAM. The Sony digital I/O is the standard AES format, although you do need to use a cable similar to TASCAM's audio harness to get the digital signals to XLRs. The Sony is a nice, rugged machine and should find itself in lots of postproduction houses for their 8-track digital audio needs. The only way they are going to get this one back from me is to pry it from my cold, dead fingers.

MAY THE FORCE BE WITH YOU

Lots of force. Archimedes said that if you gave him a lever long enough and a place to stand, he could move the Earth. Somebody else said, "Give him enough rope and he will hang himself." My wife said, "If I can't fix it with a screwdriver, I use a hammer." I once said, "There is no mouth so big or so small that your foot won't fit in it up to your ankle." When Donald Fagen said, "Can we use the guitar solo from Cleveland and put it in the rest of the tune from Houston?" I made the fatal mistake of saying, "Sure, no problem." He didn't care that the tempos were a little different and the tuning was not quite the same on both nights. He didn't care that I was living in the cardboard box that came with my new DAW (Digital Audio Workstation) because after I bought it I didn't have the rent money. He just delegated the job of wedging the pieces together to yours truly. "Just use that new DAW thing. It shouldn't take you more than five, ten minutes, tops." It is just exactly like the time your little brother dumped two different jigsaw puzzles into the same box.

I am in the middle of jigsaw puzzle *hell*! I am convinced that the only way a DAW will make things easier is if it falls on you, crushes your skull, and your family lives happily ever after on your life insurance. I am in therapy right now, and I may be able to talk more about it by next month. Right now I don't know whether to start typing my reviews or a suicide note. Check next month to see how it went. EQ

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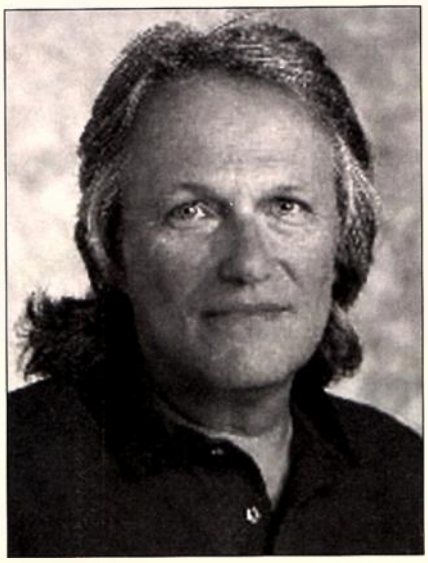

. . . So just send it all to me

BY ROGER NICHOLS

I have spent the last few months trying to go through my basement and garage trying to create space. Space, as everyone knows, is a three dimensional area with nothing in it. I guess I read the wrong dictionary, because I thought space was there to fill up with your "stuff." If there is an empty space in your rack, you get something to put in that space. If you need to add another item and there is no room, then you buy another empty rack to create more space that you can fill with more stuff. An empty space on your desk means that you are not doing enough work, because if you were, the space would have something in it. A garage is not for parking a car. Cars are just used as a measuring device to tell people how big the space should be to fill with "stuff." In California, houses are built with three car garages so that you can at least use one car as a place holder to remind you where next year's "stuff" will end up.

OK, so I have ended up with a lot of "stuff" over the years. Some of it I think I can now part with, such as the second gas tank for my 1970 Lotus Europa. Dual gas tanks were hard to come by, and I thought that I should keep it in case I ever got another 1970 Lotus Europa. It has been 25 years. I guess I'm not going to get another one. How about some old S-100 computers with 4 MHz Z-80 processors, 56 kilobytes of memory, 315 k floppy drives, and 5 MB hard disk? I have three of them. They were $8500 in 1978, but now they are worth nothing. Time to go in the trash. How about a Compupro S-100 system with 8 MHz 80286, 8-inch floppies, and an 8-inch 30 MB hard disk that set me back about $20,000. I just finished paying it off, and I can't even give them away for the power supplies.

How about old CO2 lasers, extra hard disk drives, an old laptop computer from Data General, a Synclavier graphics terminal, old printers, old multipen plotters, an old B&M blower for a Chevy (maybe I'll hang on to that just a little longer), PROM burners, Sony F-1's, PCM 701, PCM 601, Betamax decks, old VHS decks, old bicycles, a Furman spring reverb, parts for cameras I haven't owned for ten years, SCUBA gear from 1968, an old set of JBL studio speakers the size of refrigerators that I haven't heard since 1974 (but I did have the woofers reconed about five years ago), and an old Pulsar digital watch from 1970 that would last almost a month before you had to change batteries. Get the picture?

CD UPDATE

Now it is your turn. Soon you are going to be storing all of your old CD players in that empty space. We are finally going to get 20-bit, 96 kHz CDs that have so much room on them that a box set of *Everything Ever Recorded by Mankind* (by K-Tel, of course) will fit on a single CD (almost).

There are two different High Density CD (HDCD) formats waiting in the wings. The first one is from our old friends at Philips and Sony. The Philips/Sony CD will hold 3.7 GB of information on the single-layer version, and 7.4 GB on the two-layer CD. That turns out to be 11 times more music on the than will fit on a current CD. The extra storage comes from the use of smaller pits spaced closer together. (See, there was some space, and they couldn't leave it alone. They had to cram more "stuff" in there.) These smaller pits are read with a shorter wavelength laser. The Sony/Philips CD uses a technique of layering the tracks on the same side of the CD (with help from 3M). The laser is refocused to read the second layer of pits and spaces for the additional data. Since everything is done from the same side, there is still a place to print a label. The CDs will basically look the same and they can be manufactured in the same plants that make the current CDs, making the new product no more expensive to make than the current CDs.

The second entry into the HDCD race is from Toshiba and Time Warner and claims storage of up to 10 GB for the two sided disc. The Toshiba disc would be manufactured slightly thinner than a conventional CD so that two of them could be glued back to back like a laser videodisc. The two-sided disc would, of course, have no place for a label. If you think you have trouble keeping track of your CDs now, wait until after a party and you find 20 or 30 of these things scattered around the living room without their jewel boxes. The players for the Toshiba HDCD would be more expensive also, because there would have to be two lasers (one for the top and one for the bottom) and the transport would have to reverse directions to play the other side. No real speed advantage over having two CDs in a CD changer.

continued on page 136

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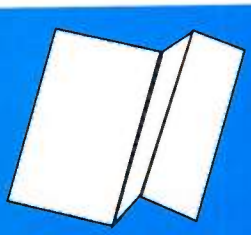

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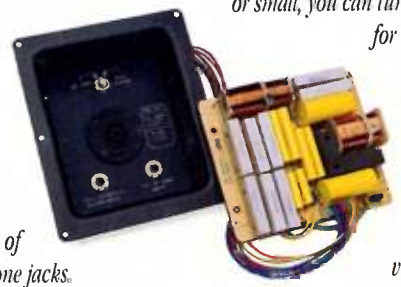

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